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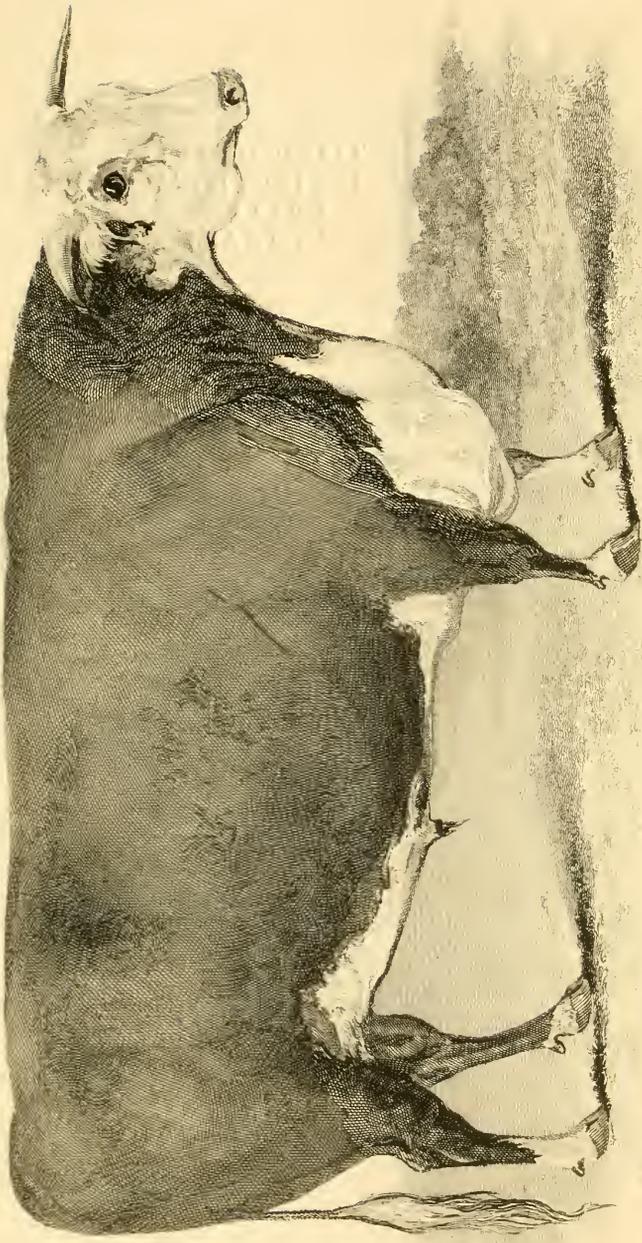












# THE FARMER'S MAGAZINE.

VOLUME THE NINTH.

(SECOND SERIES.)

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JANUARY TO JUNE, MDCCCXLIV.

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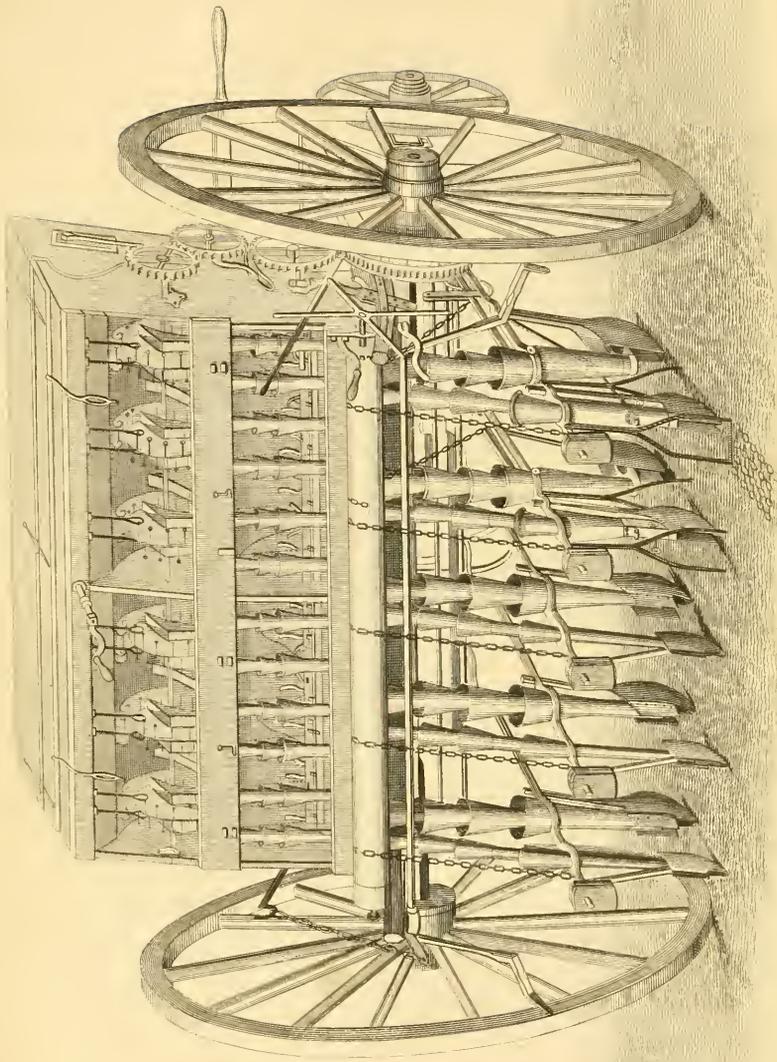
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# THE FARMER'S MAGAZINE.

JANUARY, 1844.

No. 1.—VOL. IX.]

[SECOND SERIES.

## PLATE I.

A Hereford Bull, bred by John Price, Esq., of Poole House, Upton-upon-Severn, Worcestershire, for which a Prize of £20 was awarded at the Meeting of the Royal Agricultural Society at Bristol, July, 1842.

## PLATE II.

### GARRETT'S DRILL FOR GENERAL PURPOSES.

The manufacturers of this implement, whose study it has been to render it as perfect and as useful as possible, have lately made several important improvements, which more especially refer to its manuring and seed-sowing purposes, and they now confidently present it as an implement combining the utmost economy with complete efficiency. The general utility of this implement is to perform, in one process, manuring, corn and grass-seeding, which is accomplished in the following manner:—Corn and manure may be deposited together down the same conductors, or through separate coulters, rakes being provided to cover the manure with mould, upon which the seed is deposited. The seed engine accompanying this drill is adapted to sow at the same time with spring corn and manure, or may be used as a separate implement for grass seeds broadcast, or turnips and mangold wurtzel in rows, either with or without manure.

The patentees would call the particular attention of agriculturists to the following important additions in the construction of their improved drill, viz., a double action stirrer is introduced into the manure department, having a perpendicular and also a revolving movement, by means of which the manure (which, in the drills hitherto in use, has frequently clogged and hung back in the manure-box, so much so as to require the attendance of a man to prevent it) is, in this, constantly disturbed and pressed forward into the departments for the depositing barrel, and causing an equal distribution, in exact quantities, of the most difficult, coarse, or badly prepared manures.

In the working of the seed-sowing engine as before constructed, the difficulty which has hitherto presented itself of mixing together the heavier with the lighter seeds, the heavier have by the motion of the engine been shaken to the bottom of the box, being

thereby sown in very unequal proportions. To remedy this, the small heavy seeds, such as clover, trefoil, &c., are delivered from cups, while the lighter grass seeds, such as rye-grass, &c., are by the same operation brushed out of a separate apartment of the box, down the same conductors with the other seed. This easy and simple method, whereby the required quantities of each seed are nicely mixed, and evenly sown all over the land, deserves particular attention, and is regulated by merely turning the screw at the end of the box for rye grass, and changing wheels on the cup barrel for clover, &c.

To accommodate the drill to suit any kinds of land, however hilly, an improved and simple apparatus is provided; so that, though the deposit of the seed in going up or down hill be ever so irregular (which is always the case to some extent), the man in attendance, without stopping the drill or altering the course of the horses, is enabled, by merely pressing down one handle and raising another, to alter the gear of the wheels, and put on a slower or faster speed as may be required. This is effected by a wheel on each end of the delivering barrel, one of larger dimensions than the other; so that, if the drill is getting on a certain quantity when going up hill, by altering the gear when going down, the quantity deposited is rendered precisely the same; whereas, if the barrel always worked from one-sized wheel, whether going up or down hill, the quantities of seed delivered would be found very irregular: this is of infinite importance to hilly land farmers, and should claim their particular attention.

The manufacturers of this drill having lately taken out a patent for a "horse-hoe," would venture a few remarks on these two implements, which are so closely connected as to render the effectiveness of one dependent on the efficiency of the other.

It must be well known that the rows, to be properly horse-hoed, should be as nearly parallel as possible; and not only this, but that they should be the same distance apart, one from the other: and to effect this, the coulter should be set only a little out of the straight line, to prevent the alterations or movements of the horse affecting the position of the rows; but, as it is found indispensable to set the coulters one before the other, or fore and aft alternately, in order to allow large clods and stones to pass between them, it should be borne in mind that the carrying out this plan, to any great extent, is extremely detrimental to the working of the hoc, inasmuch as the further the hind drill-coulter is from the fore one, the more irregular will the rows be deposited. This is found principally the case on side-hills, when the horse, not working parallel with the drill wheels, causes the coulter furthest off the centre of the lever-joint to form a greater curve than the nearer one, thereby rendering two rows close together, and two at a greater distance, all the drill through. One would naturally think, that the farther one coulter was behind the other, the better it would be for the working of the drill; but this only tends to prove how cautious we should be at catching at alterations which appear to be improvements, but, upon trial, are found both injurious and deficient, and a source of disappointment to the purchaser.

In addition to the above improvements, the machinery for dropping manure and seed at intervals, for the turnip root crop, may also be added to this, making it perfectly complete for every purpose.

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## ON THE RESOURCES WHICH FARMERS POSSESS FOR MEETING THE REDUCED PRICES OF THEIR PRODUCE.

BY HEWITT DAVIS,

FARMER AND LAND-AGENT, SPRING PARK,  
NEAR CROYDON.

[Communicated by C. W. Johnson, Esq., F.R.S.]

"I would have farmers look to the means which modern science affords them for lessening their expenses and increasing their returns."

In entering upon a theme so important, in a national point of view, as that of the present work, I throw aside all political observations; I profess to bring only practical remedies as palliatives for violent transitions in prices. I have no theoretical projects to offer for the removal of acknowledged disarrangements.

The sudden alteration, which has been made in the corn laws, and the introduction at a low duty of foreign produce, may well create alarm in the minds of all who have capital engaged in the ownership or occupation of land. For by these means, and in a few months, the value of all that land produces has been reduced at least a fifth; and there is still the prospect of a greater reduction. The farmers have not only lost a fifth of their capital, but they are continuing to cultivate their farms at the expenses which high prices have created, and to realize upon their produce at the low prices which these alterations have produced; and with the pro-

ability that, before long, much of the remaining protection will be taken away, and they will have to contend in the home markets—in the sale of their corn and cattle—with the produce of countries where taxes and parish-rates are comparatively unknown, and labour is obtained at half the cost of that paid by the English farmers.

This being their situation, the question of what can be done to meet these changes most forcibly speaks to both farmers and their landlords. And it is with a view to aid them in this inquiry, that I intend to recall to their notice many of the improvements in the practice of farming which have of late years been effected, and are still in progress for the saving of expense and for the increase of fertility of the soil, thereby hoping to excite attention to those points by which greater economy and larger returns may be gained; for only by these means can they now expect to carry on the successful cultivation of their farms.

The farmers produce nearly all they take to market by an expenditure in rent, rates, tithe, and principally in wages; and from a surplus in their sales over their expenses, they depend for the profit which their skill, labour, and capital, entitle them to realize. It is, therefore, evident that the value of all they produce, having been reduced below their cost, they can in future expect to obtain the same surplus only by lessening their expenditure, or by increasing the quantity of their returns without equally increasing their outlay.

The economy which has always been practised by farmers with their servants, leaves no room to expect any reduction in their labour; and their expenditure in rent, tithe, and rates, I consider beyond their control.\*

But much has already been done to lessen the cost of production, first by the better implements and machinery, which of late years have greatly reduced the cattle labour of the farm, and produced other savings of considerable importance. By noticing these more particularly, I hope to create better estimation of the resources thus still open to the cultivator; and, I next intend to show, that by modern improvements of the soil and the introduction of artificial manures, and by the rearing and fattening of live stock, as well as by more scientific cultivation and cropping, the produce of land has been greatly increased; for farmers have this advantage over manufacturers, although both alike

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\* I do not include the rates, tithe, or rent, as within the scope of reduction; for the two former charges neither landlord nor tenant can lessen, and in the latter I see little or no ground. I think the outcry against high rents is made without consideration—either as to the fair allowance or value that should be paid for land, and still less of how small is the share which rent forms in the cost of raising produce. The rent which the arable land of all England now pays, averages probably less than 25s. an acre; and at this price is included the farmer's dwelling, stables, barns, cattle-sheds, fences, and other creations necessary for its cultivation. And to estimate the net rent that land bears, the interest on the cost of all these, with an allowance for their maintenance, must be deducted from the payment. And then, let me ask, how much of what remains can fairly be taken away, so as to usefully reduce the cost per quarter of the growth of corn? Were the landlords to give up one-half, the saving would amount to less than 2s. per qr. on the cost of growing corn.

principally depend on the employment of labourers for their returns. That whilst the latter only by lessening their expenditure can be enabled to sell at reduced prices; so the former, by increasing the quantity of their returns may diminish the cost of their produce. And I am particularly desirous of attracting attention to this fact, as here there is room for improvement, productive of profit to the cultivator and of advantage to the country, and to an extent which increase of knowledge only makes more difficult to estimate.

In order to encourage farmers by these modes to seek to meet the times, I will begin by reminding them, from the results which have taken place, how much the improvements on which their present practice is based must have done for them of late years to lessen the cost of all they raise; for until within the last two centuries, the practice of agriculture may be said to have made little progress in England; and, as compared with that of the present day, was barbarous in the extreme. Within this period, we are indebted for the field cultivation of turnips, mangold-wurzel, clover, the artificial grasses, potatoes, and the better varieties of corn. No proper rotation of cropping was formerly understood; and only the richest soils were cultivated. Corn crop followed corn crop, until complete exhaustion threw for a period the land out of production; and only by one or two or more years' fallow was any renovation attempted. At the same time, fewer animals were kept, and for winter food the bulk of the population depended on salted provisions.

Whereas, now there is abundant proof, that by the better rotation of cropping, growth of root crops and artificial grasses, cleaner farming, and by the manure from the winter feeding of stock, introduced in the last two centuries, the average yield of the corn per acre is increased 50 per cent.; at the same time, the amount of cattle raised kept on the farms is proportionably larger. And, moreover, a poorer class of soils, formerly of no value, have been brought into profitable cultivation, and made to yield returns superior to what were produced from the richest lands.

It is also a fact, clearly proved by the market returns, that not only have the number of animals thus increased, but that the oxen and sheep with which Smithfield is now supplied, average nearly double the weight per animal of those brought there a century back, and that by their quicker maturity, they are sent to market at a much earlier age; at the same time the census returns of Britain have shown to us that during the last century the population has more than doubled, and, consequently, a proportionate increase of all food has become necessary, and been supplied: and in estimating the increased consumption by the numerical increase in the population, we are far from duly appreciating the advance which has taken place in the agriculture of this country; for whilst famine may be said to have formerly periodically visited us, it has of late years been comparatively unknown, and at the same time there has progressed a general change of consumption by the labourer from the poorer to the better class of provisions.

Again, it is scarcely more than a quarter of a century that a protecting duty to maintain the corn averages 30 per cent. above what have been the prices of the last 14 years, was in Parliament admitted to be necessary; and at that time a decline to the prices of late years would have been pre-

dicted as certain ruin to the landed interest, and abandonment to waste of the arable land of Britain, and yet the last seven years so far from proving ruinous have shown the farmers prosperous, and the value of land steadily increasing. These are results which the better knowledge of this improving age have already produced; and yet, great as they have proved, the improvements by which they have been effected are only partially introduced, and the generality of farmers are still comparatively but little acquainted with the economy which improved machinery, better implements, finer stock, and proper homesteads and yards produce, or with the increase of fertility open to them by subsoil and trench ploughing, mixture of soils, perfect drainage, and the application of artificial manures; and it is to awaken greater attention in these matters that I am about to allude to them more in detail.

Among the machines and implements used by farmers, first in importance comes the plough; perhaps no improvement has been effected of more consequence to them than that which has been with rapid progress of late years made in this implement. Strange to say, thousands of years rolled on, and no important change in construction was made; the plough only three centuries back was little more than a rude wooden scratcher of the earth, built by the ploughman, and of shape and make so imperfect that the agriculturist of the present day is at a loss to understand how a furrow of sufficient depth was formed, or the soil sufficiently broken up to admit of due preparation for the sowing of any seed.\* And it is to the saving of horse labour and the better tillage which the iron ploughs of the present day have effected, that in my opinion farmers are largely indebted for the ability they have shown to raise corn so much cheaper than formerly. Still the difference of draft between many of the ploughs in common use and the most improved, is such as is highly necessary should be better understood; there are 60 or 70 varieties of form and construction in use, whilst the difference of soil makes but four or five necessary, and the experiments of Mr. Pusey, so ably and clearly detailed in part 3, vol. 1, of the *Journal of the Royal Agricultural Society*, prove that a difference of 5 to 50 per cent. exists in the draught of ploughs of different make, but used for the same purpose and on a similar soil. This comparison of the forces necessary to draw the plough, at once shows that the farmer using the lightest, tills his land with a saving of one-third labour over the employer of the heaviest of the ploughs.

The next machine or implement in importance is the waggon or cart, and which also requires the

\* Such may be said to be the plough of the present day, in general use in Asia and Africa, and nearly all over the world, parts of Europe and America only excepted. "It is not necessary," says an excellent author on agricultural mechanics, "to do more than slightly advert to the various notices which are to be found in the early histories and pictures of this invaluable implement; for, in fact, for ages the plough was little more than a rude clumsy instrument, which served only to tear up the surface of the land sufficiently deep for the seeds to be buried. It was not brought to any thing like a perfect tool for the purposes required till the close of the seventeenth century."—*J. A. Ransome on the Implements of Agriculture*, p. 13.

consideration of the farmer. I am not going into the question so often argued as to which is best—the waggon or one-horse cart; I confess, in spite of all I have seen or read, I adhere for marketing and harvesting to the waggon—but of the economy of well-made waggons or carts there should not be a question. The treatise on draught at the end of the volume “On the Horse,” published by the Society for the Diffusion of useful Knowledge, at once made clear to me the folly of broad cone-wheels and large axles; and the error of harnessing the fore horses to the ends of the shafts, that is to say, I saw that much more power than should be necessary was the consequence of my having the wheels of my waggons and carts made unnecessarily wide and dished, and turning on large wooden arms; and I therefore had the wooden arm changed for steel, and the wheels made nearly upright, and the old piece-tire changed for the hoop, and their breadth lessened to four inches; and by means of a chain from the traces direct to the body of the waggon, I relieved the shaft-horse from the pressure on his back, which was the consequence previously of letting the fore-horses draw from the end of the shafts. By these alterations the draft has been much lightened, and I shall best prove the advantage therefrom by relating what occurred to me only last month.

Prior to the alterations I occasionally had to fetch oats for my consumption from London, having in those times to keep more horses, whilst my growth of oats was much smaller, and I purchased 20 qrs. at a time, and for this quantity a waggon with four horses was always sent, but not without a complaint from the carter, who used to consider the load as too heavy. The low price of oats this autumn induced me to purchase a two-horse carriage for general feeding, and not knowing how many two horses would now bring, I got an order for what my carter should find he could take, and much to my surprise he brought me home twenty quarters, weighing 38½ lbs. per bushel, thus showing to me that I had effected a saving of one-half in draft.\*

I particularly wish to draw attention to the next implements which I am about to notice—for their use is not general, and their value is far too little known—viz., the grubber, horse-hoe, scarifier, skin, and Finlayson's harrow; these are of modern invention, and used for the quicker and cheaper tillage and better clearing of the ground of weeds; with four horses eight acres may be gone over in a day, by their means the time and labour necessary in following for cleaning and making a turnip season is reduced; at the same time they are far more effectual in pulverizing the land, and bringing to the surface couch, docks, thistles, and all root-weeds, than is possible with the plough and common harrow jointly, and by their use the farmer of clay land may get in his spring corn in January, February, and March, on the fine till produced by frost on a winter ploughing, and without any horse stepping out of the furrows.† An advantage that has but to

\* On one occasion, owing to an accident to one of the horses, I had upwards of four and a half tons, net weight, of bark drawn to London by three horses, the distance being thirteen miles.

† The saving of labour which they effect, and the assistance they give for cleaning all soils, and the earlier, cheaper, and better tillage of stiff soils, have led to the invention of five or six varieties of these implements; a pretty good proof of the value which is attached to them; but still, whilst their use in some

be once experienced to be for ever highly appreciated; and the Essex, Hertfordshire, and Suffolk farmers on their clay soils are sowing barley in January and February, whilst the southern and western counties on their light soils, are leaving theirs to April and May. They are still unacquainted with the better quality and larger yield to be obtained by early sowing.

Drills come next, of the modern invented implements for my notice. By means of machine sowing the saving of seed effected is an important economy very deserving of consideration, and, as I have shown in my work on “The Injury and Waste of Corn from too thickly Sowing,” is as yet far from being sufficiently attended to.\* Also by using the drill the sowing of the seed is more even and altogether better effected, and the horse and hand-hoe are made available; the use of these remove farther off, if not entirely do away with the necessity for following, and the growing crop is largely benefited by the destruction of the weeds and by the moving of the soil in the rows. An experiment detailed by Sir John Sinclair, in his “Code of Agriculture,” proves that the part of a crop of wheat so cleaned was increased seven-bushels per acre simply by the hoe. In a word, the introduction of the drill has been considered by the most distinguished agriculturists as the most important of all modern improvements. By means of the manure-drill and dry-powdered manures, hill districts, and poor soils have been made profitable to a great extent; and many situations are thus cultivated which were previously inaccessible to the dung-cart, or were unprovided with yard-manure. A provision of winter food is grown, thus enabling the cultivators of such situations to largely increase their live stock, as well as their returns of corn. It is impossible to foresee the extent to which the fertility of this country may hereafter be brought, by a better appreciation of those home manures, which we (at present far behind the practice of the Chinese, or our continental neighbours), allow to be wasted; or worse, to escape into the rivers to their pollution and the contamination of the surrounding air; and perhaps no fact connected with the improvement of agriculture is more startling than that, at the present day, when the value of artificial manures is so much appreciated that the dung of wild fowl is being fetched 5,000 miles, and sold at 14s. and 15s. per ton, the drainage of all our large towns should be entirely lost.

By a careful calculation of the flow into the Thames, from the principal sewers of London, it has been shown that more than a million of tons of the most powerful manure, are thus wasted annually; whilst by a simple contrivance, partly copied

districts is general and much valued, there are many parts of England where these implements are unknown.

\* In this work I have shown that the yearly saving would amount to more than what has been the annual average of the importations of the last fourteen years, and that the farmers, by the mere saving of seed, would be benefited one-half of their rent; and yet this is a minor consideration to the injury the crop sustains from too much seed; for, if two plants be produced (and I show that at least three for one at harvest are produced) where one only can exist, the struggle that ensues in spring and summer must be fatal to one, and so injurious to the other, as to produce only a stunted ear in place of a full bold one.

from the process on the continent, I showed some years back, in my efforts as managing director of the Thames Improvement Company, that the whole of this, at a trifling charge, might be intercepted, and without any annoyance; and, to the great improvement of the river and advantage to the atmosphere, rendered profitably available for agricultural purposes, to the increase of our supply of corn and to the diminution of the expense of growing it.\*

(To be continued.)

\* "By carefully conducted experiments, and very accurate gauging," observes Cuthbert Johnson, in his valuable work on the "Fertilizers," p. 223, "it has been ascertained that the principal London sewers convey *daily* into the Thames 115,608 tons of mixed drainage, consisting on an average composition of one part of solid or mechanically suspended matters, and twenty-five parts absolutely fluid. But if we only allow one part in thirty of this immense mass to be composed of solid substances, then we have the large quantity of more than 3,800 tons of solid manure daily wasted in the river, from London alone! What might not the farmers of England effect if this mass of fertilizing matter was preserved at a reasonable rate for their use? Fifteen tons of this solid manure—nay, ten tons, would render in some degree fertile an acre of the poorest cultivated, or even common or heath land. But allow, for the sake of accuracy, that twenty tons were required, even then 3,800 tons ÷ 20 give a *daily* allowance of manure sufficient for 190 acres of land; and if we give 300 days on which this manure was collected, that would afford an annual supply for 57,000 acres! Can I put this in a stronger light? Is it not lamentable that the fertilizing matter for such a breadth of land should be annually lost to the country? And in this calculation I allow nothing for the absolutely *fluid* portion of the drainage—I am now speaking of its mechanically diffused matters; added to which the farmer will readily allow that when once these 57,000 acres are fertilized and rendered productive, that some time elapses before even the most naturally barren soils require again replenishing with any other manure than that which their own crops supply, by the assistance of the live stock of the farm; so that, in fact, in each and every year 57,000 acres of land might be recovered from the waste and brought into cultivation by the solid manure of the London drainage alone." Having alluded to a company which is no longer in existence, I may be excused if I add, that no object could have been more patriotic and deserving the confidence of Englishmen than that entertained by the Thames Improvement Company of 1838; and yet, alas! from the petty jealousies of one party in office, and the fear of interference by another, this grand national undertaking was lost; and the inhabitants of London still use the water of the Thames, and with it all the outpourings of the metropolitan sewers, and the manures from the consumption of the richest produce of the globe are carried into the sea.

**BROMYARD.—AGRICULTURAL SOCIETY.**—On Monday week a public meeting of landed proprietors and occupiers was held at the Falcon Hotel, for the purpose of establishing an Agricultural Society for that immediate district. John Barneby, Esq., M.P., having been requested to take the chair, resolutions were passed, and a committee appointed to prepare rules and adopt such measures as may give effect to future proceedings.

## ON CORN-RENTS AND LEASES.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—I submit to you the following observations on corn-rents and leases, which are at your service if you think them worth a place in your publication.

The rent of land was, in the earlier periods of its being let to tenants, paid in kind. The precious metals were then scarce, and paper-money never thought of. That portion of the rent due to the church is yet paid in kind, where the Tithe Commutation Act has not been put in force. Why the rent due to the church should continue to be paid in kind, so long after the rent due to the owner of the soil had been converted into a money payment, has always appeared very surprising to me. The Tithe Act has converted the tithe into a money payment on the principle of a corn-rent. This principle has been acted upon in some parts of Britain in fixing the rent to the landowners, and has been found to work better than a certain fixed sum; but still, by experience, this mode of paying the landowner for the use of his land is found to have a few evils in it, and which are against the interest of the tenant.

When rent was paid in kind, a certain portion of the produce of a farm was claimed by the owner. This, to an improving tenant, was very unjust, as the owner of the soil took his portion of the increase of the produce, without being at any portion of the extra expense of raising it. This was one of the principal evils of taking tithe in kind.

Long leases, say from 14 to 21 years, are absolutely necessary to insure good cultivation, except landowners will improve their estates at their own expense.

A certain fixed sum as rent, for a lease of even 14 years, is often found to be very unfair for one of the contracting parties. If the price of produce *rises*, then the landowner gets *less than his due*; if it *falls*, he gets *more than his due*: and very often the tenant is ruined and the farm much deteriorated. Therefore to find a mode of fixing a rent for a lease of 21 years, so as to do justice to both landlord and tenant, is the great desideratum.

A corn-rent, on the principle of taking the average price of corn every year in fixing the rent of that year, though safer than a fixed sum, is against the tenant in bad seasons; as he has a higher rent to pay, and makes less of his produce, except his farm be very favourably situated in point of soil and climate.

A corn-rent, on the principle of the Tithe Commutation Act, is open to the same objection, although the extremes will not be so great, on account of taking the average prices for the seven preceding years in fixing the rent for the year. I consider this the best principle of the two, although by it sometimes the rent will be more than in the preceding year, and the price of corn less, as was the case with the tithe rent-charge the two last years; but then in other cases it will be the reverse, as the tithe rent was in 1838, 1839, and 1840.

To remedy the evils of a corn-rent by taking the average price of corn for one year or more, some landowners have adopted the principle of having half the rent a fixed sum during the leases and the other half a corn-rent. I call this no re-

medy at all. The evils of both the others are retained in this.

When a land-valuer makes an estimate of what the rent of a farm should be, when that rent is to be a fixed sum for a term of years, he must fix upon some data on which this must be got at. He must take the value of produce at that present time; or take the average of a number of years preceding, or what he may suppose it will average for a number of years to come; or he may strike a sort of average between them all: some data he must have, or his work is of no value. The farmer who intends to offer for it should also make his estimate, to see that the rent asked is a fair one. If he or his friends are not capable of doing this, I should consider him unfit for a farmer; and of course he would be attempting to enter into an engagement, of the nature of which he was ignorant.

In making out the estimate for rent, the following circumstances have to be duly considered:—The thickness of the surface-soil. Its texture; whether clayey, loamy, stony, gravelly, sandy, or peaty. The subsoil; whether clay, marl, rock, gravel, sand, or bog. Wet or dry. Level or hilly. Convenient to farm-building and yard. Within one ring-fence, or not. State of repair of farm-buildings, occupation, roads, fences, and gates. Land much exhausted by previous bad management, or not. Farm-yard of a proper form for retaining the liquid and solid manure in a proper manner. The elevation from the level of the sea. Exposure. Thickly or thinly timbered; particularly in the hedge-rows, if it be a corn farm. Distance from lime, or other foreign manure. Distance from market. Labourers in the district; active, or otherwise, and honest. Tithe rent-charge. Rates and taxes. Game; preserved, or not. Tenure; from year to year, or on lease 7, 14, or 21 years. Price of produce. The real annual value of a farm is affected by every one of the above circumstances.

As I have before explained, and as it has been proved in practice, that a certain fixed sum for a long term is often unfair to one party; a covenant is considered the fairest for both, if made upon proper principles.

I always calculate there to be one bad season in seven. In the last 42 years there have been seven bad ones, which exceeds my calculation. It is often considered, by men of superficial knowledge in the practice of agriculture, that the high prices after a deficient harvest makes up for the shortness of the crop. Upon middling and inferior soils and situations this is not so. Upon good land and warm situations it will be the case. On most soils and situations, the loss from bad seasons will amount to ten per cent. on the rent. This it is only fair to divide between landlord and tenant: of course five per cent. should be deducted from the estimated rent on account of bad seasons; another five per cent. should be deducted for loss in cattle, casualties, and other losses. It is not all fair weather and straight-forward with the farmer; and except he is allowed a fair profit it cannot be expected he will be a good farmer, or make any improvements.

I am afraid that one cause of farmers not making much by their profession is, that, both by land-valuers and themselves, wrong estimates are made, and no deductions allowed for bad seasons and losses. If this is not done, the estimated

rent will not be a fair one, and the farmer's business will not go on well.

Too many land-valuers know little about their business. They have been brought up land-surveyors, and have taken up land-valuing without any experience whatever in the cultivation of land. What would be thought of a man setting up land-surveying and mapping, without having had any practice? In short, he could not do it. Yet, surveying and mapping is far easier and far sooner learned than land-valuing. It is impossible for any one to understand the real value of land, without actual experience in the management and cultivation of it. He ought to have ten years' practice as a rent-paying farmer. Neither should his practice be upon the best soil or in the best climate. He should be made to understand, by experience, the different natures of soils, and how they are acted upon by the various seasons. He would thus be made to feel the difference between a good one and a bad one. I have known many farmers ruined by removing from a good soil or climate to bad ones. A farm containing various qualities of soil, and in a rather inferior climate, is the place to learn the art of cultivating the land, and of course of ascertaining the true value of it.

To insure good cultivation, long leases are necessary; and with long leases, to do justice to both owner and occupier, the principle of a covenant should be adopted. Whoever are unfavourable to this principle, must wish to take some undue advantage, whether he be owner or occupier.

After a fair rent is agreed upon, by taking every circumstance into proper consideration, with the ten per cent. deducted to cover losses from bad seasons, &c., then let the amount vary every year, according to the average price of one or more descriptions of corn or other produce for the three preceding years. I should prefer this to taking the average of the preceding year alone, or the preceding seven years.

Supposing the farm peculiarly adapted for the growth of wheat and beans, and that, with wheat at 7s. per bushel, and beans at 5s., 100l. would be a fair rent, let the tenant pay every year the value of 143 bushels of wheat and 200 bushels of beans, at the average price of the three preceding years. If the farm be a wheat and barley one, let the rent be dependent on the prices of both of these; and so with other grain. If the farm be of such a quality that anything could be grown upon it to advantage, and near favourable markets for all kinds of grain and pulse crops, then the average price of all, for the three preceding years, might be taken in making out the annual payments as rent. For instance, if the rent be made to depend on the average price of wheat, barley, oats, beans, and peas, 20l. in every hundred might be dependent on the average price of each; or 30l. in every hundred be dependent on one particular kind of grain, and only 10l. on another, &c. So that, if the farm be more particularly adapted for one or two kinds of grain than the others, a greater portion of the rent might be made dependent on the average price of those kinds. It is also quite as easy to make a part, or the whole, of the rent to depend on the average prices of beef, mutton, cheese, and butter. If a farm be wholly a grazing one, it will, upon an average of years, produce a certain number of pounds of beef and mutton per acre every year; and of course a certain portion of this will belong

to the owner of the farm as rent. Let him be paid the average price of that portion every year. The same principle may be adopted upon a dairy farm. I see no difficulty whatever in making the rent of a farm to vary every year, according to the average price of its produce, however great the variety of its produce may be. If there should be any injustice done to either owner or occupier, when the rent is made payable on the above principle, it will be when the contracting parties have not understood their business or not been honest, and have ignorantly or wilfully fixed that portion of produce as belonging to the owner at too much or too little. The rent paid may be too high or too low, whatever principle it be arranged by. If it be too high, a man is far better without a lease than with one. Of course, for a lease of 21 years, it is of great consequence that no miscalculation has been made at the first. To insure this, not only real practical men, but honest men, should be engaged.

In the August number of your magazine, there is an excellent letter from Mr. Tower to the Duke of Richmond, on the principle of a lease he made to a tenant of his, in Essex, for 21 years. The principle he adopted was a wrong one, although it was more favourable to the tenant than a fixed sum would have been. From the conduct of Mr. Tower, it is evident he had every desire to do strict justice to the tenant; for when he found, at the end of 13 years, that he had fixed the sum and the pivot too high, he lowered both. Now, upon a true principle of a corn-rent, there requires no pivot. There merely requires a certain portion of the produce to be charged to the farm, as due to the owner, he to be paid the value of that portion every year; this value to be the average price of such produce the preceding year, or the preceding three years, or seven years, as the parties can agree. I prefer three years to any other number.

Mr. Tower and his tenant only took the average price of wheat, as their guide in payment of rent. This would apply to few farms in some counties. But to prove the croneousness of their principle altogether, it is only to be seen that if wheat had averaged only 4s. per quarter, the rent would have been 150*l.*; while, in such a case, upon what I consider the true principle of a corn-rent, it would have been 32*l.* In going through the figures, in your magazine, there appear to be mistakes in the calculations of the rent, if I understand them right, and which are against the landlord in the first part of the term, and the tenant in the latter part.

The farm is stated to be 480 acres, and worth 600*l.*, with wheat at 68s. per quarter; the tenant to be allowed five per cent. for every 4s. when the price was below 64s., and to pay an advance of five per cent. for every 4s. when above 72s. Now, 600*l.* is the value of 176 quarters of wheat, at 68s.; of course, 170 quarters is the corn-rent put upon the farm, according to Mr. Tower's principle. If the soil and the climate are not of the best, I should take ten per cent. off, to stand against bad seasons and other losses, making the corn-rent 153½ quarters of wheat.

Below I have made a comparative statement of the rent actually paid for 21 years, with what the tenant should have paid according to Mr. Tower's principle, as I understand it; and also according to my principle. The result shows the difference between the amount paid, and what would have been paid, in 21 years, by the different principles.

	Average price of Wheat per qr.	Rent paid by Mr. Tower's Tenant.	What should have been paid on Mr. Tower's principle.	True Corn-rent on one year's average price of Wheat.	Same on the average of 3 years on Wheat.
	s. d.	£ s.	£	£	£
1822	44 7	540 0	450	537	449
1823	53 4	540 0	540	427	411
1824	63 11	570 0	600	511	431
1825	63 6	585 0	600	543	495
1826	58 3	570 0	570	469	509
1827	58 6	555 0	570	468	495
1828	60 5	540 0	570	483	473
1829	66 3	585 0	600	530	494
1830	64 3	540 0	600	514	509
1831	66 4	600 3	600	530	525
1832	58 8	555 0	570	469	505
1833	52 11	540 0	510	423	475
1834	46 2	540 0	480	369	421
1835	39 4	400 0	400	265	369
1836	48 6	412 10	450	363	357
1837	55 10	487 10	500	417	383
1838	64 7	500 0	500	517	445
1839	70 3	387 10	562	565	509
1840	66 4	562 10	537	530	537
1841	64 4	537 10	525	515	537
1842	57 3	532 10	500	438	501
Av.	58 5	11280 0	11234	9783	9836
Averages ..	537 3		535	466	468

Average, £69 difference.

A certain great writer, in your magazine, on political economy, of the Simon Grey school, says no rent can be paid with wheat at 47s. per quarter. According to such philosophers, no rent could have been paid in the years 1822, 1834, 1835, and very little in 1836. It never occurs to such men that a certain portion of the produce of a farm belongs to the owner, and, of course, the value of that portion, let it be little or much.

There is little difference between taking the average of one year and three years, but it makes the payments more equal, which I consider to be an advantage to both parties. Now, if the tenant had taken his farm at a fixed rent of 600*l.*, he would have paid 12,000*l.* He paid 11,280*l.* He should have paid, according to my principle, 9,836*l.*, or 1,449*l.* less than he did pay. Now there can be no objection to my principle, except to the ten per cent. allowed for bad seasons and losses; this amounts to 680*l.* 14s., making still a difference of 768*l.* 6s. Except the farm be on a dry soil, ten per cent. is not a penny too much to allow for bad seasons, &c.

With respect to leases, they should be made upon just and liberal principles. There should be no clauses inserted, but what a tenant can and ought to fulfil; no feudal restrictions, such as dog and cock clauses; no boon-work to perform; no cavalry man to be found, and horse to be kept; no particular restrictions as to rotation of crops, &c. The tenant must not be bound with his hands upon his back. The interest of the landowner can be perfectly secured, and a proper cultivation of the land ensured, without these restrictions. Generally, such clauses are drawn up by men who know nothing of agriculture practically.

In improving leases, for a long term, the improvements to be made should be specified in the lease, in a plain, simple manner. When the tenant makes any permanent improvement not specified in the lease, he should be insured by a clause repayment, at the end of the term, of its value at that time.

Game is a sore question. Good cultivation cannot be expected, or a fair value for the land paid, if this be preserved to any great extent. No man can bear, with patience, to see his crops destroyed. It is said, the tenant has a remedy by demanding damages. The remedy, in nineteen cases out of twenty, would be as bad as the disease. Where game is preserved by the clause of a lease, where is the legal remedy then? Did any lease ever specify what quantity should be kept? When the tenure is from year to year, and there is nothing agreed upon with respect to game, the tenant may legally claim damages; but in return he may get a notice to quit, and leave what improvements he has made in the land. Very often game is begun to be preserved after agreements or leases are entered into; and though clauses are, for this purpose, inserted, yet they are not expected to be acted upon by the tenant; who in some instances have been told so by the owner or agent of the property, as an inducement to take the land. I like to see some game upon the land, but not overrun with it, or even to be very numerous. I would not take a farm, upon any conditions, where a great quantity was kept. The quantity of produce consumed by it is not all the evil; sometimes a young and rising crop is destroyed by it.

To do strict justice to a tenant, all rates and taxes should be paid by the owner of the soil. A farm should be let clear to the tenant. He is not the proper person to look after the business of the township, the church, or the county. This is the proper sphere of the owner of the soil. He has a permanent interest in them: the tenant has not. Generally, the owners of property have the management of these matters, and make the tenants pay the cost.

Suppose a tenant has a lease of a farm for 21 years, and before the expiration of it a considerable improvement is made in a road; a church rebuilt or greatly repaired, and perhaps the work done at an extravagant expense. Suppose great sums spent in repairing, rebuilding, or enlarging the county and hundred gaols. Suppose extensive damage done by riots at elections, or from other causes, either political or from the depression of the times. The rural police have been put upon the country without a single farthing being deducted, on that account, from the rent of a single tenant in the nation. This was downright injustice. In some townships the poor-rates have been nearly doubled by them. If the expense of them must have been paid direct from the pockets of the owners of property, they would never have been established. There never was a greater delusion than to suppose, that all these extra pulls for cash, in the shape of poor, church, highway, and county-rates, are paid by the landowners, no matter whether the tenants have leases or not. If, when an agreement was made from year to year, or when a lease was given, the amount of rates to be paid by the tenant was specified, then all would be fair, because whatever was demanded above that sum would have to be paid by the owner.

The Scotch farmer is exempt from any of these charges. He has his rent to pay, and nothing

more; of course, he perfectly understands what he will be called upon to pay every year. We are told to imitate them in our farming; let us imitate them in other matters, and we shall perhaps improve in our cultivation. Let not the means for improvement be taken from us, and then be charged with negligence.

I took a farm in 1813, for 14 years. The rates at that time were 4s. per acre, and had never been more. Before my term was out they amounted to 8s. per acre; and in two years, in a great depression in trade, they amounted to more than 12s. per acre, and the means reduced. Did my landlord pay any portion of this advance of rates? Had I taken my farm upon a corn-rent, and had my rates and tithes paid by my landlord; or, in short, been put upon the same footing as a Scotch farmer, I should have had a considerable sum less to pay than I did pay.

When the tenure of a farm is from year to year only, there should be an agreement between the parties that a fair valuation of the farm should be made at entry upon it; and that if an advance of rent should be demanded, or should the tenant have notice to quit, a valuation should again be made, and the difference paid by the owner, or rather the value of the improvements made; that is, in any case where the tenant had given notice of making the improvements, and had the owner's consent in writing. In cases where the tenant was impoverishing the farm, and had notice to quit on that account, the deterioration would have to be valued, and paid by the tenant to the owner.

But, to insure good cultivation, there is nothing like long leases, if they are made upon proper principles; only care should be taken to engage tenants who understood their business, and had sufficient capital to manage the farm in a proper manner. If the Reform Bill were reformed, and no tenant allowed to vote for a county member of Parliament except he had a real *bona fide* lease, for at least fourteen years, we should soon have more leases granted.

I am, Sir, your's respectfully,

W. ROTHWELL.

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FARMERS' CLUB HOUSE, 39, NEW BRIDGE STREET.—On Monday, December 11, an extraordinary general meeting of the committee and members of the Farmers' Club, established for the use of farmers and others visiting London interested in the cultivation of the soil, and open to agriculturists and scientific men of all countries, was held at the house of the institution, Bridge-street, Blackfriars—William Shaw, Esq., member of the council of the Royal Agricultural Society of England, presiding—when the following resolutions, relative to the internal arrangements of the club, with a view to the advantage of its members and the convenience of those foreigners and agriculturists from the provinces who visit the metropolis, were passed:—“1. That the number of the committee be increased to forty-one. 2. That the entrance fee be continued at one guinea. 3. That members elected in December pay subscription for the following year. 4. That gentlemen proposed as members, having obtained the recommendation of three members of the committee, be admitted to the privileges of the club from the time of their proposal, subject to their being elected at the next monthly meeting. 5. That in rule nine the words, ‘Having previously obtained the consent of the committee,’ shall stand ‘Having previously obtained the consent of two members of the committee.’”

## ESSAY ON THE MANAGEMENT OF FOLD-YARD MANURE.

READ BY MR. WEST, OF COLLINGHAM, AT THE LATE MEETING OF THE MARTON AGRICULTURAL SOCIETY.

Sir Charles Anderson and Gentlemen,—Permit me to make to you a few preliminary remarks by way of introduction to the subject which I shall have the honour to submit to your notice this evening. There is no one question connected with rural economy which appears, in my view, as invested with so much importance as *that of finding employment for the labouring poor*. As, on the one hand, there is not a more useful member of civil society than the man who, by "honourable toil," continues to support a wife and bring up a large family; so, on the other, there is not an object more worthy of commiseration than such a man *when he cannot obtain employment*. It would at such a period, be distressing to trace and analyze his feelings, and I envy not those of that individual who does not sympathize with him under such circumstances. It has, indeed, long been the conviction of my mind, that those who have the power of finding employment for the poor around them, and who yet do it not, incur a fearful amount of responsibility. How far that responsibility extends, and whether or not the social degradation which the want of employment speedily introduces has any necessary connexion with that social disorder, those petty offences, and the commission of those fearful outrages against the interests of society with which every neighbourhood teems in times of general distress, I will not presume to say; but when the humbler classes are so depressed, that by a wholesome share of labour they cannot escape the bondage of parochial relief, and with it scarcely sustain a miserable existence, the finer sympathies of humanity wither under the pressure of want, and the feverish anguish of defeated anxiety too soon endangers a *reckless state of mind*, which almost inevitably leads to irreligion and crime. A time of agricultural distress, therefore, is just that time of all others when those whom Divine Providence has blessed with large means should anxiously inquire, *not how few labourer they can manage to rub on with, but how many they can possibly employ upon such work as will yield a suitable return, either to themselves or to their posterity*. That there is abundance of work of this description in almost every locality, I am fully prepared to prove. If any should ask me what this has to do with the manure question, I answer that it has a good deal to do with it, and blind indeed must he be who does not see it. To employ the poor constantly, and to encourage in them habits of sobriety and good conduct as you do in class C:—of industry and honest independence as you do by your prize in another class:—of thrift and order, and neatness in the cottages of the poor as you do in class I:—are not only objects eminently worthy of your association, but, where the degree of attention to these laudable objects exists which I see manifested here, I am quite sure there will be such modes of farming adopted as will greatly contribute to the increase of the *manure* heap. One word more as to the utility of your association. A condition is almost invariably attached to prizes for good conduct, that the individual shall not (except during sickness) have received *parochial relief*. The restriction is necessary, and adds much to the value of the prize which the poor

man may obtain; but, in carrying it out, due consideration should always be given to the circumstances which may have compelled him to ask for it. This will be admitted by all who call to mind the difficulties and privations which the father of a large family must necessarily have had to struggle through; and the self-denial which *he* must have practised who has reared that family from the product of his own hand-labour. Suppose such a man a *successful* competitor here to day; and if you want a practical comment on the utility of the "Marton Agricultural Association," follow him home, and listen to him while he tells to his anxious and thrifty partner the story of his success. But to the question. Attached as I am almost exclusively to the peaceful occupations of the soil—engaged as I have constantly been in immediate connexion with those who belong to it, from the noble proprietor of the splendid domain to the humblest peasant employed in its cultivation—I may well be excused if I am led to manifest a more than ordinary concern in every thing that has a bearing upon the interests of agriculture. To views whose origin may thus be traced must be attributed not only my appearance here to-day, but my attendance in many other places on similar occasions. This plea must be my justification for presuming to write books and pamphlets, and to appear in the agricultural periodicals of the day, as the humble advocate of that interest to which I consider myself to belong.

Gentlemen, we live in times when it behoves the farmer to *apply all his energies, and to tax all his powers, to increase the productions of his farm*. And I venture to say, whoever may contradict it, that the field on which his energies may operate is far more extensive than he has hitherto imagined.

It is the peculiar glory of the present age—and it will form an important era in the agricultural, if not in the political, history of this great country—that *the light of science has begun to shed its influence upon the path of the farmer*, and if he would wish to survive the crisis which is before him, he must, in every way that he can, take advantage of that light. At this assertion the anti-corn law man will turn up his nose in derision; and the farmer who confides solely in protection will shake his head. Gentlemen, I tell you fairly that I have just as much respect for the sneers of the leaguer as I have for the scepticism of the man who cannot be persuaded to go *one inch* out of the "good old way!" The *old* way, with some very few exceptions, is *not a good one*. The "old" way of managing your manure heaps, for instance, is not a good one. In short, I am much more inclined to say, that wherever any considerable improvement has taken place upon a farm, and the produce thereby increased, it has been by "a good *new* way."

There are very many reasons why *increase of production* should be aimed at, and that most strenuously, even upon farms that have hitherto been looked upon as managed by men whose practice is, at this time, *the nearest to perfection*. These, however they may at present condemn it, will yet derive much benefit from the application of the principles of agricultural science. I do not mean to say that you must all *thoroughly understand* the sciences of botany, chemistry, geology, &c.; but I would, on the other hand, most anxiously caution you against the *much more dangerous extreme* of totally disregarding those sciences. Ere long, I doubt not, *botany* will teach you a much

better practice than that which you now pursue in *laying down land to grass*, whether permanently or otherwise; also what varieties of grain you ought to sow upon particular soils, &c. *Chemistry* will become to you an all but *infallible* guide in the application of lime, manures, &c., to the soil, and in determining your rotation of crops, so that you may know how to adapt the latter to the condition of the former: and *geology* will throw so much light upon that first of all improvements, *draining*, that men will no longer wonder why land should still be wet after it is filled full of shallow drains, as is frequently seen to be the case, for the cause will then be quite familiar to them.

I will now proceed at once to the question which I propose to discuss: viz., "*What are the best means of making and of managing fold-yard manure?*"

First, I remark in general that the question of making the largest possible quantity of fold-yard manure suggests to my mind several important considerations, which have a relative bearing upon it; among which I would mention the following, viz., first, whether or not the farmer has the requisite conveniences, in the shape of out-buildings and fold-yards, upon his farm; for if he have not, he assuredly will fall short of making what he otherwise might do. Secondly, it is impossible for the occupier of strong clay-land, or certainly other kinds that are *very wet*, to grow the necessary quantity of straw to enable him to make the largest possible quantity of manure upon his farm. To do this his land must be *drained*. Hence the absolute necessity of landlords undertaking at once to place their tenants in a favourable position as to these two points. But there are some men in the occupation of land, whose crops are, independently of either of the reasons that I have just supposed, uniformly, or at least comparatively bad. This is a state of things which should not exist anywhere. I presume not to dictate to others, nor would I make a single remark which can by possibility be construed as having a local, much less a personal, application; but I venture to assert that in the present enlightened and most trying period, when the necessity for employing the best methods is so urgent—when the means of acquiring correct information are so accessible as to be at the door of every man—and when examples of the *effect* of improved cultivation are actually within sight of all—no man is excusable—nay I will go further and say, no man ought to be permitted so to farm his land as to grow nothing but bad or middling crops. His occupation of land at all is injurious to his landlord, to himself, and to his own family, but above all to the general consumer. I would say to the landlord of such a person. "Weigh his case well; in which I include a thousand considerations which cannot be here enumerated; and if you cannot change his practice, change the man; place him in a more congenial position. Better far to pension him from the increased proceeds of the farm than to allow him to stand in the way of improvement." To such a man farming his own land—and there are many such—I would say, "*Let it, let it without delay.*" The man who is indebted to the accident of a favourable season for what good crops he gets, rather than to his own skill and good management, is not the man to make the largest quantity of manure upon the farm that he holds. Oh! no; the more probable effect of such management will be, that both the farm and the farmer will become poorer and poorer, each succeeding

year, until both are beggared. The deficiency in the manure heap of such a man as this, and the waste and destruction which will accrue from his management of what little he has, will tell a sad tale as respects his crops.

There are numerous ways of meeting this evil of bad crops; for an evil it is, whatever may be the cause from which it arises. If they are fairly attributable to the want of buildings or fold-yards of a suitable kind, the remedy is solely with the landlord as I have before said. If to the land not being drained, still, in my judgment, it is with the landlord. But where it arises from mistake or from limited means, motives of humanity would suggest the idea of taking away, at least for a time if not permanently, a portion of the land, assigning the true reason: and I confidently avow my opinion to be this, that it would be a real act of kindness to such a person to do so. I have, indeed, known many a man who has been the tenant of a farm considerably too large for his capital, and who has, after a long and painful struggle against a stream too strong for him, finally sunk beneath the water; who would, if he had occupied say but half of it and *adequately cultivated it*, have lived in comparative comfort, and would have increased instead of having diminished his property. There is not so great an evil in farming, nor any one thing that operates so injuriously on the farmer himself, as niggardly cultivation. The experience of almost every one will have convinced him that twenty acres of land, *thoroughly improved and well cultivated*, will do much more for the occupier than will forty acres under a course of imperfect cultivation. In the other case, where means are not wanting, but the inclination or the skill, the obvious course is to take away not a part, but the whole, for such men are not fit to farm in the present day. The farmer of small capital will find it impossible to keep his place in society, if he persist in attempting, with the knowledge and practice of the last century, to supply the wants of this: his occupation of land at all, operates injuriously in every way, upon the interests of society. On the other hand—to look upon a most pleasing picture—the man who improves his land to the greatest practicable extent is the greatest benefactor to his fellow-countrymen. He does well for himself and his own family; he does well for his landlord; he does well for the industrious and generally thriving poor around him; and he does best of all for "the general consumer;" for he contributes far more to procure what is in the present day so clamorously called for—I mean cheap bread—than all the demagogues that have been hired and sent forth to misrepresent and abuse him.

And now, Sir Charles and gentlemen, having given you some notion of what I should expect as to *produce* from a good farmer, which you will perceive has a great deal to do with the size of the manure heap, I proceed to inquire what ought to be the course pursued by such an one with reference to the question before us; and, in doing so, I must be understood as addressing myself more particularly to such of you as are practical farmers, to whom, in plain intelligible language, I wish to make my appeals, and let them be weighed in the balances of your own practice, experience, and judgment.

Having accomplished that first great requisite for making an ample quantity of manure—the production of an abundant supply of the raw material (if I may so call it) on your farms—your next object will be "to tread down or otherwise consume

on your premises," to the best advantage, all that you have grown, including the whole of your stubble, where your wheat is not mown; which stubble should be cut immediately after the wheat is carried, and as carefully harvested as the corn itself.

This is one way by which the farmer may make the most of his available means, which I am sorry to say is even yet too frequently neglected by him; for it is generally left until it can be raked off without being mown, when it is comparatively of little use either for bedding or as increasing the quantity of manure. But I will now suppose the case of a farmer who has harvested all his grain, and collected every thing upon which he can lawfully lay his hand, which it is possible to use as litter for his stock. Such a person is exactly in that position, of all others, when it is most important to him to receive a satisfactory answer to one branch of the question which I have brought before you: viz., "*What are the methods best adapted to produce the largest quantity of the best manure?*" If I were anxious to proceed according to strict logical rule, I should divide the answer which I propose to give to the question into two parts, and show first how to make the most, and next how to make the best: but this minute division of what I have to say is not necessary; I therefore proceed to remark, that in my judgment the best arrangement that can be made—and I think it a very material point as affecting the size of the manure heap—is to have every hoof of live stock under your sheds or in your fold-yards. Secondly, I think it of considerable importance that you subdivide those yards, so that you may completely classify your stock. Wherever this is practicable it should be done; as it will greatly facilitate your object in consuming your straw profitably; and it is perfectly obvious, that by economising that part of your straw which is good enough to be eaten, and by littering your yards with extraneous matter as far as you can, you will be enabled to keep a larger number of cattle; which it is equally clear must increase the quantity of manure in something like an equal proportion. Thirdly, I strongly advise all farmers to give to every head of neat stock upon their premises, a *regular supply of some kind of artificial food*, in addition to a proper quantity of sweet fresh straw. This recommendation has reference more to the quality than to the quantity of manure which is to be made; but still it will, undoubtedly, in some degree, increase the quality. At present we know of nothing which is so generally approved of, or which has been so extensively tried, as linseed oil-cake. It is true we have heard of cake being made from barley, and even wheat and beans, and much has been said about it, but as I cannot speak of it as an article that has been tested by myself, I must leave it until its merits are better known. It has this recommendation at least—it is a home production, while the other is chiefly the produce of foreign countries. But whatever it be, whether this or that, it will have such a beneficial effect upon your stock, and—what bears more particularly upon my present object,—it will so increase the value of your manure, that I cannot for a moment hesitate to recommend such of you as have not already done so to adopt the practice. I speak in the presence of some, doubtless, who have used it, and they will correct me when I have done if they think that I over-rate the matter; but I assure you I never yet met with an individual who, having tried it, was not more than satisfied with the result.

The practice of giving cake to store stock has indeed been tried by so many that it would be a waste of your time to go much into the subject by way of illustrating its good effects; but I may just state that the way to reap the full benefit of this excellent practice is, to begin with your calves, and, as soon as they can be made to eat it, give them for the first winter, say about 1 lb. per day. The quantity should be increased every succeeding winter until they either go off fat or are in some other way disposed of. Reasoning upon such a recommendation as this, some of those who have not tried it would say that the expense of such a system would prevent its becoming general. I will not, in replying to such an objection, impertinently or offensively thrust my own opinion forward; but, admitting that the outlay for cake in carrying out such a practice as this must be large, I will just remark that there is room for question, whether the superior *health, quality, and "proof"* of stock thus kept will not pretty nearly counterbalance the extra expense of it; to say nothing of the certain and very considerable increase of production from the arable land on the farm, which must immediately result from such a system; for let it be remembered that, after the first application of manure thus made, there will be an increase of *straw*, which will in the next year act upon the manure heap, which will again act upon a larger breadth of the farm; and thus acting and re-acting upon every acre of it, the spirited farmer will find his means of improving the condition of his farm increasing every succeeding year. I cannot but think that the important bearing which this mode of keeping stock will have upon the manure heap is by this time evident to you all, and that therefore it is unnecessary to say any more by way of recommending it.

But it does not suit the convenience, or accord with the view of every farmer, to adopt this method of improving his cattle and enriching his manure, and that for the following among various other reasons:—Some farmers have a plentiful supply of Swedish turnips, and they think that, where store cattle have plenty of these and of good sweet straw, that is sufficient. I admit that this plan may do very well, but it is not the best mode of making manure. To give store stock good fresh straw and Swedish turnips, is to do well; but to give them in addition a small portion of artificial food, is to do still better. I know of no better reason, however, for *not* giving cake or something of that kind, than this. Swedish turnips are an excellent thing along with straw, but the first-rate farmer will not look upon them as a substitute for artificial food, so as to render it unnecessary to give anything else—at least such is my opinion: and besides, if nothing else be given it may, upon many farms, involve the necessity of drawing all the Swedes that are grown—a practice which I am not disposed to recommend if it can be avoided. I may just observe here, that when cake bears, compared with home-grown grain—such as beans, for instance—a relatively high price, it would be clearly the interest of the British farmer to use that grain. It is perhaps the best substitute for cake that can be employed. I need not point out to practical men like you the immense importance of cake, or some other kind of artificial food, as a means of improving a poor farm. I know of none other so safe, and at the same time so efficacious. If the occupier of a poor farm will but resolve to cake-feed a number of beasts every

year, in proportion to the size of his farm, and to clip a certain number of sheep, provided that in both cases the numbers be high enough, his farm will not *long* be a poor one. Other most valuable auxiliary means of making fold-yard manure may be mentioned; among which I would first most strongly recommend, for all clay farms where it is practicable, *the folding of sheep during the winter months*. I feel that I cannot too strongly recommend this practice to those gentlemen who are so situated as to be able to do it. Of course it can hardly be attempted where Swedish turnips, or at least some of the hardier varieties cannot be grown, inasmuch as turnips must constitute one of the most important articles of food for sheep during the time that they are folded, which generally will be for the months of December, January, and February.

I may possibly be speaking in the presence of some whose experience, more extensive than mine, will enable them to contradict me if I am wrong; but I am myself convinced, both from close observation and experience, that sheep which are folded and properly attended to will thrive much better—they will be more healthy, and make much better proof,—than they would do on any other plan or system of management that could be adopted on a clay farm; and the wool will often be actually sounder than that of sheep fed upon turnips, upon the very best lair. And then, gentlemen, comes my primary reason for recommending the practice, viz., the quantity of valuable manure that will be made. This is an object of sufficient importance in itself to recommend the plan to the adoption of every clay farmer, even though the sheep were turned out at spring only about as good as under the common practice; but when it is recollected that the farmer of clay land has no choice, but either to winter his sheep very badly, or purchase turnips for them and eat them on another person's land—thus, for the time being, losing all their valuable manure, instead of keeping it at home—it really does seem strange that the practice of folding, more or less, has not been more generally tried on such farms as those that I am now referring to. And yet, decided as are the advantages of the plan which I have recommended, and the disadvantages of the other system, it is quite certain that upon an average, not one person in a village can be met with who has adopted it. I will not attempt minutely to calculate the advantages of the one practice over the other: this would at once be difficult to do with accuracy, and superfluous. You all know as well as I can tell you, that it is often impossible for buyers of turnips to meet with them near enough their own homes to shepherd them themselves; and that frequently, in such cases, the sheep are neglected, and there is, too, a loss of life among them. You all know very well the great value of the evacuations of the sheep, and you can estimate quite nearly enough, the difference between having a lot of sheep come home in an unthrifty state, after losing some of the sheep themselves, and *all* the manure; and on the other hand, having your sheep always under your own eye, and keeping them, as you would do, in high condition at about the same expense, or rather less, while all the time you are making some of the very best manure that can be applied to land.

As to the precise mode of folding sheep, a very simple and inexpensive inclosure may be made with stubble or straw; the advantages of which

over a permanent fence will be that it will be warmer than almost any other, and may be fixed where a farmer would not choose to put the other down. Into this fold the sheep should be driven every night, after being allowed to exercise themselves during the day; at which time the operations of cleansing out the troughs, and providing the necessary quantity of food, and littering the yard, should be done. The sheep will give little or no trouble, after the first week or two, in folding; for they will themselves find their way to the fold quite as soon as they are wanted.

To carry on this plan with convenience it will be necessary to have a supply of turnips *hilled*, as close at hand as possible, for the winter months; and for the time intervening between the middle of the month of March, and the end of the season, a suitable quantity should be *set*, or *placed on the ground*, while they are consuming which, they will continue of their own free will very frequently to occupy the yard at night. The tap roots of these should be cut off, but not too close, and during severe frost it would be as well to cover them up with stubble or straw. These turnips will retain their nutritious properties until very late in the spring; but during the whole of this period a good farmer will introduce some *artificial food*, such as *cake, beans, culm, &c., &c.*, and that with the most beneficial effect. The turnips should be cut up, and put into troughs, which will also serve for the dry food.

As I have said, the fold-yard should be repeatedly littered, and if due attention be paid to the condition and quantity of the turnips, &c., which they eat, it will be a matter of surprise to the person who tries the system for the first time, what a quantity of excellent manure will be made, and in what beautiful condition the sheep will be turned out at spring. I will not say that in everything they will be *superior* to sheep kept on good turnips and on a good lair, but I do maintain that, if properly attended to, they will be *fully equal* to them.

Another method of increasing the quantity of fold-yard manure, although it cannot under any circumstances, perhaps, become universally applicable, may be here mentioned as of great importance wherever it is practicable. I mean what is usually called *soiling*, or keeping cattle upon green food in the fold-lands in summer. It is a system very extensively pursued in Flanders, and with much success. Within a few years it has also been partially tried in Scotland. In the neighbourhood of Edinburgh very large establishments of cows, for the supply of that city with milk, are kept almost wholly upon green food during the summer months, and the quantity of manure thus made is immense. It seems to me to be better adapted for keeping milch cows than almost any thing else; and it is one which I should certainly adopt if I were occupying a poor farm, and at too great a distance from a market town to procure an extra supply of manure. I should also carry it out to as great an extent as possible with the draught horses on my establishment, for there cannot, I think, be a shadow of a doubt upon this point: it is a well-ascertained fact, that any given extent of ground will, at least, keep double the quantity of stock if its produce be carried to the fold-yard and consumed there, instead of allowing them to help themselves in the usual way. This is of itself a very important consideration, but, after all, is as nothing compared with the great advan-

tage arising from the increase of the manure heap, to which the practice contributes so much. It may also be questioned whether all or most of the store beasts would not be better in the yards, properly classified, during the day, for the hot season, than in the fields. It is well known that, after they have had plenty to eat, nothing contributes so much to keep the animal race in a thriving condition as *rest*: this is a law of nature, and is not peculiar to any one class of the domestic animals, but is, I believe, applicable to all. And it is equally certain that in hot weather they rest but very badly in the fields. Besides this, it is quite certain, that when they are out at grass their excrement is almost all wasted.

Pigs should certainly be closely confined to the yards, except when they are tended upon the stubbles. You will all agree with me that the manure made by pigs is of great value. No farmer ought, therefore, to be without a considerable number of them. I have often been surprised at seeing so few in farm-yards, but could never find a sufficient reason for it. It is true they have got into disfavour with some on account of their *habits*; but even in respect to this, certainly the most disagreeable of all domestic animals, a great deal may be done by constant care and attention, for which those who bestow that attention will generally receive an ample return. It is the nature of the beast to be clamorous when he is hungry; but, as it is very much the interest of his owner that he should always be supplied with food when he wants it, I see more reason for blaming the rational animal than the irrational one. In these ways, amongst others, the quantity of manure made upon a farm may be greatly increased; and let it be distinctly borne in mind that, whatever may be the discoveries of science as to the application of different substances, popularly called manures, which are or may be put upon land—and I am not one to under rate those discoveries—*fold-yard manure will always be, as it ever has been, the farmer's sheet-anchor*. And I may safely add, that he who pays the most and closest attention to this point, *viz., the increase by every possible means of his manure heap, and the due, right, and proper application of it, will be likely to grow the largest crops of every description*; that is, when other circumstances are equal.

Of course I do not mean, in saying this, that any other improvement required may be neglected, certainly not; but that so manifest will be the difference in the crops of the man who acts thus and those of his neighbour who goes on in the old way, that all shall see it, and he himself shall, as he deserves, both see and feel it in an extraordinary degree.

I shall here introduce to your notice some valuable experiments on soiling which were tried in Scotland, and which must have the effect of convincing those who are even least disposed to be convinced, that *under certain circumstances* the introduction of this system must be at the least a very valuable resource. I should not have mentioned them, however, knowing with what jealousy every novel practice is received, if they had not a direct bearing upon the question which I am now considering—the best means of making the largest quantity of manure upon a farm. Take the two following instances, which are detailed with minute exactness. The first experiment is related by Mr. Brown, of Markle, and it was tried upon

some Aberdeenshire steers, which were wintered in the farm-yard, and divided in the spring into two lots, the one being put to grass and the other soiled. The soiled lot was fed upon Swedish turnips, until the clover was ready for cutting; the clover was given but sparingly at first, for a week, to prevent dangerous consequences from the cattle eating too much: after that time, however, they were allowed a full supply, and the offal furnished food for a number of swine. The animals thrived remarkably well until the grass got hard and withered. At the end of July, the clover being ripened, this food was changed for tares, which were continued until the second crop of clover was ready for the scythe. Ten of the soiled cattle were sold in August, and the remainder of the two lots in September. In the last sale it is remarkable that the price of both grazed and soiled were the same. Many dealers supposed that the confined air of the fold-yard would keep the cattle so warm as to prevent tallow from being gathered in any quantity; but this was disproved by one of the soiled cattle, which was killed previous to being sold, having 94 lbs. of tallow. The following is the result of the experiment. The 48 cattle cost for purchase and wintering 503*l.* 2*s.*, or 10*l.* 9*s.* 7*d.* each. The 10 best of the soiled cattle sold for 17*l.* 5*s.* each, and the remainder of both grazed and soiled for 14*l.* 5*s.* each; thus yielding for the soiled lot of 24 the sum of 377*l.* and for the grazed lot of 24 the sum of 342*l.*, making a difference in favour of the soiled lot of 35*l.*, although they were all purchased at the same price, and separated with the greatest fairness. The food consumed by the soiled cattle was 1½ acres of Swedish turnips, 8 acres of clover, and 3 acres of tares. The grazed cattle were unfortunately allowed to mingle with others, which prevented the exact cost of their maintenance from being ascertained; but the gain from soiling was calculated at the least at 50 per cent.; and this will not be doubted when the calculation is closely examined. The soiled cattle, it will thus appear, consumed the produce of 12½ acres only, which could hardly have been expected to maintain half the number if they had been turned out; besides which the tenant would have been minus a large quantity of valuable manure.

Another experiment was the following: “Six horses and a pony were kept in a fold-yard, upon green clover and tares, for four months. Two acres of the first cutting of a good crop of clover and rye-grass were expended along with half an acre of green tares, to carry them on until the clover was ready to be cut a second time; these, valued at 7*l.* 7*s.* per acre, were worth 18*l.* 7*s.* 6*d.* It required 12 acres of the second cutting of the clover crop to carry on the horses, which at 30*s.* per acre amounts to 18*l.*; the whole expense for the four months' feeding being 36*l.* 7*s.* 6*d.* The cost of cutting and leading is not added, for these are compensated for by the value of the dung. It would certainly have required seven acres of the clover in pasture to have maintained the horses for four months; and estimating at the same rate as in the other case, it would have come, of course, to 61*l.* 19*s.* for the same period; thus showing a balance in favour of the soiling system of 25*l.* 11*s.* 6*d.*, or 3*l.* 13*s.* for each horse for that short time.”

Having thus enumerated some of the ways by which the heap of pure fold-yard manure may be increased, I come now to notice two other means

by which the available quantity of organic matter directly made upon the farm may still further be augmented to a great extent. The first hint that I would respectfully throw out is, that every farmer should have, whether his occupation be large or small, a compost-heap in some convenient place near his farm-stead, to which he should carry every refuse animal and vegetable substance on which he can lawfully fasten: *road scrapings*, the sides of roads when lowered—soil out of the ditches that may be near,—weeds, and a thousand other things which I may not mention, including all the rubbish from the winnowings of corn—so long as he has any, but which every good farmer will aim at getting rid of altogether—may be put together; and to these may be added with great advantage a portion of soot, salt, &c., together with as much fold-yard manure as may seem necessary; and it should be deemed, by every farmer, an object of great importance to make as many contributions to this heap as he possibly can. My remarks about this compost heap may be almost said to be a digression from the subject; but although it be not strictly relevant to the question before us, I deem it to be of so much real practical consequence in the economy of farming, that I could not but have felt conscious of an omission if I had left it out.

(To be continued.)

## AGRICULTURE AND CHEMISTRY.

Professor Brande, at the request of Lord Spencer, the president of the Agricultural Society, devoted two evenings to describe and to illustrate to that numerous and influential body the connection between agriculture and chemistry. The attendance at the theatre of the Royal Institution, granted for the purpose by the managers with their usual liberality, was numerous; and much pleasure was evinced and interest excited by the judicious selection and masterly treatment of the subject. We wish we could call up the like lively feelings by a verbal description of the illustrations; but the wonders of experimental chemistry must be seen to be enjoyed. We think, however, that a full report of the lectures, without going deeply into the chemistry thereof, will be received with thanks; and we therefore cheerfully proceed to the task, devoting to it more space than usual, because agricultural chemistry is one of *the* topics of the day, and because a plain statement of facts by an able experimenter and skilful analyst, and by one who acknowledges the union of theory and practice to be more than ever desirable, will tend to promote the welfare and progress of agriculture.

Soils are made up of organic and inorganic constituents. Professor Brande confined his observations to the latter, and classed them under two heads—1st, those constituting the bulk of the soil, upon the mechanical texture and chemical composition of which its general fitness for the growth of crops and timber depend—namely, lime, clay, and sand; 2nd, particular substances involving the fitness of the soil for particular crops, such as sulphate of lime, phosphate of lime, salts of potash, soda, magnesia, iron, and manganese.

*Lime* is an article of so much importance to the agriculturist, and some of its salts seem to possess such valuable, though, in some respects, obscure influence as manures, that it was the first substance considered. What is lime? The chemist replies, it is a compound of a metal (calcium), and of a gaseous body (oxygen), and in their united state called an oxide of calcium. Calcium, because of its great affinity for oxygen, could not be exhibited; it belongs to a class of bodies little inclined to remain in an isolated or separate state, and requires difficult processes to evolve and to procure it. Its counterpart or type, potassium, possessing similar affinities and properties, was shown, and the alkaline nature of its oxide proved by the turmeric test-paper. Lime does not exist in its native state; except, perhaps, in volcanic regions and in a lake of Tuscany. Its compounds are very numerous, and these are the sources of lime to the agriculturist. One of them, the carbonate of lime, is very abundant, easily decomposed, and is chiefly resorted to. It constitutes, in various forms, mountains and hills, and strata covering large districts, and is geologically spoken of as primary, secondary, and tertiary limestone, as being associated with the older, intermediate, or most recent strata of the globe. It is known as marble, limestone, shellstone, oolite, chalk (the upper flinty, the lower argillaceous), calcareous spar, coral, shells, shell-sand, &c. All these are more or less carbonates of lime; and carbonate of lime, like all other chemical compounds, is made up of determinate or definite proportions of its elements: it is always constituted of 28 parts of lime and 22 of carbonic acid. But

### THE DUKE OF CLEVELAND ON LEASES.—

The following declaration by his Grace the Duke of Cleveland, respecting the granting of leases to farmers, will be read with interest in Shropshire, where his grace owns property in land to the amount of 60,000*l.* or 70,000*l.* a year. At an agricultural meeting the other day, the Duke of Cleveland said, within three miles of the place where he had resided for the last nine years, was a place which had long been rented as a rabbit warren. A spirited farmer, acquainted with it, applied to Sir Wm. Welby, and offered, if he could have a lease for fourteen years, that he would break it up, and bring the land into cultivation, his rent being allowed to remain at the same amount as that paid by the warrener. This offer was accepted; and the farmer, being satisfied that the undertaking would ultimately repay him, entered with spirit upon it. On the fourth or fifth year after the warren was broken up, he (the Duke of Cleveland), saw this farm, and he could testify that it was bearing the best crops in the county; and last year, in the month of July, he again saw it, and would not wish to behold finer crops of wheat, barley, and oats, than those which he witnessed growing upon this very farm (*applause*). This showed what could be done by a spirited farmer. At the end of four or five years after he entered on the cultivation of this farm, the tenant applied to his landlord to erect suitable buildings upon it. Sir William Welby observed that the rental was so small that he could not be expected to incur an outlay of that description. This farmer, however, so far from having the necessary confidence, even in a lease of 14 years, to induce him to erect the necessary buildings, offered terms to his landlord. Like a sensible man, he would not place implicit reliance in the mutual confidence principle, but preferred having an agreement in black and white, under signature and seal. He made an offer, that, if his landlord would extend his lease from 14 to 21 years, he would build himself a complete range of buildings. This was agreed upon, and a better and more perfect set of buildings could not be seen than he had erected. Now, the tenant would no doubt be amply repaid for his outlay; the landlord, although he would have to wait so many years before he took any advantage from the improvement, would ultimately find his farm trebled or quadrupled in value.—*Chester Chronicle.*

lime and carbonic acid are themselves compound bodies; they constitute, therefore, what chemists call the *proximate* elements of carbonate of lime, the *ultimate* elements of which are calcium, carbon, and oxygen; lime being a compound of 20 parts of calcium and 8 of oxygen, and carbonic acid a compound of 6 carbon and 16 oxygen. (Carbonic acid was here formed by burning charcoal in oxygen, and was then combined with lime, so as to show the formation of carbonate of lime from its elements.) The common mode of detecting the presence of carbonic acid in a rock or soils consists in subjecting it to the action of diluted muriatic acid, when, if carbonic acid be present, an effervescence ensues; and when it is desired to determine what *quantity* of carbonate of lime exists in a soil, it is done by ascertaining the *weight* of the carbonic acid which passes off: thus, if 100 grains of the soil lost 22 grains of carbonic acid, it would indicate 50 per cent. of carbonate of lime, and so on. (Professor Brande showed the mode of performing this experiment.) In referring to the composition of the varieties of chalk, Professor Brande adverted to the importance of certain foreign matters occasionally contained in it, which were formerly overlooked or thought insignificant, such as bituminous substances, alumina, silica, potash, soda, magnesia, phosphate of lime, &c. The chalk about Brighton, made up chiefly of the remains of multitudes of animalcules, contains phosphate of lime; hence it may occasionally be used as manure for chalk not possessing it, and especially as a top-dressing for wheat. The peculiarities of the limestone or chalk extend to the lime, or quick-lime, resulting from burning it in the kiln, which is merely a process to drive off the carbonic acid; but the properties of quick-lime are chiefly important to the agriculturist. And first, the change it undergoes on exposure to air, crumbling down into a white powder, in consequence chiefly of absorbing water. By long exposure, a portion of the caustic lime becomes a hydrate, and a portion returns to the state of a carbonate, or chalk. Its great affinity for water is shown by slaking, 28 parts of lime taking up 9 parts of water: 700 parts of water are required to dissolve one part of lime. The action of lime on organic matters—peat, leaves, vegetables, &c.—is to decompose and convert them into humus or mould, to neutralize acids, and to form salts of lime. It also decomposes certain salts of iron injurious to vegetation, throwing down the iron as a harmless oxide; and it reacts on salts of alumina, potash, soda, magnesia; and ammonia. It tends—and particularly with bone-dust—to produce ammonia and nitrates; and its action on slate, felspar, &c., develops alkalies and soluble silicates, so essential for wheat and certain other crops. When lime has passed again into a carbonate, it becomes a good ingredient in the soil; it is chemically the same as crushed limestone, shell-sand, or marl; but mechanically it has the advantage of being in very fine powder—hence more perfectly blended with the soil, and brought into contact with the roots of plants: and if these secrete acid, and so render it soluble, it will, of course, be more easily taken up.

The other salts of lime which principally claim the agriculturist's attention, are the sulphate and phosphate. Sulphate of lime is a compound of sulphuric acid and lime—its ultimate elements being sulphur, oxygen, and calcium. It is called gypsum, plaster-stone, and selenite. They are natural products, and found crystallized. Heated to

400° or 500°, they become plaster of Paris, and may be moulded with water; but, if heated to redness, the powder loses the power of re-combining with water. Organic matter changes sulphate of lime into a sulphuret, and sulphuretted hydrogen is evolved; hence fœtid and poisonous exhalations. Crops contain not only sulphate of lime, but sulphur in a free state, as in mustard and horse-radish, derived from the soil. Its principal sources are the red marls and salt deposits, also some of the primitive rocks, and the tertiary deposits. Its use in agriculture is, that it acts as food, but does not attract moisture or promote decomposition. It is contained in lucerne, sainfoin, red clover, and turnips, and for these crops is a fertilizing top-dressing; it is not contained in wheat, barley, oats, beans, or peas; and to these it is of no service. The plants which do contain it never grow well on lands destitute of it; so also in regard to the other salts of lime. When applied to grasses, it is important that the weather should be damp. In an ordinary crop of clover there is from  $1\frac{1}{2}$  to 2 cwt. per acre; and this is the proper proportion recommended for use by the best authorities for those soils deficient in it. One of these authorities, Professor Johnston, says farther of it—"If fields which once gave luxuriant crops of red clover no longer yield it—if the young plants spring up numerously, but die away as summer advances—if the land is tired of clover, or clover-sick—if farm-yard compost is ineffectual upon his grasses, the agriculturist may conclude, without analysis, that gypsum is required." Peat-ashes are often effectual, because they contain 12 per cent. of gypsum, the rest being sand, oxide of iron, salt, and carbonate of lime. Also coal-ashes, as there is 10 per cent. of gypsum in them. Such, then, are the uses of gypsum as a top-dressing for artificial grasses, and it is especially beneficial in certain localities. It is cheap; and a waggon-load will dress 30 acres. Sulphate of lime is also said to be capable of absorbing ammonia. Carbonate of ammonia and sulphate of lime, it is true, react on each other, but very imperfectly, except they are in solution; and hence its failure as an absorbent for carbonate of ammonia in stables, where the atmosphere is loaded with it, to the injury of man and beast; and where such immense quantities of this otherwise valuable material apparently goes to waste. (Trays of sawdust saturated with sulphuric acid, were said by a gentleman, in conversation after the lecture, to be very effective in rapidly clearing the atmosphere, and rendering the ammonia in stables available.)

The phosphate is another important salt of lime: it forms part of the bones of animals: it is derived from the soil, and transmitted to animals through vegetables. How the soil is supplied with it, has lately occupied much attention. Bones, in this respect, possess great fertilizing powers. Soaked in acid, the animal matter is left tough and flexible, but the bone-earth, or phosphate of lime, is dissolved out. Fossil bones are also sources, but this has been over-rated as to quantity; likewise guano, an excrement of birds. Phosphate of lime is, farther, a mineral product, and is found in the slaty rocks of Bohemia, and Estramadura in Spain, and in some marls, clay-slates, and chalk. It is contained, too, in oyster-shells, corals, and crustacea generally. When rock-slate has yielded the subsoil clay, subsoil ploughing is an abundant source. Liebig considers phosphate of lime most essential to wheat, and to a great extent doubtless

it is so. And because it is necessary to wheat, oats, &c., those plants which, such as leguminosæ, contain least salts, form the best fallow crops. They exert no injurious effect on corn, because they do not rob the soil of alkalies and phosphates. In the use of bone-manure, much depends upon the state in which it is applied. When it was thought that the animal part of the bone only was active, it was deemed enough to crush or bruise the bones; they were afterwards found more effectual in powder; and lately they have been disintegrated by acids, such as muriatic or sulphuric acid and water, and applied in solution. The free acids are neutralized by the bases in the soil, and very finely divided phosphates and sulphates are diffused through it. (The Duke of Richmond subsequently said, that bone-manure had been thus successfully applied in Scotland:—about 12 tons of turnips had been obtained from an acre of ordinary land at a cost of 11s.; whilst with other manures, at a cost of 3*l.*, about 11 tons only had been produced.)

*Clays.*—Very different substances pass under the name of clay; but they all agree in containing one chemical element, on which their peculiarities in many respects, called *alumina*, it being one of the ingredients of alum. Alumina has a strong affinity for water and for vegetable matters, and is soluble in acids and alkalies. Another compound of clay is silica, possessing remarkable properties. Its varieties are rock-crystal, calcedony, flint, sand, &c. It is insoluble in water, and in all acids except one: it is soluble in alkalies. With excess of soda, it forms a glass soluble in water; and considerably diluted, is known as the liquor of flints; the addition of an acid throws down the silica in a state of jelly. It is this property of solubility in alkalies that renders silica so important and so available to grasses; and when in its gelatinous state, very weak acids and alkalies, and even water, will dissolve it.

Mixtures and compounds of silica and alumina form clays, which receive different names according as they contain more or less of their essential ingredient, as they are blended with limestone, or as they have mixed up with them various occasional substances, yet of great importance, such as potash, soda, &c. How are these latter to be detected? If mere soluble salts, by boiling in water. But clays may be rich in alkaline matter, and yet yield no indications of it in that way. They can be separated from their combinations only by fusion; by long continued exposure to air, water, and temperature; by the influence of lime; or, in the laboratory, by voltaic electricity. There can be no soil fertile, in reference to texture, without sand and clay; none, in reference to composition, without lime and alkalies; and, in reference to particular crops, without sulphur, phosphorus, magnesia, oxide of iron, &c. These are essential to animals; they must originate with vegetables; and vegetables create nothing, as was once supposed, in regard to sulphur, phosphorus, and the alkalies. No clay is fertile without lime; its presence is chemically essential, not only as a component part of the crop, but as a substance slowly reacting on the clay, and developing, under the influence of moisture, its alkaline constituents in the state of a soluble silicate. It is thus that lime becomes a great means of awakening what have been called the dormant capabilities of the soil. If clays containing lime be burned, these changes are afterwards more rapidly effected, and at the same time the texture of the clay is so mechanically altered,

that it crumbles into a kind of sandy powder, and never again acquires the same relation to water, or the plasticity, that it had before. Calcined clay, moreover, is an absorbent of air, ammonia, nitric acid, &c.

If 100 soil have 10 clay, it is termed sandy.			
”	10 to 40,	”	sandy loam.
”	40 to 70,	”	loam.
”	70 to 85,	”	clay loam.
”	85 to 95,	”	strong clay.
”	95 to 100,	”	agricultural clay.

Pure clay consists of 60 of silica and 40 of alumina, in intimate combination—that is, as arising out of the disintegration of slates, felspars, and other rocks. But these are rare; and the strong clays contain 5 to 15 per cent. of adventitious sands. There is seldom more than 30 per cent. of alumina in arable land. Marl is a calcareous clay. Sand added to clay soil acts merely mechanically; but clay added to sand acts chemically—that is, along with alumina it always brings alkalies. Ashes of plants rarely contain alumina, but almost always silica and silicate of potash. The hay-stalk, the corn-straw, the exterior of cane, &c., chiefly consist of silica: hence the necessity of the clay, as a chemical element of the soil, yielding the alkali which renders the silica soluble. When potash is not united to silica, it is combined with other acids derived from the plant, as tartaric, citric, oxalic: in the former case the ashes contain no carbonate; in the latter they effervesce with acid.

Such, then, is an outline of the facts related. The experiments, illustrations, tests, specimens, &c., were as complete as could be wished; and they and the whole matter gave general satisfaction. Thanks were voted by acclamation to Professor Brande for his admirable lectures, and to the managers of the institution for the use of the theatre.—*Lit. Gazette.*

#### INJURIOUS EFFECTS OF BEARING-REINS.—

TO THE EDITOR OF THE MORNING HERALD.—SIR,—If you will have the kindness to admit into your paper the following remarks on the injurious effects produced by the fixed bridle, or bearing-rein, they may attract the attention of your readers; and as the opinion of a person of great practical experience may lead them to give the matter that consideration which I feel convinced is, in many cases, all that is required to induce them to discontinue a part of the harness which is more than useless, and is a source of infinite torment and suffering to the noble animals upon whom so many of our comforts and pleasures depend. An old experienced coachman says:—“I have entirely abolished the use of bearing-reins, from a conviction that they are not only destructive of ease and generally useless, but because they are a positive *hindrance* to animals in the full exercise of their strength. I would draw the attention of all who have the control of draught-horses, which are in harness for hours together, to the cruelty of using bearing-reins. This unnecessary punishment inflicted on the patient animal can but be estimated by those who, abolishing the use of these reins, will notice the ease and comfort bestowed, particularly in ascending hills. Bearing-reins are not only unnecessary, but they are a source of continual torment and the cause of many falls, by keeping the heads of the horses in a stiff unnatural position, preventing them from seeing the road, and impeding the free exercise of their strength and agility. When a carriage is stopped the poor horses are seen tossing their heads, drawing them round to their sides, and indicating by these and other signs their distress and uneasiness. Without bearing-reins they would soon recover their breath, and enjoy relaxation at every stoppage.”—G. M.—*Dec. 12.*

## NOTICE ON THE ORIGIN OF THE POTATO, ITS VEGETABLE AND ECONOMICAL QUALITIES, THE SOIL, THE MANURE, AND THE CULTURE THAT SUITS IT BEST; ALSO THE MANNER OF LAYING THE SEED-BEDS, TO RENEW AND AUGMENT THE SPECIES BY SEED.

BY AN AMATEUR.

*Origin of the Potato.—Its introduction in the European Culture.*

The potato (*solanum tuberosum*)—named also by some *solanecé parmentière*, in honour of the philanthropist Parmentier, its indefatigable propagator—is generally considered as being originally from South America, where it is found from the coast to the summit of the Andes, and where the Baron Humboldt, in his scientific voyage, found some varieties producing tubercles nearly a foot in diameter.

Nevertheless, some writers maintain that it is originally from Spain. On this they found their opinion:—In the province of Galicia the potato grows spontaneously, not only near the sea, as some report it, but everywhere in the interior, as well in uncultivated as in cultivated lands; these are of several varieties—some red, some white, and of each of these some are long and some round. The farmers complain a great deal of the trouble they give them, because they encumber their vines and their fields, and that it is with great difficulty they get clear of them. It is true that in its uncultivated state this potato is very small, when cultivated it grows as large as that produced in Europe. In the opinion of the inhabitants of Galicia the potato has always existed in that country, there being no tradition of its ever having been introduced from elsewhere: that its importation from America seems impossible, the date of the discovery of that continent being too recent to allow the recollection of its introduction into the country to be lost: finally, in many of the neighbouring towns it has never been known but by the name of *Gallega*, supposing it to be the natural production of the soil of that country.

Although some writers suppose that the potato has been imported into America by the Galician vessels trading from Corunna to those ancient Spanish colonies, yet I do not pretend to support that opinion; nevertheless, without contesting the American *indigeness* of the potato, I think there is reason to believe that it is at least indigenous also of Galicia.

However, it is certain that the potato which was introduced in the European culture had been imported from Peru by Sir Francis Drake in 1586. It appears that the Italians were the first to cultivate it largely. It was but little known in England before 1630, and in France not till many years after.

In the beginning of its culture in Europe, there was a strong prejudice against this prodigious root, by which its propagation was greatly impeded; at first it was supposed susceptible of breeding the plague, and of causing several maladies; its enemies pretended further that its culture exhausted the land so much that it became afterwards quite barren.

Some persons, however, full of devotedness for the well-being of society in general, having examined the potato, and knowing its worth, as well for its nutritive qualities as for the immense

quantity of its produce, did all they could to advance its propagation. A. A. Parmentier, who laboured most ardently in this philanthropic work, it is reported, bestowed his attention on it for forty years without intermission. He first tried to destroy the idea which the people had of its supposed unwholesome qualities; to this object the *Falcuté de Médecine* of Paris published a refutation of the silly opinions then prevalent, declaring that the potato was a food free from any noxious qualities.

### *Utility of the Potato.*

The potato is one of the most useful plants to man; it presents a wholesome nutriment, is easy of digestion, and serves for food to the poor without any other preparation than the simple cooking under ashes, in the oven, or boiled; it furnishes a *fecula* or flour of a superior quality, and in a treble proportion to what the same portion of land would furnish sowed with wheat. Finally, the surprising abundance of this *fruit-root* permits us not to dread any more the scourge of dearth where its culture is somewhat extended. Since that, growing under ground sheltered against the intemperatures, its produce is certain, though it may sometimes be less abundant, through an extreme contrariety of season.

As food for man, the potato must be considered as a *farinaceous* plant, and as a pot pulse, under this last consideration, it is worthy of being placed at the first rank; it can be cooked in a variety of ways; it is found with pleasure on every table, if not as a principal dish, at least as accessory to meats or other pulses.

As a farinaceous plant, the potato can be made one of the first resources for the alimentation of the people. It is now a considerable branch of agricultural commerce, and contributes largely to the well-being of agriculture.

The use of the *fecula* of the potato is now general in Europe for several objects of first want, which gives it a considerable consideration. Thousands of families use it daily; it makes a pap very nourishing, and very superior for taste to that of any other flour. A fourth part mixed with wheaten flour makes the bread whiter, and gives it a pleasing relish. The *fecula* is also used in stiffening calico; it is even used in the fabrication of paper, at the rate of 10 per cent. of the weight of the rags. The best fancy biscuit can be made exclusively with it, and sea-biscuits made with its mixture are excellent. In some places sugar is extracted from it of a good quality, but the quantity is very small.

If we consider the potato as food for cattle, we shall find again that this root is a great and interesting resource of rural economy; every domestic animal is very greedy of it; given cooked, and particularly by steam, it is very profitable for nutrition and for fattening, without the fear of it causing any sickness. The horse which is fed

with it always keeps fat; his skin is shining, and he has more strength. The ox will fatten perfectly with it; it is also a very good food for cows, whose milk will then be abundant and of good quality. One cannot give anything more pleasing or more fattening to the pig; it gives its flesh an agreeable taste, and renders it easy of digestion. Finally, it is good for all kind of poultry, if it is given a little warm.

*Produce of the Potato—Its economical, agricultural Inspection—Its chemical Analysis—Comparisons of its nourishing Qualities with several other alimentary Substances.*

The potato produces a great deal more than any economical plant yet known; the weight of its crop is never less than *six times the weight of wheat* obtained on the same space of land; but in rather cold lands, or in countries not exposed to extreme dryness, the weight of its produce can be reckoned from *nine to twelve times* that of wheat. It is true that there are some varieties of potatoes that produce a great deal less than others, but we must suppose that the farmer will try to get that kind which gives the greatest profit, since, good or bad, they give the same trouble and take the same breadth of land.

*Economically*, potatoes are considered of two sorts, some having a pleasing and delicate taste suitable to man, and the others only fit for cattle, their taste being less agreeable, but producing a great deal more. Their numerous varieties show an extraordinary difference in the quantity of farinaceous substance which they contain; some contain twice as much as others, and consequently are doubly nutritive. The cultivator must, then, know which to employ in his culture, to answer the object of his farming—those which have most of *alimentary* substance, those which are the most fruitful in roots, or those most estimated for the table.

The *local* inspection or analysis is the only way of choosing with the assurance of success; for it must be allowed that the analysis made in other places cannot be a sure guide for the cultivator, since that, without reckoning that most of the varieties have changed their name in changing their country, it is still more certain that the qualities change also by the difference of the land, which is no doubt one of the first circumstances that influence essentially the properties of the potato. Moreover, the varieties have already multiplied *ad infinitum*, either by seed or by change of locality. It is not, then, now possible to enumerate, and still more difficult to know them; each country—even each town—has already its special varieties, which are not known elsewhere, and which, if they were transferred, would soon also alter in their qualities.

*Chemical Analysis.*—According to the analysis made by M. Vauquelin upon forty-seven varieties of potatoes, this root is chemically composed, out of 100 parts, of from 13 to 25 parts of starch or pure flour, of from 5 to 9 of a fibrous matter, 1 to 3 of albumen, or a substance condensable in the fire, resembling the white of an egg, of 2 of a substance containing gum and sugar, and from 65 to 80 parts of vegetable water. From the observations of this chemist, it follows that 11 of these 47 varieties gave from a fifth to a fourth of their weight of starch, and that only two varieties gave as little as an eighth. He believes, by the results of his observations, that 100lbs. of potatoes will

give, on an average, from 15 to 20lbs. of *fecula*, which is a great advantage, considering the abundance of nutritive substance the *fecula* contains, and consequently the price it has in trade.

*Its nourishing qualities compared to several alimentary substances.*—Many experiments have been made to ascertain the nutritive properties of the substances that are most used for the subsistence of man. A notice published by M. M. Perry and Herring gives the quantity of nutritive matter that each of these substances contain; but this work, precious as it is, cannot serve to answer the end of this notice. However, we find in it a few deductions having special reference to the potato.

To answer my object, I borrow from a very commendable work the following comparisons, which show precisely the correspondence of the potato with several other substances, as to the nutritive properties of the one compared with those of the other.

100lbs. of potato are equal for nutriment to	
	lbs.
Meat without bone .....	25
Beans .....	28
Wheaten bread .....	35
Parsnips and carrots.....	190
Turnips .....	300
Cabbage .....	400

The notice of M. M. Perry and Herring establishes that 3lbs. of potato are equal for nourishment to 12 ounces of bread and 5 ounces of meat. There is, as will be perceived, a great difference between the two calculations, particularly as regards meat.

#### SUBJECTS PREVIOUS TO THE CULTURE OF THE POTATO.

*A few Observations—The most convenient Soil—The quantity and quality of Manure that suits it best.*

*Observations.*—In considering the origin of the potato, one would be led to believe that it could not grow perfectly except in warm climates, but the result proves that it is otherwise: it grows well everywhere; heat or cold act very little on the quantity of its produce, especially if the potato is already used to the climate, which is done with better success by the produce obtained from seed in the country itself. It is another recommendation for this precious plant, since it offers to all the inhabitants of the globe indiscriminately a sure and abundant produce. It has also the great advantage of suiting itself to all kinds of land; nevertheless, the crop is more or less abundant, and the quality of the produce is more or less good, according to the nature of the soil. This is sufficient to show the necessity of choosing the soil that suits it best; if, however, one has the facility of that choice, it cannot be too often repeated. *The goodness of the potato depends as much on the nature of the soil as on the species.*

In agriculture the cropping of the potato is considered as *preparatory*; that is, it prepares the soil to produce a subsequent exhausting crop, by the benefit it draws from the labour bestowed on it while the potato is growing, by the effect of the cleansings and the small dressings, delvings, &c., and by the remainder of the manure it has received on that occasion. It is certain that wheat or any other corn will do uncommonly well after a crop of potatoes.

*The most convenient soil, and the most favourable situation.*—The first condition that a soil must have to be fit for the cultivation of the potato is, that it be of a nature easy of tillage, to permit the growth of the tubercles. This is so true, that this plant will even succeed well in pure sand or gravel, and that for the same reason it will come indifferently in chalk or in clay—substances too compact to allow the increase of the tubercles.

Consequently, the soils best adapted for this culture are, by order of enumeration, generally all soils friable, dry, and light; the vegetable earth, whatever may be its nature, but the sandy is preferable; alluvial earth; the red grit in decomposition; and all stony land.

The most unfavourable lands for this plant are, generally all the compact soils, and those that are very wet; the clayey and chalky soils. Yet by tilling well these lands, and by keeping them during vegetation in a state of suppleness and of division, a crop will still be certain, though less abundant, and of an inferior quality.

The potato requires for its good culture elevated grounds; it will always be of a better quality in high than in low lands; it is also better in dry than in wet soils. It is an error to believe that it requires much wet. It is true that it will often produce more in wet than in dry soils, but generally the *tubercle-seeds* rot in such places; and above all, this augmentation of produce, if it happens, will always be at the expense of the quality. The tubercles that have grown in a wet soil have always an insipid and sometimes a mouldy taste; they are more watery, and consequently have less of nutritive qualities, and are more subject to rot and to freeze.

However, as it may happen that the farmer will be obliged, in spite of his will, to use low or wet lands for the culture of the potato, it is good to know that practical experience has established this general rule in agriculture, that the red suffers less in low and wet lands, and that the whites require more particularly the high and dry lands.

*Of the quality and quantity of manure.*—The potato requires manure, and some have even advanced that *the weight of the produce of the tubercle will be in proportion to the manure employed*, and to the number of the delvings, &c., given. Without contesting this principle, which I think, on the contrary, to be correct, I must, however, observe that the produce arising from an excess of manure has always the inconvenience of an inferior quality, and even sometimes is not eatable for man. There is an axiom that should never be forgotten—*potatoes are tender, farinaceous, and of a pleasing taste, in a sand a little manured; on the contrary, they are viscous and of a bad taste, in a soil clayey, wet, or over-manured.*

The cultivator will easily understand that the manure communicating a bad taste to the potato, is precisely *putrefying dung, either solid or liquid*, as the stable-dung, the pig-dung, human excrements, fermented urines, &c. If the crop was designed for fattening cattle, it would then perhaps be indifferent whether they would be more or less savoury, since, for all that, the potato does not contain less of nutritive substances; but if, on the contrary, they are intended for the table, the cultivator must use only a moderate quantity of that manure, and if he wish to force the production, he must do it with *inodorous manure, either solid or liquid*, such as ashes, the *fucus* or *sea-weed*, the blood of animals, &c. Yet I must observe that all

the small dressings, such as delving, hoeing, &c., repeated and well executed during vegetation, are the best means of obtaining large crops with a moderate quantity of manure, and always to the great advantage of the quality of the produce.

Nevertheless, the potato suits itself to all kinds of manure, as it suits itself to all kinds of soils, but as it comes better in certain soils, it is also more benefited by certain manure. Stable-dung, animal matters, mineral substances, cleansings of canals, ponds, &c., all these manures will do; but the bodies which contribute the most to its development, and give it a vigorous vegetation, are matters containing *azote*, a fluid forming the greater part of the atmosphere, such as rubbish of plaster, clippings of skins and of horns, bone-dust, &c.

Mr. Dombasle, a distinguished theoretical and practical farmer, tells us—“In Flanders and in the Palatinate of the Rhine, they sprinkle the potatoes in June with fermented urine, immediately before the hoeing; this labour, which takes place afterwards, gathers round the foot of the plant the earth impregnated with this manure, and increases prodigiously the vegetation, by which a considerable crop of potatoes is obtained.” We must remark that the two countries named by Mr. Dombasle are known to be very advanced in agriculture.

However, the ordinary dung is generally used for the potato; the oldest is always preferred, when it is reduced to a clammy substance, and when it is easily cut with the spade. The manure in this state, called on the continent *beurre noir* (black butter), has the advantage of not containing the seeds of injurious weeds, they having been destroyed by the long fermentation; its effects are immediately produced, so that vegetation profits directly by it. Some say that dung fresh from the stable, containing a great deal of straw, is the only manure fit for wet or clayey soils; they say that it warms the former and divides the latter, so as to help the development of the tubercles. I advise those who have such soils to make the trial.

#### CULTURE OF THE POTATO.

##### *Observations—Preparatory Labours—Plantation—Harrowing—Delving—Hoeing—Defloration.*

Parmentier has said—“The culture of the potato is grounded upon one only principle, whatever may be the nature of the soil, and the species or variety of the potato; it consists in *tilling well the land before planting, and continuing during the growing.*” If this principle is fully acted upon, a good crop is always certain, whatever may besides be the circumstances of the soil or of the manure; it is from the result of this principle, that we see the potatoes succeed better in a soil *deep ploughed, but without manure*, than in a ground only *spade-dugged, tilled, and manured.*

If the advantage of a soil well tilled before the planting or sowing is generally received, it is not generally admitted that the surface should be kept in tillage during the vegetation; many farmers would think of considerably prejudicing the crop, if they were to give a second delving, particularly during hot weather. They suppose that by opening the surface of the soil, the evaporation of the interior humidity would take place, which would cause the root to dry and the plant to perish, and that on the contrary the upper crust formed by rains, dews, or the crusting alone of the earth, helped by the atmospherical action, hinders this evaporation, and that consequently the interior hu-

midity is sustained a long time, to the great advantage of the root. This reasoning is far from correct; I would even call it, with Mr. Dombasle, a *great error*. I am *convinced* that the roots enjoy more humidity when the surface is well divided by the small tillages than when it is covered by an hardened crust; it is certain that if, during the heat, the surface of the soil is crusted, the evaporation of the interior humidity will not be so great; but in that state the earth cannot enjoy in its interior the immense atmospheric advantages, putting aside the light showers that are lost for the roots in a hardened soil. We must also reckon the benefit that the dew confers *daily* on the roots, which it can reach when the surface is well divided; the air also penetrates them constantly, and besides the particles of water it contains, and that the roots draw from it, the air, by its own essence, does them a great deal of good in communicating to them the fertilizing substances it contains. From this motive, crops weeded will succeed often in soils where plants not weeded perish through dryness.

*Preparatory Labours.*—The preparatory dressings are multiplied or reduced according to the nature of the soil; for if the soil is heavy or clammy, it will naturally require more labour than if it were light. It is then necessary to suppose them distinctly in two cases.

*The heavy, clayey, and chalky lands.*—To be well prepared, these lands require *three dressings*—the first with the plough, before winter, by which the stubbles or straw of the last crop, with the casual grass and bad seeds, are buried as deep as possible; and *two*, of from four to six inches deep, with the *scarifier*, early in spring, and again just before planting. The winter's ploughing produces admirable effects on the chalky soils; it exposes them to the rain and the snow, and the frost crumbles them, to the great advantage of the subsequent dressings, and of the vegetation of the next culture.

*The light lands, sandy or otherwise.*—Two dressings are sufficient for these lands—the *first, with the plough, and deep*, must be given early in spring, a month or six weeks before the planting; and a fortnight after, the *second, with the scarifier, at four inches deep*.

If the heavy lands destined to be planted with potatoes are occupied during winter with an *extraordinary culture*, either of turnips, trefoil, winter vetches, &c., these lands cannot be prepared otherwise than the light lands; and yet one would be obliged to plant tardy potatoes, since these crops, particularly the trefoil, cannot be cut before April. The plough must then immediately follow the scythe.

*Plantation.*—As to the culture, potatoes are of *two sorts—early and tardy*.

The cultivator must decide which of these two sorts he wishes to cultivate, and then he will be able to determine the time, even the day, for planting; but before deciding he ought to consider, besides the anterior crop, the one he intends shall follow the potatoes, that the time of the harvest of these may permit him to dispose his land for the one that will follow.

The early potatoes are planted in March. If the season is favourable, they may be planted in the beginning; otherwise in the middle; and sometimes even at the end.

The tardy are planted in May and in the begin-

ning of June; there are some varieties that may even be planted in July, the time they take to operate their complete vegetation being short, a very essential circumstance, and which it is the interest of the cultivator to well observe, that he may profit by it.

One must not try to change the season proper to each species; an early sort planted too late produces generally a great deal of *fibrous matter*, and very few tubercles; likewise a tardy variety planted too soon does not rise so quick as one might think; and if it obeys the desire of the farmer, it is to shoot again when after dry weather it comes to rain. Nature will always revenge itself when such a yoke is imposed on its vegetation, sometimes by deteriorating the quality of the produce, but always by a reduction of its quantity. Consequently, the cultivator must be well assured that the species belong truly to the season when he intends making his plantation.

The early sorts are frequently liable to rot after being planted, by the effect of the tardy frosts of spring. If the season is backward, the cultivator must wait a fortnight, or longer if it is requisite, and he must always mind to bury them deep enough to avoid this accident.

The tardy, on the contrary, are exposed to be still underground when the autumnal rains arrive, which might cause them to rot, or at least to alter their quality by getting mouldy or watery, and they are often very subject to the rot or the frost. To avoid this evil, there are no other means but to take them up the moment they are ripe.

A good variety of potatoes may degenerate by the mere mixture of a few plants of an inferior quality amongst those of the plantation; the communication of the *pollen* or seminal dust with each other suffices to occasion the alteration of the species. Some which were good and fit for the table are seen very often to deteriorate and to be no longer fit but for cattle; and some becoming good for the table which were before fit only for cattle, though this last case is rare by the effect of the natural tendency to the deterioration rather than the amelioration. These changes are brought about solely by the mixture of different varieties; consequently, great care must be taken to cultivate each species separately.

There is a common principle in theoretical agriculture which has very few exceptions—that *anything sowed or planted succeeds better when made by lines or rows than when it is executed at random*; but from that principle is derived a general and exclusive maxim in agriculture—that all the planting and sowing done in lines or rows ought to have these lines or rows placed from north to south, provided at least that the configuration of the ground permits it. The principle of planting in lines is generally adopted for the culture of the potato, but the maxim of always giving to these lines a south direction is not much observed; and I dare say that a great many of the plantations done according to that method are very often so by casualty. That disposition is not, however, immaterial, for, so disposed, the plants enjoy fully the beneficial influence of the solar rays, which they receive on both sides between the lines, as well as from the top; and the soil itself is also benefited by it, since it receives from these rays a part of its vegetative power. The potato is one of the plants that thrive the most by this kind of culture. I think that when the configuration of the ground

allows it, the potato should not be planted otherwise.

Though there are several methods for planting potatoes, I shall speak only of that performed with the plough; for I think it is the most expedient for culture on a large scale.

The day before that of planting, the manure is carted to the field, where it is placed in small heaps, to be distributed on the ground intended to be used. On the day of the planting, a person spreads the manure as the plough works; then the plough, in filling the ridges with the new earth, causes the manure to fall on the fragments of potato placed at the bottom of the ridges; the fragments are in this way covered with the manure, and consequently receive the benefit of its substances and of the heat necessary to their first unfolding. If the farmer is short of manure, or if he wishes to spare what he has for some other culture, he can manage with half the quantity without in any way prejudicing his crop of potatoes. To that effect the small heaps are not spread, and the person who had that to do places the manure in the ridges where the potatoes are planted, waiting before to put it that the fragment-seed be placed, taking care to cover them well with the manure before the plough comes again; by this means the potatoes have as much manure as they require, and half of the manure is saved. The least distance the lines of potatoes ought to have is twenty to twenty-four inches, but twenty-eight to thirty would still be better; the seed-fragments ought to be placed eight, ten, or fourteen inches from each other, according to the space the variety requires, and the depth five or six inches; in a damp soil four inches are enough, and even sometimes three are sufficient. When the plough is eleven or twelve inches wide, a ridge is planted and the other left empty, and so on successively, so that the lines will be from twenty-two to twenty-four inches apart; but if the plough is only eight, nine, or even ten inches wide, two of the ridges ought to be left empty, and only one planted, and the lines will be from twenty-seven to thirty inches from each other. Several well-informed cultivators leave from thirty-six to forty inches distance between the lines, and their crops leave nothing to desire, compared with those of their neighbours who follow the thick-planted system.

The farmer must take care that the persons whose duty it is to place the seed-fragments do not throw them negligently in the ridges, but that they are placed with the hand pressing on them; that being sunk a little, the horse coming in the ridge does not derange them. In rainy seasons, or in very damp soils, the fragments ought not to be placed in the bottom of the ridge, but two inches higher, sinking them a little; that will be a great precaution against the rot, which in some soils destroys a great many before they have time to grow up.

The greater the distance between the rows of potatoes, the greater will be the produce, and the finer the fruit; daily experience proves that to be a fact. The thickness of the plant does not increase the produce of the crop; on the contrary, the produce is rather less, notwithstanding a double quantity of seed has been used in vain. Besides the greater produce, and the economy of the seed, planting at a good distance has other advantages. The soil is a great deal less exhausted, and what exhaustion it suffers is partially

restored, as well by the air and the light that the breadth of the lines permits it to enjoy amply, as by the effects of the frequent tillages, which keep it always in a proper state of becoming impregnated with meteorical substances, caused by the repeated contact of all its parts with the gaseous atmospherical matters—true source of fertility, and soul of all vegetation.

The fragments placed at five or six inches deep will be better secured against the rotting effects of rains and of late frosts, by the greater shelter that the earth gives them, and by the greater activity of the central heat, which maintains better the fermentation, and thus advances the germination; finally, that deepness is most proper to keep a certain freshness to the roots during summer, and consequently is a precaution against dryness.

The moment the shoots appear, a good harrowing must be given to the plantation of potatoes, passing the harrow twice at least long-ways and cross-ways. This tillage may be considered as a small delving and a weeding, for it opens the earth, and it destroys the weeds which begin to grow in the plantation. By it the vegetation is stimulated and considerably fortified. It would be difficult to form an idea of the good done by this tillage, if it were not compared with plantations which do not receive it. As soon as it has been given, young shoots are seen growing with a surprising vigour, and rapidly developing an abundance of strong leaves, which contribute directly to favour the growing of the roots by their aerial absorption. In cases where the fragments are only two or three inches deep, great care should be taken that the teeth of the harrow do not displace them by penetrating too deep, which could not happen if they were placed five or six inches deep, as it has been advised before.

Some of the most distinguished writers on agriculture, in recommending the harrowing of the potato, affirm that the plants suffer no damage by the breaking of the young shoots caused by the teeth of the harrow. I grant that, in spite of the damage caused to the new shoots by the teeth of the harrow and the stamping of the horses, this tillage produces a result very favourable to the crop, by the sole effects of the permeableness of the earth, caused by the breaking of the crust formed at the surface. The meteorical substances will then easily penetrate, as has already been demonstrated; but this advantage that the harrowing gives to the potatoes cannot reasonably prove that the breaking of the young shoots is not prejudicial to the plants; for it is easy of conception that the nourishing juices extracted from the tubercle-seed by the broken stalk is lost for its future vegetation. For that reason, I believe that the harrowing would still be a great deal more profitable to the crop if the harrow was constructed so as to operate between the lines without touching the plants.

*Delving.*—The delving is a labour very favourable to the potato; it has the double effect of keeping the earth in a light state, and by that means rendering it permeable to the aerial fluids, and of cleansing it of the weeds which, the moment their roots are cut by the flat edges of the shares of the instrument, die, affected by the drying winds and by the heat of the sun. A plantation of potatoes, well minded, will have two delvings intercolated between the harrowing and the raising the earth against the plants. The delvings produce such

good results on the crop, and the operation is so easy and so expeditious, when executed with improved instruments, that it would be surprising if any cultivator did neglect it.

*Earthing up.*—The earthing up is the most important labour bestowed on the potato; whatever may be the circumstances of a plantation, the want of this labour will certainly cause a deficiency in its produce; but if the ground is elevated or the soil dry, the crop must be reckoned as lost if a lengthened dryness arrive before the plants have been earthed up.

The potato requires two earthings up—the first when the shoots are five or six inches high, causing the earth to very near cover them; and the second a little before the blossoming. If it is done only once, it ought to be done amply when the shoots are six or seven inches high.

The earthing up produces three remarkable effects on the culture of the potato—first, it facilitates the production of new roots or filaments from the first knots of the plants the moment that that part is covered by the earth; these roots will give tubercles sometimes as large as those of the bottom, for they are advantageously nourished by the fecundating substances contained in the earth newly brought near; secondly, the earth gathered round the plant supports the stems, and by keeping them upright permits the air and the light to penetrate the lines in every direction, and by that favours the vegetation of the subject and the fertilization of the soil: finally, the raised part formed by the earth, in keeping the heat out, maintains a fertilizing freshness to the roots, by which the tubercles increase in quantity and in size, and are secured against the disastrous effects of an extreme dryness.

The potato is an aëriovorous plant; that is, a plant which nourishes itself as much, or perhaps more, by the absorption of aerial substances drawn by its leaves and its stems, as by the nutritive matters which the roots suck from the earth. The more a plant draws its nourishment from the air, the more it needs the conservation of all its *caulinary* or aerial system; consequently, the stems or leaves of this kind of plant cannot be destroyed without causing a great prejudice to the vegetative functions of the subject. That is the reason why the potato requires the conservation of all its green parts to fully operate its development. A respectable writer on husbandry, M. Montgolfier, says that “the mowing of the stems, when the leaves are not completely withered, diminishes the produce by nearly one-half.”

*Defloration.*—It is now generally acknowledged that the taking off the flowers at the time they blossom produces an admirable effect in favour of the potato. The numerous trials made by several distinguished agriculturists have demonstrated the surprising influence of this process. First, it has been discovered that it accelerates the development of the tubercles, and further, it has been proved that these tubercles were larger when the plants had been deflowered, and even that they were more numerous.

The increase of the produce of the potatoes by means of that operation is truly important enough to deserve the serious attention of the farmer; moreover, it is so simple that no one can find a reasonable pretext for neglecting it. From repeated trials it has been found that the produce is augmented by at least one-fifth.

It is by the modern admirable progresses of the ve-

getable natural philosophy that we are able to give the solution of so extraordinary an effect. Organography and physiology, pertaining to that branch of botany, give us the solution of this mysterious phenomenon of nature. They teach us that the moment the blooming of flowers arrives, and that the sexual organs of the plants they contain begin to acquire their fertilizing principle, all the plant enters into a state of effervescence or irritation, which brings to the floral part all the fertilizing powers the plant contains. All these powers are necessary to accomplish the fecundating act; they are accumulated by the sexual organs contained in the flower, and transmitted to the ovaries, where they remain to produce the development of the seed. The plant, then, which does not operate the exhausting act of fecundation, must naturally conserve more of its fertilizing power to all the other parts of its system. That is the reason of the augmentation of the produce when the plant has been timely deflowered.

## ROSS FARMERS' ASSOCIATION.

The annual meeting of this association was held on the 26th October, under the patronage of the Right Hon. Lord Ashburton, Kedgwin Hoskins, Esq., M.P., Thomas M. Baskerville, Esq., M.P., Joseph Bailey, jun. Esq. M.P., Kingsmill Evans, Esq., Hill Court, and Thomas George Symons, Esq., Mynde Park, and was exceedingly well attended; we are happy to state that report speaks well of its success, and that its members are gradually increasing. The ploughing match took place in a field called the Park, on Calboro' Farm, about three miles on the road from Ross to Ledbury, occupied by Mr. James Rudge, and distant about a couple of fields from Grendon Court, the residence of the worthy President of the association, Henry Chellingworth, Esq. The day was beautifully fine, and the field, a clover ley, was most admirably situated, being about 100 yards from the turnpike-road. The soil was in very good order, probably it would have given the work a little neater appearance had it been more moist, but on the whole nothing could have been better adapted. The whole arrangements were carried out with much ability, under the direction of the committee and the hon. secretary and treasurer, Mr. Wm. Price of Benhall, to whom the press is much indebted for his courtesy and attention. The judges of ploughing were Mr. John Bennett, of Ingeston, Mr. Wm. Bonnor, of Aildersly, and Mr. Jas. Rudge, of Calboro'. Of implements, Mr. Raester, Thingehill, and Mr. Peake, of Harewood Grange. The ploughing was “half an acre of land to be ploughed within three hours in the best and most workmanlike manner.”

Many of the prizes were given in clothes, the buttons of which were struck from a die made for the society; in the centre was a plough, encircled by the words “Ross Farmers' Association Reward,” and the whole formed a very neat device.

## THE DINNER.

About four o'clock upwards of sixty gentlemen sat down to a most excellent dinner at the Royal Hotel, and which was highly creditable to the establishment. Henry Chellingworth, Esq., President, ably occupied the chair, supported on his right by K. Evans, Esq., Hill Court, R. D. Cooke, Esq.,

Hellens, and on his left, J. Partridge, Esq., Bishop's Wood, J. W. R. Hall, Esq., K. Hoskins, Esq., M.P., Edward O. Partridge, Esq., and Wm. Hooper, Esq.; John S. Collins, Esq., C. E. Thomson, Esq., H. Hargraves, Esq., and most of the leading agriculturists of the neighbourhood, including Messrs. Bennet, Higgins, Powell, Bonnor, Rudge, Jones, Garrod, Street, Prince, Peake, and several of the most respectable tradesmen of the town. Mr. Wm. Price, of Benhall, and Mr. Henry Burgham, of Bickerton, officiated as vice-presidents.

The usual loyal toasts having been drunk,

The CHAIRMAN having proposed "The County Members,"

Mr. HOSKINS, a liberal contributor to the funds, rose and said,—As one of the representatives of this county, I beg to return you my sincere thanks for the honour you have conferred upon us. Our worthy chairman has read Mr. Bailey's letter, in which he states that very important business prevented his attendance; and we may safely conclude that some pressing engagement is the cause of Mr. Baskerville's absence, otherwise he would have been here and enjoyed, as much as I do, the proceedings of this day. (*Hear, hear*). Our chairman in proposing the toast, has said much more of me than I deserve. (*Cries of No, no*). In reply, I can only say, that I have done the best in my power, according to my views, to promote the interests of agriculture, because I considered it my duty, having the honour to represent a county, the population of which is dependent on the cultivation of the soil. (*Hear, hear*). I am very happy to support these institutions, because I consider them of vast importance to the community; at the present time we have great difficulties to contend with, which I conceive can in some degree be lessened by uniting together to promote the objects we have in view. (*Cheers*). It certainly is natural for me to be favourable to these institutions, and I can assure you that I will not deviate in my attachment to the agricultural interest; for if I did, I should consider myself unworthy of your confidence. (*Hear, hear*). It is my duty to take everything into consideration which is of the least importance to agriculture, and you shall always have my best endeavours to further your interests. (*Cheers*). I have told you, and with the greatest truth, that I consider these institutions of the highest importance to the county, and I am sure you will all agree with me, that much of their prosperity depends on having talented gentlemen to conduct them; in this respect we have been exceedingly fortunate. We have presiding over us a gentleman of great ability and talent—a practical agriculturist of much experience (*hear, hear, and cheers*); and I need not say more than propose to you the health of our worthy president, Mr. Chellingworth. (The toast was received with three-time-three.)

The CHAIRMAN rose amid renewed cheers. Order having been restored, he said, Gentlemen,—In rising to return thanks for the honour you have done me, I cannot refrain from expressing my gratification at seeing the anniversary of our society so well attended. (*Hear, hear*) I trust we shall go on steadily advancing, and add more members to our lists every year. Our object is to bring together, in one interest and companionship, all classes engaged in the cultivation of the soil, and to increase, by every means in our power, the productiveness of the soil. (*Cheers*). Associations of this kind are highly calculated to strengthen the bond

of union and good fellowship between landlord, tenant, and labourer, which ought ever to exist. and one of their most prominent features is that of bestowing rewards on individuals who have maintained an honest, upright character, and have distinguished themselves by good conduct. (*Hear, hear*). The good resulting from this is incalculable—it stimulates the servant to maintain the proud position he has gained, and induces others to follow his example. (*Hear, hear*). The meeting to-day has brought into competition the skill of ploughmen of many farms, and the judges have certified that the work has been done exceedingly well, which is highly satisfactory to us all. By holding these meetings, we have the opportunity of seeing new and improved implements exhibited, from which we can select those best adapted to the cultivation of our farms. We are told that unity is strength—then let us be united in promoting the interests of this society, for by so doing we shall promote the good of the country. (*Hear, hear*). Our society has been very successful hitherto, and I trust we shall still go on increasing in prosperity; and I would merely observe that, were our funds ever so great, we should not expend our money in sending paid orators into the manufacturing districts to sow the seeds of discord amongst the community, and to set the working man against his employer. (*Hear, hear*). Both manufacturers and agriculturists are all embarked in the same ship, and if one sink the other cannot swim very long. (*Hear, hear*). Before I sit down allow me to propose to you the health of a gentleman, one who has filled the office of Chairman of Petty Sessions, and also of the Board of Guardians, who has done all in his power to promote the best interests of the town and neighbourhood, and who is so well known amongst you that I am quite sure it would be superfluous for me to say anything further; therefore I will propose to you "The health of Kingsmill Evans, Esq." (*Great Applause*).

Mr. EVANS rose and said—Gentlemen, I should be extremely in want of gratitude if I did not express my thanks for the manner in which the toast has been given by our worthy chairman, and also to you for the cordial manner in which you have received it. This is the first time that I have had the honour of appearing before you as a member of this association, because I did not think myself justified in appearing before you until I had enrolled my name. It affords me great pleasure to find that it should so happen that I sit next to, and have the honour of supporting so respectable a president as the gentleman who presides over us (*hear, hear*), and allow me to say, that although my acquaintance with him has not been so long as yours who live nearer to him, I have been in his society sufficiently long to know the virtues and merits of the gentleman; and as he has spoken of me as filling the office of Chairman of the Board of Guardians, I must beg leave to say that there is no gentleman who has more faithfully served his parish as a guardian than our worthy president. (*Hear, hear, and cheers*). I am fully convinced that societies of this kind must prove beneficial to all, and it is to be hoped that in every agricultural district like this, similar societies will be established, and then we may expect, should unhappily any differences exist between landlord and tenant, a better union will be promoted amongst them. (*Cheers*). I have no doubt of the great benefit that will arise from these associations—that they will induce the tenant

to look carefully to the terms of the contract which he made with his landlord when he commenced his tenancy, in order that nothing should arise from his entry into the farm to his retiring from it, that would cause any difference between them. One of the most material points for a farmer to consider, and which goes very far to bind man to man, is a faithful discharge of those laborious duties which he takes upon himself when he enters upon an estate—an endeavour to increase to the utmost of his power, the productiveness of the soil, by adopting the most productive course of cultivation.—On the other hand, allow me to say that there is another great benefit that our chairman has spoken of, and that is, the distribution of prizes to labourers and servants. This is the first time that I have witnessed the ploughmen at work, and I must say that great competition prevailed; by these meetings much emulation must be excited, and I feel convinced that they will act as an inducement to parents to bring up their offspring in a proper manner, and I trust they will act as a stimulant to the rising population of every parish. (*Hear, hear, and cheers*). Gentlemen, there have been so many speeches of late on the subject of agriculture, that I should consider myself intruding upon your time were I to enlarge upon it. Allow me to assure you that I shall be happy at all times, whenever my abilities can be of service, to promote the best interests of the Association. (Mr. Evans resumed his seat amid loud cheers.)

Mr. HALL rose and said: Gentlemen, I have the permission of our worthy Chairman to propose the next toast, and I do so with great pleasure, because I think if it were not for good and efficient officers associations like these could not exist. I have the honour to propose to you the health of the Honorary Secretary of the Ross Farmers' Association (*Cheers*). It has so happened not only from public report, but also from private sources, I have heard of that gentleman's zeal in promoting the interests of this society, and I witnessed at the time the great energy he exhibited in establishing it (*Hear, hear*). I have seen to-day the great exertions he has made to cause everything to pass off agreeably, and I am sure we cannot fail to observe how much we are indebted to him for the great assistance he has rendered the institution, for turning his experience to the best account, and for giving us the benefit of it. (*Hear, hear and cheers*). There can be no interested motives on his part; everything he has done has been voluntary, for the benefit of the association and the community generally (*Applause*). I have very great pleasure in proposing his good health, and feel much obliged to our President, Mr. Cheltingworth, for allowing me to propose a toast so congenial to my feelings. [The Honorary Secretary's health was drunk amid loud cheers.]

Mr. PRICE: Mr. President and gentlemen, I beg to acknowledge with feelings of pleasure the kind notice you and my friend Mr. Hall have been pleased to take of me and my exertions in so good a cause. Whatever I have done I have done with the sincerest motives, and with self-gratification (*Cheers*). From the commencement of this society I have had its welfare at heart, and have anxiously laboured to see it prosper; judge then with what feelings of delight I have this day witnessed the support and countenance (indications of its future importance and prosperity) that have been accorded to it (*Cheers*). Knowing that great good must arise from the establishment of a society like this, I have

rendered my humble assistance cheerfully, and I shall continue to do so as long as I have the pleasure of discharging the duties of Honorary Secretary and Treasurer to the Association (*Loud Cheers*). Gentlemen, allow me again to acknowledge your kindness, and in conclusion to drink all your very good healths. [Mr. Price resumed his seat amid much applause.]

The CHAIRMAN next gave "the health of the Judges," which was responded to by Mr. BONNEL. "The health of the new members" was next given, and acknowledged by JOHN PARTRIDGE, Esq.

The CHAIRMAN: Gentlemen, I have the pleasure of proposing to you "The health of Henry Clifford, Esq., of Malvern," from whom I received a letter a short time since, expressing the great interest he felt in the society, and in the letter he enclosed two sovereigns, which he wished to be given as a premium to the labouring classes. [The toast was drunk amid loud applause.]

"The health of Whaley Armitage, Esq.," was next given in a neat address by the chairman.

Mr. HALL: Gentlemen, having the permission of the President to propose a toast, I will briefly do so. It would be useless for me in proposing the toast to enlarge on the objects of this society; they have been very ably dwelt upon by our worthy President, and also by the Chairman of the Board of Guardians. We have had to-day the pleasing gratification of witnessing the awards distributed to the successful candidates. I have heard, amongst other trite remarks, that good landlords make good tenants, and I have also heard that good masters make good servants. As an illustration of this, sure am I that we should not have seen the gratifying exhibition to-day, and more especially that very worthy old man, with his snowy locks and blooming face, unless their employers had been sound, upright, honourable, good masters (*Hear, hear*). Gentlemen, in proposing to you the health of the masters of those servants who have received the prizes, I cannot help noticing the beaming countenance and glowing pride that was exhibited in the face of one master present, Mr. Jones, of the Flan. I could not help noticing him looking up with the pride of a master whose servants have honestly served him; and he has good cause to look up with pride, for three of his servants have gained prizes this day (*Hear, hear*). In vain shall we look for good servants, unless we have good masters; therefore I propose to you "the health of the masters of those servants who have gained prizes" (*Loud cheers*.)

Mr. JONES, of Flan, returned thanks, giving his servants a most excellent character, and stating that the old man should be taken care of as long as he lived.

Mr. HIGGINS, of Fawley, also in acknowledging the compliment, said he regretted he did not see more of his agricultural friends present, because he thought the society was in every way worthy of support (*Hear, hear*). Many of them objected to it because, they said, they were not going to spend what they had earned the last fifty years on new societies; and others said that these institutions were only established to open the eyes of the landlords. His landlord was present, and he was sure he did want his eyes opening as much as some of the rest of them. It might not be amiss, as they were met for discussion of agricultural subjects, to allude to what had become a question for the coun-

ty's consideration. He did not wish to allude to politics, but some time ago the cry was "petition," but now it was "cultivate," and much had been said by the new doctors about draining. He would ask any gentleman who knew the nature of the soil of the county, what would justify the tenant, under the present state of things, in making permanent improvements? He did not think there were many large landlords who would grant a lease, and therefore it was useless to expect that a tenant would lay out his money in permanent improvements, unless he had better security to stay on his farm and reap the benefit of them, and to which he would be justly entitled (*Cheers*). Mr. Higgins continued in a very able address to advocate farms being let on leases, on a fair corn and meat rent; and expressed his surprise at the remark of Mr. Bailey, at the Hereford agricultural dinner, with regard to the probability that if tenants would offer 2s. 6d. or 3s. per acre more for their farms, landlords might be disposed to grant leases. Now, if this were the remedy required, he (Mr. H.) blushed for the liberality of landlords, and hoped in vain for redress from them (*Hear, hear*). Mr. Higgins concluded by proposing the health of J. W. R. Hall, Esq., which was received with deafening applause.

Mr. HALL: Mr. President, I feel exceedingly obliged to our worthy friend, Mr. Higgins, for having proposed my health, and to you, gentlemen, for the kind manner in which you have received it. I certainly did inform Mr. Higgins, this morning, that I should be happy to place at the disposal of the committee one or two premiums; and, if it meets with their approval, I would suggest that it should be given to labourers of good character (*Cheers*). Gentlemen, I will not follow my friend, Mr. Higgins, through the whole of his observations and remedies for the present state of agricultural distress; but I would beg to notice that part of his address which has allusion to leases (*Hear, hear*). A tenant of skill and ability would give an estate the benefit of his experience, if he had a long lease; and quite certain am I, from observations that I have made, that it is decidedly the interest of the landlord to get upon his estates gentlemen of ability, integrity, and capital (*Cheers*). Now, as the interest of the landlord to possess such tenants, it is quite evident the best way for him to secure them would be to grant leases (*Hear, hear*). It must also be highly gratifying to the landlord to see, year after year, the same tenant upon his estate—he and his family become attached to the tenant by ties of affection, through a long and uninterrupted intimacy—and he looks upon his tenant as the main prop and support of his family (*Hear, hear*). Our friend, Mr. Higgins, in alluding to these meetings, has said they are productive of much good; but I cannot go with him and say that we are to look to these meetings alone for relief from the present depression. We must not only cultivate, but we must apply all our experience in endeavouring to increase the productiveness of the land—that is the grand object we should have in view (*Hear, hear*). Whether we fight to improve agriculture through this small meeting, or whether we fight through the larger one, the Royal agricultural Society of England, we must strenuously exert ourselves to produce more from the same quantity of land (*Hear, hear*). This should be our first object but we cannot be expected, by any reasonable landlord, to expend our time, talents,

ability, and capital in such pursuit, unless we know that our interest in the land is secured by a lease sufficiently long to remunerate us. (*Cheers*.) I have ever felt the truth of this most deeply; and one of the most correct observations that I have made, is that those estates always look best cultivated where tenants have long leases upon them. (*Hear, hear, and cheers*.) With respect to these meetings, I would only say that I wish we could attend here in larger numbers. Mr. Higgins has said that some of our neighbours object to attend, for myself I cannot comprehend how any one can raise an objection, or have the slightest foundation for doing so, when an object is the rewarding of labourers for superior skill, and servants for their honesty and long services. (*Hear, hear*.) I should not have credited such an assertion had it not come from so respectable a source. How illiberal for a man to say I cannot bestow the knowledge I have gained by a fifty years' experience, on the members of such a society as this! Why, gentlemen, what would become of our land if we had not men of ability to spread their knowledge? And, I would ask such men as those alluded to by Mr. Higgins, do they suppose they have some peculiar covering to their land that we cannot see their method of cultivation?—their absurdity is so great that I scarcely fancy our friend Mr. Higgins is in earnest. I can only say if such individuals do exist among us, that they are of a very old school. (*Hear, hear*.) It is no credit to me that I have not become a member of this association before, and I hope and trust that many of our neighbours will take an early opportunity of enrolling themselves in the society. (Mr. Hall resumed his seat amidst much applause.)

The CHAIRMAN—I beg to propose the health of the Right Hon. Lord Ashburton, a large landed proprietor in this neighbourhood, and I regret that he, or some part of his family does not reside amongst us; we all know the injury a locality sustains by the absence of landlords, and I trust the time is not far distant when his lordship will do away with the grievance. (*Hear and cheers*.)

Mr. BURGHAM, one of his lordship's tenants, returned thanks.

K. EVANS, Esq., in an interesting address, gave the health of "Sir Hungerford Hoskyns, Bart."

Mr. PEAKE, the respected baronet's steward, returned thanks.

Mr. HALL proposed "the health of Mr. Cooke of Hellens." (*Great applause*.)

Mr. COOKE returned thanks.

Mr. WM. PRICE—Mr. President and gentlemen, I cannot forget the very great benefit the society has derived from the good working of the committee. (*Hear, hear, and cheers*.) I have received great assistance from them, and also much useful advice. Allow me to propose to you "the health of Mr. Burgham, Mr. Higgins, Mr. S. Edwards, and the committee." (*Cheers*.)

Mr. BURGHAM—Gentlemen, for what little services I have rendered the society I am most amply compensated by this expression of your good feeling. I rejoice in having been instrumental in establishing the society, by having been its first president, and I am proud to say that its principal feature is rewarding labourers. (*Cheers*.) We may differ in almost every other matter, but I believe we all agree that honest, faithful and industrious servants are valuable members of society and are worthy of reward. (*Hear, hear*.) So much

has been said, and well said, on the subject of agriculture, that I really think there is nothing new to offer, and therefore I would merely observe that leases with corn rents are much wanting, and in sitting down return you my sincere thanks on behalf of the committee (*Applause.*)

Mr. EVANS, in a neat address, proposed "Mr. Woolley, and the town and trade of Ross," which was received with loud cheers.

Mr. BURGHAM proposed that Mr. Cary Cock's name should also preface the toast, which was carried by acclamation.

Mr. CARY COCKS—Mr. President and Gentlemen, allow me to return you my most sincere thanks for the compliment you have paid me, and also to return thanks, on the part of the inhabitants of Ross. I regret to see so few of my neighbours present, for it pays the agriculturists a very ill compliment. (*Hear, hear.*) I cannot answer for them; I can only state that I am very happy to be present myself. (*Cheers.*) Before I sit down, allow me to suggest that I think it would accord much better if the buttons on the shepherds' clothes had an ewe and a lamb upon them instead of a plough. Mr. Cocks resumed his seat amidst loud applause, and having afterwards been informed that a new die would have to be made for the device suggested, he liberally offered to defray the expense.

"The professional gentlemen of the town of Ross," was next given, and acknowledged by T. Edwards, Esq., and W. Hooper, Esq. "The better health of Mr. Thos. Cooke, of Hereford," followed, with expressions of regret that he was labouring under severe illness. Mr. Thomas announced his intention of becoming a member of the society, which was received with applause.

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## TO THE LANDOWNERS AND AGRICULTURISTS OF THE UNITED KINGDOM.

GENTLEMEN,—It has for a long time past been my conviction that the essential principles upon which our Agricultural Clubs were constituted, would in the end be the cause of their destruction, and this is the more strongly impressed upon me at the present moment by the pertinent observations made by the Rev. Mr. Cox, at the Hineckford meeting, upon that subject. During a time of peace perhaps, there was propriety in excluding all subjects having a political tendency from discussion; but when the enemy is at our gate in full force, it is then time to arm for the contest, and with a manful struggle to contest the field, to concentrate and bring all the power of the agricultural body into opposition, and not to take the motto, "Knowledge is power," without fully acting up to its precept.

The Anti-Corn Law League has grown into a formidable body; and exceedingly well drilled and supplied with *material* to carry on the contest, having all their energies directed to one object, *the destruction of the agricultural interest.* With the assistance of a powerful press, and well-arranged meetings in every district in the kingdom, can it be supposed that success will not attend their efforts, so long as their opponents make no exertion to resist them, but rather suffer themselves to be annihilated in detail?

I would not for a moment venture an opinion

upon the subject (notwithstanding the utter disregard to decency and truth exercised by the League), unless that opinion would be borne out by truth, and supported by argument, and such is the conviction upon the subject that must come home to the mind of every honest man, if he fairly investigates for himself, that he will at once see the necessity of *protection to agriculture necessary as a national good*, independent of any boon it may be supposed to confer upon the agricultural body as the recipients.

The words *dear* and *cheap* are always applied to the value of land produce, and merchandisable articles; but the application of the words in relation to the value of the produce of different countries can only be measured by the ability of the inhabitants of each country respectively as sellers or purchasers: thus, wheat at 35s. per qr. in all wheat growing countries north of the Baltic, may be absolutely dearer to the inhabitants of those countries than it would be to the inhabitants of this country at 50s. or even 60s. per qr.; and it is quite notorious, that in all the cheapest producing countries, the distress of the lower portion of the population is increased over the dearest producing countries; and in all those districts from which the finest wheat is imported *viâ* Dantzic, the poorer classes never taste wheaten bread, but live upon rye and oat bread of the coarsest description.

It would follow, then, as a consequence, that if a free importation of corn were to take place, the money would find its way from the dear corn growing country to the cheap corn growing country, and the latter, having no wealth except what they might obtain by carrying on the trade, would not become purchasers of our manufactures only to a limited extent, and then only with the money first obtained from this country. Mr. Keer Brown, who lately addressed his letter to me upon the subject, has so fully explained this that I refer your readers to his pamphlet, now in process of publication.

I have entered into this subject merely to show that it is *money* and *money* only that would flow from this country in exchange for corn; and if there were no other proofs existing, those alone of the hostile tariffs of all European nations as well as of America, at the present moment, would be sufficient—the determination of the Governments of those countries being to *preserve their own trade and manufactures* from being brought into competition with the English producer; and unless a tariff carried out upon the same principle shall be established in this country, our trade must suffer by such one-sided and I may say short-sighted policy.

When the League first commenced their attack, they stated that the object was to produce food at a rate so cheap in this country that the English mechanic might be able to compete with the foreigner; they found, however, that this line of proceeding was open to attack, as they were immediately challenged upon having the intention of reducing wages by means of lowering the price of food. It therefore abandoned this course, and started another—that a free trade in corn would allow proportionate exports of manufactured articles, presupposing that all foreigners having wheat to dispose of would be in want of clothing, hardware, &c., in exchange.

The fact is, the League do not expect that either result will follow, without the other accompanying it—one object being to reduce wages, but the main object being to involve the whole agricultural body

in ruin; and such is their inveterate hatred that no pains will be spared to effect their object.

I must, in the space of a letter, only touch upon the leading points connected with the subject; but at the same time that I do so, I cannot let those pass that materially apply to, and affect the agricultural tenants and labourers. The whole object of the League has been to destroy confidence between the landlord and tenant, and to produce dissatisfaction between the labourers and their employers, by telling the one that they pay exorbitant rents, and by endeavouring to convince the latter that they are paid inadequately for their labour.

By the returns made at the last census, the rent of this county appears to be under 20s. per acre, a much lower sum than many would have supposed: from this 20s. all the usual drawbacks for repairs, maintenance of sea walls, &c., for a deduction of at least 15l. per cent. leaving a net rental of only 17s. 6d. per acre. The average of the poor and county-rates is about 4s. per acre; the tithe-commutation about 6s. per acre; surveyors' rates 10d. per acre; labour about 30s. per acre; and horse labour about 20s. per acre. The land-tax, assessed-taxes, property and income-tax, also, *all direct charges*, unalterable in amount, except that in proportion as the value of produce declines they are proportionably advanced. Let me ask any tenant, therefore, who thinks rationally, what must be the result of any sudden change in the value of his produce; experience has already taught him in part, and he has only to imagine what a further declension in value would produce with so many unalterable charges upon the land, the rent itself being proportionably insignificant in amount, and I may fairly state that the picture drawn by Mr. Cox so forcibly, of the sales that would follow of agricultural property, is neither overdrawn nor exaggerated.

The average consumption of a full-grown individual is about 1 quarter of wheat per annum, and admitting that he pays 8d. or 6d. for the 4lb. loaf, or the difference between 40s. and 52s. per quarter, is it not of consequence to him as an agricultural labourer, and worth his consideration, whether, in the event of his obtaining his bread at 6d. he would probably obtain only 9s. per week, with half employment, whilst at 8d. the loaf he would obtain 11s. per week, making a balance of 4l. 12s. per annum in his favour, with full employment—placing him in a better situation, even should he have seven in family, as to the comparative amount of his earnings with the actual cost of his food.

As regards the occupying tenant, all those who hold under leases and agreements would be bound by them, and a fluctuating price in corn would not at first materially affect the annual value of land. It is very true that rents would, in the event of a free trade, be reduced from 25 to 35 per cent.; this sum, however, would be so disproportionate to the reduction on produce, that ruin would inevitably overtake the tenant, before he could produce an adjustment of claims upon him; and all those who have liabilities unliquidated, either from borrowed capital or otherwise, would find their difficulties increased in a proportionate degree, as they would have to pay probably one-third more in produce than that under which the debt was contracted.

As regards the landlord, a greater confiscation of property would follow than ever took place during any previous *revolution*; for I contend that this change would in effect be a *revolution*, and of such magnitude as to involve every one except fundholders, who would have their property apparently in-

creased for the time, in the same proportion as the value of land would be decreased. But can any one, with the least pretension to political discussion, so stultify himself as to believe that the taxes could be raised from a depreciated produce as easily as from one of increased value? or, to put it in plain terms, could as much rent continue to be paid from land with wheat at 40s. as with wheat at 60s.?—the proportionals being the same as applicable to either, whether it be rent, tax, or any other fixed payment whatever.

Let me ask them, can the statements I have made be received as true, or can they be controverted? If not, is it not worse than madness to suffer such a harpy as the League to prey upon our very vitals without even a show of resistance? I say then, Gentlemen, let me exhort you to put the machine in motion that has been hinted as necessary for our protection. Let our landlords come forward handsomely and liberally in its support, and let the tenants by their assistance show that they are warmly interested in the cause; let a committee be formed at once, and let the watchword be *protection*; let all societies in the country, whether agricultural or consisting of Farmer's Clubs, be invited to join, and let us one and all, from the landlord to the labourer, show by our firmness that we do not intend to succumb to the League, but rather to meet them with argument, and expose their fallacies and false statements. "Knowledge is power," and if fairly exercised will tend as greatly to repel an attack as to commence one. The agriculturists have all the wisest and best men with them; but however good and righteous their cause, it must fall if not bravely and vigilantly defended.

If such be the case—and the danger that threatens is so fraught with mischief—I ask, is this a time for agriculturists to stand still? I suggest, then, that the Agricultural Societies and Farmers' Clubs, in every county, put themselves in motion; that liberal subscriptions be made for the purpose of counteracting and contradicting the falsehoods concocted and published by the League; that the press be enlisted in our service, and that plain incontrovertible statements be published, to convince the working classes and occupying tenants of the necessity of protection to agriculture as an end, and as a national good, irrespective of any individual advantages that it may confer, except as tending to increase and maintain the hand-labour of this country, not only as the greatest source of wealth, but as the basis of all wealth and the support of all national greatness and prosperity. Are the men of cotton origin, and I may say with cotton minds, to dictate laws, and to hold in subjection that class who have ever been the nation's thought and pride, and who for many centuries caused her to be envied by surrounding nations? So long as England was an agricultural kingdom she was happy; the golden days of bye-gone ages, handed down by our historians and poets, confirm it: when she became a commercial nation she became great, and wealthy, and glorious; but when she became a manufacturing nation the plague-spot was upon her; its livid hue was at first supposed to be a sign of health; but it has proceeded until it has sunk so deeply into her system, that nothing but the knife or caustic will eradicate it. Casting metaphor aside, can any true friend to his country but deplore the morbid state of the manufacturing classes? Debauchery and vice has laid the foundation for sedition and treason; the wily leaders of the League exasperate their passions and influence their judg-

ments by inundations of vile trash and inflammatory harangues; repetition upon repetition follows, until the deluded victims, that at first only doubted, at length become convinced, and finally look upon the agricultural body as a horde of harpies, banded together for their destruction. In confirmation of this, I give you a few of the epithets that they have applied to us:—"Rapacious harpies!"—"merciless footpads!"—"monsters of impiety!"—"relentless demons!"—"heartless brutes!"—"inhuman fiends!"—"swindlers!"—"murderers!"—"plunderers!"—(*Vide League Circulars*, No. 27 to 100.) These, and a thousand others of like nature, are constantly issuing from their press against us, and unless met in open contest, the result will be fearful to the welfare of our classes, and destructive to our existence as an influential body in the state.

I place little reliance in the boasted vauntings of their fund. I do not, nor does any rational man, believe that one-half the subscription will be paid. The public are more awake than formerly to the modes resorted to to raise a subscription. A name with 500*l.* attached is sometimes as effective to draw others as if 500*l.* were actually subscribed. No account, I believe, has been rendered of the 50,000*l.*; nor will any account be rendered of the 100,000*l.* The subscribers will be told how many tons of paper have been printed and circulated, how many speeches have been delivered, and how many lectures inflicted upon the public; as if the number of bottles, phials, and pill-boxes found in a chamber after sickness could convey anything of the good effected to the patient beyond the length of the bill that was to follow their introduction.

But I fear that I am carrying my letter beyond its fair proportions; if so, place it to the warmth I feel in the cause, and let me conclude by reiterating the motto that we have adopted—"Knowledge is power;" and let me at the same time connect it with another—"Union is strength." Combine these in action, and you will still live to see the agricultural interest flourish as formerly—the *first in the state*.

I have the honour to remain,

Your most obedient servant,

ROBERT BAKER.

Writtle, Nov. 30th.

## ON MANURES, EXPERIMENTAL FARMS, AND AGRICULTURAL CHEMISTRY.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—Much as had been written on the subject of manures and the cause of their action on the growth of plants, no true explanation was given to the world till the publication of Liebig's immortal work. That cultivated land required the addition of something to keep it in a state fit for vegetable increase, and that the experience of ages had pointed out certain substances which produced the desired effect, were truths well known; but the true part that manures played in the process of vegetation, was, up to the year 1840, a profound mystery and a vexatious uncertainty.

Liebig has unveiled the mystery; and, in my eyes, he stands a greater creditor to mankind than all the heroes, or statesmen, or philosophers

that have preceded him. He has, in a wonderfully plain and simple, yet profound and logical manner, laid bare the true principles upon which successful agriculture depends; and, doubtless, every deviation from those principles will be a loss of time and profit to the farmer who goes astray. "There is no profession," says Liebig, "which can be compared in importance with that of agriculture; for to it belongs the production of food for man and animals; on it depends the welfare and development of the whole human species, the riches of states, and all commerce. There is no profession in which the application of correct principles is productive of more beneficial effects or is of greater or more decided influence. Hence it appears quite unaccountable, that we may vainly search for one leading principle in the writings of agriculturists and vegetable physiologists. The methods employed in the cultivation of land are different in every country and in every district; and when we inquire the causes of these differences, we receive the answer, that they depend on circumstances. No answer could show ignorance more plainly."

This ignorance has been manifested very plainly in the numerous trials that have lately taken place with the various new species of manures. So many contradictory accounts have been received regarding their fertility, that we can only come to the conclusion, that the farmer has been guided more by chance than by principle in their application. Guano has been proved to be successful here, and a failure there; burnt clay answers with one, and not with another; and so on with all the other kinds of manure. One farmer lauds the action of this as wonderful, and another disparages it as valueless. And why all this. Men of common honesty surely would not tell falsehoods about the matter—would not willfully lead astray, because there is so much ignorance as to what constitutes the nourishment or food of plants. Land only requires for manure that which it is deficient of; and where there is already an abundance of the salts of lime and a sufficiency of the salts of ammonia, it would be an absurdity to go and apply guano. In Sir Robert Peel's speech at the Tamworth agricultural meeting, he alludes to the fact that the farmers are bewildered and know not what to do. "With respect to experiments, I believe nothing is more bewildering to the practical farmer than the different results of the experiments that have been lately made with artificial manure, natural manure, and patent manure; in fact, the tenant hardly knows what to do from the result of a series of conflicting experiments, and cannot tell whether they do not owe their success to situation and soil;" and, in truth, they never will know what to do until they gain knowledge and become acquainted with principles. Why, farmers are acting on the principle that Morrison so successfully (for his purse) pursued—"Here, take these pills, they will cure whatever is the matter with you;" and the fact is, they did cure some, but I believe not a few met an earlier grave than they calculated for. Just so with the land: it happens to be sickly sometimes; it wont grow what the farmer wants, or so much as he wants, and what does he do? Why, he applies the remedy that has been latest advertised or most talked about; and expects that, because this very remedy happened to prove successful with his neighbour and friend, that it must so prove like-

wise with him. Is this not quackery? to find men applying to their soils—soils which differ as much in their constitution, as patients do in their disorders—a kind of universal restorative? What can be expected when such a course is pursued? Just what we find—mystery, doubt, and uncertainty. Let the farmer ascertain what the true composition of his soil is, and then let him learn what the constituents of a healthy plant are; he becomes immediately acquainted with the remedy, and at once supplies the deficiency. Let us suppose that a farmer wishes to grow a crop of turnips, and instead of manuring his land from his yard, he makes an experiment with guano. It is evident, if his soil be deficient in the salts of potash, he will not obtain a remunerating crop; for turnips require a large proportion of potash to insure a perfect and vigorous growth, and guano is deficient in that very constituent. But guano would be the very material to add to a soil already rich in the salts of potash, because it contains a sufficiency of the salts of lime, magnesia, and ammonia. Sir Robert Peel's remedy, however, is a recommendation to landlords to set aside a few acres of their land for the prosecution of experiments on manures; so that the tenant farmer may be assuredly informed of the genuine properties of whatever species of manure may be tried. I believe that to be an unsafe mode of proceeding; for it may lead astray, as exemplified above, and it does not go far enough. The nature and constitution of the soil should first be taken into consideration; then the properties and composition of the plant intended to be grown; and lastly, the species of manure to be employed.

What means are necessary to enable a field to sustain its fertility for the same plant, and to make it fit for the cultivation of one, two, or for all plants?

The latter questions are proposed by the art of agriculture, but they are not susceptible of solution by means of the art. When a farmer institutes experiments for the purpose of making a field fertile for plants which it would not formerly bear, the anticipation of success must be small unless he is guided by scientific principles. Thousands of farmers try analogous experiments in various ways, and the results of these constitute a mass of experience, out of which a method of culture is finally formed, and this method suffices for a certain district; but the same method fails with a neighbouring district, or it may prove actually injurious.

What an immense amount of capital and power is lost in these experiments! What a very different and certain path does science follow! It does not put us in danger of failure, and it gives us the best security of success.

What then is the best, and safest, and surest plan for the landlord to adopt to dispel the doubt and uncertainty that now attaches to many of the farmer's operations? Why, he should employ a competent chemist to survey the whole of his estates, and to make accurate analysis of every species of soil under cultivation. The individual who undertook the investigation should go to his task with an honest ardour, and a pure love of science; seeking only for the truth.

“These investigations are a necessity of the times in which we live; but in a few years, by the united diligence of chemists of all countries, we may expect to see the realization of these views; and, by the aid of intelligent farmers, we may confidently

expect to see established, on an immoveable foundation, a rational system of farming for all countries and for all soils.”

Many chemists are to be found now-a-days, possessed of every qualification necessary to ensure success, and capable of conducting the most complicated analysis, and for a trifling consideration, if the benefits that are sure to accrue be taken into the account. But whoever undertakes the duty must discard all the former results that have been obtained by preceding authorities; or rather, he must not be led astray by them; and it is not to be doubted, but that a mass of information would soon be obtained, which would more than remunerate all expenses attending the labour. Till lately many important constituents of fertile soils escaped the dexterous manipulation of all those who had pretended to investigate their composition; and perhaps, after all, the farmer is not so much to blame, if he is more doubtful than credulous, when it is considered he has been banded about by so many quacks.

Agricultural associations might likewise extend their sphere of usefulness by establishing experimental farms on a small scale. A rod of ground is as good as an acre to show a result. The produce of a small farm, say fifty acres, would assuredly nearly cover the expenses of cultivation; and it appears to me that the practical results that must follow the employment and the carrying out of the suggestions of intelligent men, would decidedly prove more beneficial in furthering the objects of the association, than the members merely meeting at stated times and discussing subjects taken at random.

It has been far from my intention to disparage the associations now in existence, because everybody knows that they have done incalculable good; but I wish humbly to express an opinion, that the true road to success in all investigations is experiment; and it is because the experiments that individual farmers are in the habit of making are not exactly to be depended on—for prejudice has such great sway, it does so blind us—that I ardently recommend the establishment of experimental farms by the associations now in existence. One experiment, well and safely conducted, does more to advance truth than all loose reasoning and verbose argument. There are two modes of experimenting: one mode is to establish or falsify a specific proposition, based upon known data; the object of random experiment is to see what chance will do.

Let us exemplify the latter. We possess a spot of land not capable of growing to advantage some kinds of wheat, and as we possess no previous knowledge to enable us to judge of the kind best suited to its nature, we throw upon its surface a medley of twenty known varieties: when autumn comes our object is attained. A random experiment of this kind possesses a certain advantage—it does away with speculation, and at once establishes the truth sought after. The time is fast coming, however, when experiments of this nature will be entirely superseded.

The first kind of experiment leads us to put into practical operation theories deduced from scientific reasoning. We have found by analysis, for example, that wheat in corn and straw contains certain constituents. “Four Hessian acres of a soil have removed from it by a crop of wheat 130.51lbs. of the salts of potash and soda; 67.55lbs. of the salts of lime, magnesia, and iron; and 260.05lbs.

of silica," whereas the same soil gave "with a crop of peas 198.42lbs. of the salts of potash and soda; 371.46lbs. of the salts of lime, magnesia, and iron; and only 46.60lbs. of silica." Now if we reason according to the dictates of common sense and sound philosophy, we ought to conclude that a soil deficient in the salts of potash and silica will not produce an abundant crop of wheat; and that peas cannot be grown to advantage in soils wanting the salts of potash and lime. Experiment justifies that mode of reasoning. Peas cannot be grown in soils wanting lime, and wheat will not arrive to maturity in the soils deficient of potash and silica.

In recommending, however, the establishment of experimental farms, I wish to explain; because it is a matter of importance, that I would not have them to be considered or looked upon as example farms. Now that the true principles of vegetable growth are established, and simple and plain rules laid down for the guidance of the farmer, example farms are perhaps needless; and, as has been previously explained, that as almost all soils differ in some one material quality, the policy that may suit one farm may not be applicable to another. Just let us reflect for a moment on the great number of constituents that are necessary to render a soil fertile for beans, and that if one of those constituents be absent, or not present in sufficient quantity, its fertility is vastly diminished, and the produce comes not to maturity. Example farms *might* then prove an injury to a farmer whose soil but slightly varied in nature and appearance from that, the system of cultivation on which he was going to adopt.

An experimental farm has this object in view: to discover the particular features of every species of cultivated vegetable, the distinct properties of every variety of each species, and to bring vegetation to such a state of perfection, by employing a system of cultivation based upon known data and recognised principles, that, unless visited with those dispensations of Providence it is not in man's power to avert, we may always be enabled to calculate with certainty upon the exact amount of produce the land is capable of bearing. Those who have read Colonel Le Couteur on the cultivation of wheat will at once acknowledge the desirability of experimental farms being established.

Experimental farms will act as a stimulus on the mind of the farmer, and may eventually be made to be safe and sure guides for him; but time is required to effect that object. The true cause of barrenness and fertility must be previously well understood by the cultivator.

I cannot help in this place making a quotation from a letter written by Mr. Hillyard, and published in the *Mark Lane Express* of November 6th. That gentleman says, "that greater good has arisen from mechanical science in the improvement of agricultural implements than could have been expected; but it does not appear that there has arisen that great good from chemical science as anticipated. I do not mean, in saying thus much, that, although as yet no important chemical discovery has been made to bring into general farming practice, still I believe it possible that some great discovery may yet be made by chemistry, and so develop some of the mysteries of nature as to enable the occupiers of the land to get a larger produce from it than they have hitherto been able to obtain." We will now place in juxtaposition an observation or two made by Liebig in his preface to the third edition of "Chemistry applied to

Agriculture." "In the three years which have elapsed between this edition and the first, I have not neglected any opportunity of subjecting to a rigorous and careful examination the principles which I had developed of the nutritive properties of plants, and their application to agriculture. I have endeavoured to make myself acquainted with the condition of practical farming, and with what it requires, by a journey through the agricultural districts of England and Scotland; and during this interval a long series of experiments were carried on in the laboratory of this place, with the sole object of giving a firmer basis to my exposition of the causes of the advantageous results attending the practice of rotation of crops, and also of effectually banishing all doubts concerning their accuracy." And in the next paragraph but one he states, "Now that the conditions which render the soil productive and capable of affording support to plants are ascertained, it cannot well be denied that from chemistry alone further progress in agriculture is to be expected." Now, which of these two statements is the correct one I will leave the reader to judge for himself; only I do think persons should be more careful, especially when their statements carry a kind of authority with them, not to allow their tongue to utter or their pen to write what their cool judgment must repudiate. The first idea that struck me on reading Mr. H.'s letter was, that he had never heard that such a man as Liebig existed, or that such a work as the "Chemistry of Agriculture" had been published; but, as it is evident he is a reader, I am astonished he should have displayed such gross ignorance. He is as bad as the obstinate pilot, who suffered his ship to be wrecked because he would not look at the compass.

The chemist can do no more than lay down just principles, and I boldly say that Liebig has propounded the true theory of vegetable growth. It is now the farmer's duty and interest to put those principles to the test; but if he will continue obstinate, if he will remain in ignorance of, or reject without trial, well considered plans, he has only himself to blame. Let the farmer do justice to science, and make her his future guide, and let him at once leave the paths of doubt and mystery, and let honour be done to the name of Liebig; and whenever we pass through fertile fields, let us bear in mind that it was he who first showed the certain way of making two blades of grass grow where only one did before. I never look at the satellites of Jupiter without doing honour to the memory of Galileo; I never explain the properties of the earthy and alkaline bases without calling to mind that Davy was my countryman; and I seldom talk about America, without reflecting on the dangers that Columbus underwent.

It may be desirable in this place to point out a few of the advances that chemistry has made towards perfecting the art of agriculture. Chemistry has exploded the old theory of the action of humus, and has satisfactorily shown us the true source of carbon and nitrogen in plants; it has explained why the alkaline bases are necessary for vegetable life—that "they are present for the purpose of effecting the conversion of carbonic acid into a living part of the plant." It has likewise explained to us the true nature of fallow, and how it operates in disintegrating from the soil some of the necessary constituents of plants; and it has discovered to us the true reason why a rotation of crops has been rendered necessary, and how it was that the land could not grow to advantage two successive crops of the

same nature. Chemistry has also exploded the use of mysterious language, so that we shall no longer hear of land "being tired," and it has given us the remedies to prevent exhaustion for the future. It has also given to us the means of knowing to a certainty the particular kind of manure or food to apply to a field, to render it fertile for any particular plant. It has shown that wheat, rye, and barley, cannot be brought to maturity in soils deficient of potash and silica; that tobacco, peas, and clover, require an abundance of the salts of lime; and that turnips, beet-root, and potatoes, require an excess of potash. I do not think it ought ever to be repeated, then, that "Chemistry has done nothing for the farmer."

Let the farmer state fairly what it is he does expect from the aid of science. I know this, though, that he will never find it to play the part of either conjuror or magician. It may be that he expects Hercules to shove the wheel round for him, while he stands still and looks carelessly on; but I am satisfied that the day has long gone by when a mere common application was all that was necessary. Depend upon it the time is not now when fruit could be gathered without first pruning the tree. The application of chemistry to agriculture will indubitably require greater application and more labour, but the results will be more sure and the crops more abundant. Skill and energy, knowledge and perseverance, are now the only elements of success; and I tell the British farmer that he may sooner than he expects it, feel the effects of being deficient in either of the above necessary qualities.

Let enlightened landlords set an example, then, and show to their tenants what is to be done by following just principles deduced from scientific reasoning. I have said before there are many intelligent men, fully capable of undertaking the duties that would devolve upon them, were they called upon to fulfil such a task; there can be no difficulty about that matter. The first thing, of course, to be done is to obtain an accurate knowledge of the constituents of the soil—every field ought to undergo a searching examination. As Liebig says—"The farmer will thus be enabled, like a systematic manufacturer, to have a book attached to each field, in which he will note the amount of the various ingredients removed from the land in the form of crops, and, therefore, how much he must restore to bring it to its original state of fertility. He will also be able to express in pounds weight how much of one or of another ingredient of soils he must add to his own land, in order to increase its fertility for certain kinds of plants." This is not mere speculation, there is nothing visionary about it—it is truth. It has often struck me, when I have been going over a field of turnips, for instance, and seen a few isolated ones much larger than the others, as a matter of great importance to learn the reason why those turnips should have outstripped in size and weight the smaller ones that have surrounded them. It is evident that certain conditions must have been present to have operated on the growth of the larger ones, and an intelligent man might make that a means of obtaining important information, and, perhaps, of gathering a better knowledge of the means of cultivating them. There must be a reason why some of the turnips attain a larger size than the remainder, and it often happens that from such apparently accidental circumstances, great truths are obtained. I hope the reader will not look upon the views here entertained as visionary or specula-

tive; I am sure I have endeavoured to keep within the bounds of scientific reasoning; but I believe there is no calculating the amount of good an intelligent man, being a clever practical chemist, is capable of effecting. I believe it will be as easy for a farmer, by and by, through the agency of the chemist, to predicate results, as it now is for the astronomer to foretell celestial phenomena.

Having ascertained what the constituents of the soil are, and made a careful calculation of each ingredient, so as to ensure a faithful result; the next point is to obtain a knowledge of the mineral ingredients existing in full grown healthy plants. But let me inform the farmer here, that the analysis of a soil is not such an easy matter as most writers on agriculture seem to apprehend. The fact is, there is not one single plan published in agricultural works, which is now of any service at all. Recent investigations have so completely altered our views concerning the causes of barrenness and fertility, that it has become a matter of the greatest importance to obtain an accurate knowledge of the exact quantity of every constituent existing in a soil. The plans that have hitherto been published are useless in a chemical point of view, because they take no account of, and consequently give no mode of, discovering the real active agencies of fertile soils. When we come to examine a soil fertile for wheat, and find that it contains as many as 12 or 14 different constituents, and that most of them are essential to the healthy growth of the plant; and when we likewise find that some of those constituents do not form more than a two-hundredth part of the soil, it requires a dexterity of manipulation and a nicety of observation, and such an amount of chemical knowledge, to discover and distinguish them, that few but practiced and experienced hands really possess the necessary amount of skill. It is not every one that is capable of giving a popular lecture, possesses that practical knowledge of chemical compounds which is so essential a requisite in all investigations of this kind. If there is one business more than another which requires a long and studious apprenticeship, it is that of the practical chemist.

A few tables of the mineral constituents of several kinds of manure, and of some of those plants more generally cultivated by the farmer, are here subjoined. They are taken from Liebig's work, and are worthy attentive study.

100 parts of the ashes contain—	Red Wheat Seed.	White Wheat Seed.	Rye Seed.	Peas Seed.	Beans Seed.
Phosphate of potash . . . .	36.51	52.98	52.91	52.78	} 68.50
Phosphate of soda . . . . .	32.13	..	9.27	5.67	
Phosphate of lime . . . . .	3.35	5.06	5.21	10.77	9.35
Phosphate of magnesia . . . .	19.61	32.96	26.91	13.78	19.11
Phosphate of iron . . . . .	3.04	0.67	1.88	2.46	0.00
Sulphate of potash (common salt) . . . .	traces	..	2.98	9.09 3.96	1.84
Silicate of potash . . . . .	..	..	0.34	..	1.11
Silica . . . . .	0.15	0.30	..	..	..
Coal . . . . .	} 4.99	} 8.03	} 0.50	} ..	} ..
Sand . . . . .					

	Salts of Potash and Soda.	Salts of Lime and Magnesia.	Silica.	
Silica plants.	Oat straw with seeds.	34.30	4.00	62.00
	Wheat straw .....	22.00	7.20	61.05
	Barley straw with seeds .....	19.00	25.70	55.03
Lime plants.	Rye straw .....	18.65	16.52	63.89
	Tobacco (Havannah) ..	24.34	67.44	8.30
	Ditto (Dutch) .....	23.07	62.23	15.25
	Ditto (grown in artificial soil) .....	29.00	59.00	12.00
	Pea straw .....	27.82	63.74	7.81
Potash plants.	Potato herb .....	4.20	59.40	36.40
	Meadow clover .....	39.20	56.00	4.90
	Maize straw .....	71.00	6.50	18.00
	Turnips .....	81.60	18.40	..
	Beet-root .....	88.00	12.00	..
	Potatoes (tubers) .....	85.81	14.19	..
	Helianthus tuberosus.	84.30	15.70	..

1,000 parts of human urine contain—	100 parts of a specimen of guano from Liverpool.
Urea .....	30
Lactic acid and lactate of ammonia .....	17
Uric acid .....	1
Sulphate of soda and potash ..	7
Phosphate of soda	3
Phosphate of ammonia .....	1.5
Chloride of sodium	4.5
Muriate of ammonia	1.5
Phosphate of magnesia .....	1
Water .....	933
100 parts of horses' dung.	
Phosphate of lime	5.00
Carbonate lime..	18.75
Phosphate of magnesia ..	36.25
Silica .....	40.00
1,000 parts of human feces yield 150 of ashes by incineration.	Cows' urine, 1,000 parts.
Sulphate of potash and soda, and phosphate of soda	8
Phosphate of magnesia and lime, with a trace of gypsum .....	100
Carbonate of soda	8
Silica .....	16
Carbonaceous residue and loss ..	18
1,000 parts of horses' urine.	
Carbonate of lime	11
Carbonate of soda	9
Hippurate of soda	24
Chloride of potassium .....	9
Urea .....	7
Water .....	940
	Chloride of potassium, muriate of ammonia .....
	15
	Sulphate of potash .....
	6
	Carbonate of potash .....
	4
	Carbonate of lime ..
	3
	Urea .....
	4
	Water .....
	650
	Cows' dung, 100 parts.
	Phosphate of lime 10.9
	Phosphate of magnesia .....
	10
	Perphosphate of iron .....
	8.5
	Lime .....
	1.5
	Gypsum .....
	3.1
	Silica .....
	63.7
	Loss .....
	1.3

A mere survey of the preceding tables must convince any intelligent person, that the successful application of manure to land is inseparably connected with the nature of the plant to be grown and the composition of the soil to which it is to be added.

On looking over the tables, we shall find that the ashes of red and white wheat differ very materially; for though both contain nearly the same amount of phosphate—from 90 to 94 per cent.—the ashes of white wheat are entirely deficient of phosphate of soda, whilst those of red wheat contain 32 per cent. Again, the ashes of white wheat contain 53 per cent. of phosphate of potash; those of red only 36.51 per cent., and whilst the ashes of the former contain near 33 per cent. of phosphate of magnesia, those of the latter contain but 19.61 per cent.

It will also be found that plants are naturally divided into three separate classes—silica plants, lime plants, and potash plants; consequently, it would be as absurd to expect to grow wheat or oats in a soil deficient of silica and the phosphates, or tobacco and clover in a soil deficient of the salts of lime, or turnips and beet-root in a soil deficient of potash, as to expect to gather figs from the thorn-tree or roses from the thistle. It is likewise a matter of importance to know that the presence or absence of the salts of ammonia, affect very materially the nutritious properties of plants. "Animal manure exerts a very complex action on plants, but as far as regards the assimilation of nitrogen, it acts only by the formation of ammonia. One hundred parts of wheat grown on a soil manured with cow-dung (a manure containing the smallest quantity of nitrogen) afforded only 11.95 parts of gluten, and 62.34 parts of lime or starch; whilst the same quantity, grown on a soil manured with human urine, yielded the maximum of gluten, viz., 35.1 per cent., or nearly three times the quantity.

Putrefied urine contains nitrogen in the forms of carbonate, phosphate, and muriate of ammonia, and in no other form than that of ammoniacal salts.

Putrid urine is employed in Flanders with the best results. I gave, a short time ago, an effectual and economical mode of preparing human excrements for agricultural purposes, in the *Mark Lane Express*, and I have received many letters from various parts of the country, thanking me for publicly making known the process. As to its efficacy, if tried, I doubt not; it is only astonishing that so little attention should have been bestowed on such valuable materials.

I look upon farmers as manufacturers of food, and considering that man cannot exist without it, the consumer has a right to expect that every and the best means are adopted to procure a sufficient supply.

In urine, and in the solid excrements of animals, and in guano, we furnish ammonia, and, therefore, nitrogen to our plants. This nitrogen is accompanied by the mineral food of plants, and actually in the same proportion as both exist in the plants which served the animals for food, or, what is the same thing, in the same proportion in which both are capable of being applied to a new generation of plants.

I must now bring these random observations to a close; but I will take this opportunity of giving "A Welch Farmer" a word of advice. Never more mix wood-ashes with guano, or any manure containing the salts of ammonia; wood-ashes contain a large portion of carbonate of potash, which decomposes the ammoniacal salts immediately it comes in con-

tact with them. I find guano contains sometimes more than 30 per cent. of the salts of ammonia. Neither should caustic lime be added to guano, for it acts in the same manner as potash or its carbonate.

If, sir, you should think the hints here thrown out be of any value to your readers, I should feel flattered by your inserting them; and if I should not be thought intrusive on your columns, I believe I have a mode of rendering potash more permanently available as a manure than any we possess at present, and which will form the subject of a short letter at some future period.

I am, sir, &c.,  
15, Maze Pond, Borough. JAS. COOMBE.

## LONDON FARMERS' CLUB.

On Thursday, Dec. 7, between 100 and 200 gentlemen, members of this Club, the now successful establishment of which is attributable to the energy and perseverance of William Shaw, Esq., its founder, dined together at the Club-house, in Bridge-street, Blackfriars; enjoying one of those social *re-unions* which the visits at this season of large numbers of influential agriculturists from the provinces, attending the anniversary of the Smithfield Cattle Show, and the meetings of the Royal Agricultural Society, render so obviously opportune and agreeable.

WILLIAM SHAW, Esq., Member of the Council of the Royal Agricultural Society of England, presided. The dinner, which was sumptuously served up by the experienced and practised caterers for this establishment, took place, as appointed, at six o'clock; and perhaps the only drawback to the completeness of the festival, was the unavoidable division of the members, owing to the impossibility of locating them in one room, though in itself of most ample dimensions, but obliging them to be distributed in three different rooms in the establishment.

Amongst the leading gentlemen and members we observed—Hon. Mr. Wilson, Capt. Aitcheson, Rev. Mr. Waller; Robert Baker, Esq., of Writtle, in Essex; W. R. Brown, Esq., Devonport-street, Oxford-street; George Emery, Esq., the Grange, Somerset; Humphrey Gibbs, Esq.; Stephen Grantham, Esq., Sussex; W. F. Hobbs, Esq., Marks Hall, Coggeshall, Essex; John Hudson, Esq., Castleacre Lodge, Swaffham, Norfolk; Wm. Huntley, Esq., Power's Hall, Witliam, Essex; Fielder King, Esq., Petersfield, Hants; H. Price, Esq., H. Lattimore, Esq.; and a large number of the members of the Royal Agricultural Society of England.

The cloth being removed, and grace said—

The CHAIRMAN rose to propose the first toast which, he said, would be readily anticipated, for it was one which was always first proposed and loudest responded to at all meetings which partook of a public character. They had so frequently had the happiness of hearing eulogiums passed upon our most gracious Queen, that probably it would be found difficult for him to say anything of novelty on that subject. There was, however, one remarkable circumstance which had occurred since they had last met together, and which he thought was entitled to their regard and observation. Her Majesty had paid a visit to the King of the French;

and though he was not one of those who was disposed to consider that governments could be regulated by the visits of princes, still he looked upon it as an omen of good, with respect to that bond of union and concord which it was desirable to see subsisting between the two countries. (*Cheers.*) It was, moreover, expedient in every point of view, that the Sovereign should be acquainted with the character of her country and her subjects; that she should be seen, and known, and heard by the nation; and not like the Sardanapules of old, remain immured in their palaces, afraid of showing themselves to the people. (*Cheers.*) He would give "The health of her Majesty the Queen," coupled with the heartfelt and fervent wish that she may long reign over her people. (*Loud cheering.*) The toast was responded to with three times three.

The CHAIRMAN—The next toast he had to propose was "The health of the Queen Dowager, of his Royal Highness Prince Albert, Albert Prince of Wales, and the rest of the Royal Family." (*Cheers.*) Of the Queen Dowager, either when seated on the throne, or retired from that exalted station, he need not say one word in commendation. (*Cheers.*) Of Prince Albert he would say, that since he had been among them, he had distinguished himself alike by his good feeling, his amiability, and condescension; and he need hardly say that the interest which he had lately been induced to take in farming, (*loud cheers*) had endeared him more than ever to that important body. (*Renewed cheers.*) It was to be hoped that his Royal Highness would devote himself to that pursuit in such a way as to become thoroughly acquainted with it, so as to enable him at the same time to appreciate and understand the true position of the British farmer. (*Cheers.*) On Albert Prince of Wales the nation placed its hopes prospectively, and he would call on all present to unite with him in drinking that he might live long to wear the crown of his ancestors. (*Loud cheers.*) Drink with three times three.

The CHAIRMAN—The next toast was one of a body of men who must at all times command their respect and attention, as the moulders and the guardians of the minds and characters of the labouring population of this country; he alluded to "The Clergy of England." (*Loud cheers.*)

Rev. Mr. WALLER, of Hampshire, returned thanks, and expressed in a brief but appropriate address, his best wishes for the future prosperity of the club.

"The Army and Navy" having been proposed, coupled with a marked tribute to his grace the Duke of Wellington,

Captain AITCHESON rose to acknowledge the compliment, as a representative of the two services. (*Cheers.*) He had always felt the deepest interest in agriculture, and consequently as a member of that club, the deepest interest in its welfare and advancement. (*Cheers.*)

The CHAIRMAN then said, that, although this was only a festive meeting of the members of the club and of their friends, and not one of their anniversary meetings—being as yet not old enough for such a celebration—it would be a singular oversight on their part were they to permit that opportunity to pass by without drinking prosperity to their own institution. "Success to the Farmers' Club." (*Loud and long continued cheers.*) Although, for some short period before opening in June last, the club had progressed but slowly, he

(the Chairman) having moved first in the matter, felt himself in no way disheartened, since it was not the first occasion on which he had experienced a slowness to move amongst the farming body. (*Hear, hear, and cheers.*) Although, however, "slow to move," they were, when once set in motion, very effective (*hear, hear, and cheers*); and he felt satisfied that every one would concur with him that the progress of their own Club was all-sufficient proof of this, when it was remembered that since their public opening six months ago they had added sixty members to their list, making their numbers now to approach to the amount of 400 members (*loud cheers.*) It must be further borne in mind, that this addition of one hundred was made in the latter part of the year—a period when it was least to be expected that persons would be willing to join in an institution of the sort, when they had the prospect before them of the payment of two subscriptions in little more than one year and a fraction (*hear, hear, hear.*) They, however, found that members were coming in from time to time, and now the Committee had come to the determination that all members joining the Club in the month of December should be admitted immediately by a certain operation of the rules, and by paying only their subscription for the following year; he felt persuaded by this arrangement that, before they held their anniversary meeting in June next, their numbers would be considerably increased (*hear, hear, and cheers.*) Although but at present in their "swaddling clothes," he had the gratification to announce to them that, unlike many other clubs to which he had adverted on a former occasion in that room, they had already begun to show that thriftiness and industry which distinguished the British farmer by laying by something for a future day (*cheers.*) Thus, with as yet, a small number of members, a small entrance-fee, and a small subscription—all but too necessary for the present position of the farmers—they had been enabled to invest, as a sort of nest-egg, 300*l.* in the Three per Cents (*loud cheers.*) It was not much, but he (the Chairman) hoped that they would go on accumulating until it reached a sum worthy of mention (*cheers.*) This, he thought, was a good earnest for the future, so far as the funds of the Club were concerned (*hear, hear.*) He had had the satisfaction of knowing, from several members of the Club now in town, that they felt the greatest gratification in finding that this institution had been established on a firm foundation, and that they should henceforth have an opportunity of meeting with their brother farmers from different parts of the country, for the purpose of discussing their mutual interests; to quote a celebrated remark of a high individual expressed the other day—of improving themselves by "rubbing their minds one against the other" (*laughter and cheers.*) He hoped that the farmers of England would make the Farmers' Club-house, as it were, a "rubbing-post" for their minds (*hear, hear*)—that they would bring their mental faculties into collision; he (the Chairman) being convinced that by so doing, as in the collision of flint and steel, they would produce light for their own irradiation, and draw into closer union those elements which should bind them as a brotherhood together (*cheers.*) At present, the institution being so recently established, the Committee had been unable to make such extensive arrangements as they could have wished. They were obliged, for instance, to divide themselves with reference to the dining-rooms, which he was afraid had given a

considerable degree of dissatisfaction to many; indeed, he was sorry to state, that between twenty and thirty had gone away, but he believed that it would be far more satisfaction to them to have to say, that the room instead of being half-full, was so crowded that all could not be accommodated; showing, as it did in truth, a disposition among the farmers, to support and promote an institution which was emphatically their own (*loud cheers.*) Now in whatever point of view they might regard the institution of this club, there was one object connected with it of paramount importance, and one to which he might most legitimately advert—namely, that of forming in the metropolis a central point of union for the farmers of the kingdom, for the diffusion of knowledge, and the protection of their interests (*cheers.*) Whether it was to be regarded in that point of view, or for forming a bond of union amongst farmers which had hardly ever yet existed, it was equally incumbent upon them, and equally important that such an institution should be supported (*cheers.*) He had just been informed that a club at the western end of the town, honoured with the names of divers noble lords and influential men, paying large subscriptions, was about to close its doors; and he hoped he might not be thought presumptuous in contrasting the position of the Farmers' Club with theirs—they had been only six months in operation, and had contrived to save a little money; the other had been six years in operation, had exhausted all its funds, and was now no more (*laughter and cheers.*) He had every reason to hope that such was not likely to be their case. In the first place, they had not large funds to squander, and that, it would be admitted, was one way of keeping them tolerably regular and frugal; and even if they had, he believed that the management of the club was in such hands that they would not, like others, be unnecessarily lavish (*hear, hear, and cheers.*) He hoped that each member of the club resident in the country, and whom business had brought up to town on the occasion, would go back impressed with the advantages of the institution, and use his utmost energies to add to the present number of the club; for it was only by perseverance, and by a progressive increase in numbers that they could hope to make it useful to themselves, and useful to the country at large (*cheers.*) He (the Chairman) should never be content to see it a mere Club House (*hear, hear, and cheers.*) He must confess he had ulterior views. He might indeed be too enthusiastic, but he hoped some day that, even if they might not become so large as the Royal Agricultural Society, they might at least number amongst them a numerous proportion of the best farmers through the counties of England (*loud cheers.*) He felt, for his own part, that the farmers of England wanted some systematic organization (*hear, hear.*) He remembered when some three or four years ago an institution was established in London for other purposes, he suggested that arrangements should be made, that communications might readily be opened from it as a central point with every parish in England; as he anticipated, the necessity of having such a machinery ready for action would arrive (*hear, hear, hear.*) They had all seen whether such machinery was necessary or not. They all knew pretty well that it had been required (*hear, hear, hear.*) and that the time was come when such an arrangement would be useful. Whether it was for the object for which this club was more particularly established, or for other objects, he should wish to see members corresponding with that institution dotted all over the

kingdom, so that reports and communications sent from farmers' clubs, and other fountains of improvement in the country, might be forwarded to a central club in the metropolis, and having been there digested and put in proper shape, returned so digested to the respective clubs (*hear, hear, and cheers*). He felt confident that a machinery of that sort, if only judiciously established, would work well for the improvement of the agricultural body; and *a fortiori* he conceived that whatever conducted to that interest, must be conducive to that of the nation at large (*loud cheers*). He would conclude by calling upon all present, to pledge themselves with the utmost warmth and determination in support of the institution, and to drink "Success to the Farmers' Club House." (*Loud and long cheering*.)

Hon. Mr. WILSON next addressed the meeting. He had to propose a toast which he was confident would meet with the warmest reception, and most pleasurable response—the health of their most worthy Chairman. (*Loud and long-continued cheering*.) To him they were all most deeply indebted for the exertions he had made, in rearing the Farmers' Club from its infancy to its present position. He (Hon. Mr. Wilson) individually felt most peculiarly indebted to that gentleman, for his noble and persevering exertions, seeing that he (Hon. Mr. Wilson) was one of those who in years of former agricultural distress, had exerted his humble means to the utmost, to advance the interests of clubs like the present. (*Hear, hear, and cheers*). He rejoiced exceedingly to see that such an institution was likely to be prosperous and useful, feeling, as he did, firmly persuaded that they contained within them all the elements of usefulness and success to the farmers and agriculturists of the country. (*Renewed cheers*). He wished their worthy Chairman had explained himself more fully when he spoke of ulterior views. (*Hear, hear*.) He was quite aware that all institutions of that description must be entirely devoid of party politics—in fact, that they must never in any such society introduce any topic which was likely to savour of political hostility. (*Hear, hear*). But at the same time, as an assembly of intelligent men, they were met to devise the best means disseminating knowledge on the practical parts of husbandry and of science, and of those great facts which were associated with their interests. (*Hear, hear, and cheers*.) This was the distinction which, in his opinion, ought to be kept in view. They ought not to look at other men, measures, or party, or acting as a body of British farmers, to be curbed in their expression as to facts which most vitally affected their interests. (*Cheers*.) He believed that with such limits as these the Farmers' Club would flourish, and that it would be the means of disseminating the most useful information throughout the length and breadth of the land. In conclusion, he would express the sincere gratification which he felt in being enabled to attend on that occasion, coupled with his hearty thanks to Mr. Shaw, for his exertions in bringing it to its present crisis. The hon. gentleman sat down amid loud and long-continued cheering, again proposing the health of Mr. Shaw, which was drunk with three times three, and amid the most enthusiastic cheering.

The CHAIRMAN in acknowledging the toast, observed, that he was most sincerely grateful to the members for the approbation they had bestowed upon his humble exertions. He could assure them that he felt so unremittingly attached to everything that related to agricultural pursuits, to which his mind had been directed from his youth upwards, that to

bestow his utmost exertions in their advancement was a gratification rather than a labour. (*Loud cheers*.) Nothing could so stimulate him to increased exertion, or reward him so well for his labour as the approval of those for whom he felt such a deep attachment and respect, and who were ready to unite and rally round at every point which was calculated to improve their position and consolidate their interests. (*Cheers*.) He regarded such men as the chosen pioneers of agricultural improvement, and as the benefactors of their country and their kindred. (*Renewed cheers*.) They had heard much, both in ancient and modern times, of those who might be said to benefit their country; but for his own part, he was proud to be one of those who believed that there was no man who could now more benefit his country than he who turned his attention studiously to the advancement of the agricultural interests of this kingdom. (*Loud cheers*.) He felt that he was treading upon tender ground, otherwise he should have been disposed, as the hon. Mr. Wilson had observed, to have entered more largely into the subject; but he thought, under the circumstances in which they were associated together, that it would be more prudent to refrain from trenching on the subject. He should be perfectly prepared in any other place, or upon any other occasion, to do anything in his power to co-operate in the adoption of any other course which the agricultural class might think it judicious to adopt. (*Cheers*.) But that was not precisely the period or the place. He believed, however, that it was the time, however much he might regret the inappropriateness of the place, or the occasion (*hear, hear, and cheers*), or that in matters so deeply affecting the agricultural body, they should, generally speaking, be found so slow to move. (*Hear, hear*.) Again thanking them for the honour they had conferred upon him, he would conclude by assuring them that so long as his health and strength, and mental faculties were preserved to him, he would exert his utmost efforts to support and promote the interests of the farmers of the kingdom. (*Loud and prolonged applause*.)

Captain AITCHESON rose to propose the health of the Hon. Mr. Wilson, almost the only member, he believed, of the aristocracy who was a member of the Farmers' Club. (*Cheers*.) The hon. gentleman had been emphatically "the farmer's friend through life." (*Loud cheers*.) They had heard him deliver his sentiments on the subject. Let them make as much of him as they could, for he deserved all that they could possibly say of him. (*Loud cheers*.) He would propose the health of the "Hon. Mr. Wilson," the farmer's friend. (*Renewed cheers*.) Drunk with three times three.

Hon. Mr. WILSON rose to return thanks. Captain Aitcheson had been kind enough to say that he (Mr. Wilson) was the "farmer's friend." He must confess that from his cradle he had been brought up a farmer, that his delight had ever been in agriculture, and in promoting it by every means in his power in the counties with which he had been connected (*Cheers*). It was certainly a pleasing symptom of the times to see the prime minister of this country laying aside the dignities of his station, and the party strifes of political feeling, to unbind his mind to the interests of agriculture, and to unite with the nobles of the land in presiding at farmers' clubs, throughout the kingdom (*loud and long cheers*). He (hon. Mr. W.) was one of those who had mingled with farmers from his youth, and from them had received invariably every mark of attention and respect. It had been his great object, no less than his desire, to bring together, on every occasion, the land-

lord and the tenant farmer (*cheers*); that they might meet, as it had lately been expressed at the meeting of a farmers' club—*that they might "meet one another face to face,"* without the intervention of the agent (*hear, hear, and cheering*). He was perfectly satisfied that it was only by mutual intercourse and interchange between the landlord and the tenant, that an honest and straightforward understanding could be come to (*cheers*). This it was that he (hon. Mr. W.) had so particularly and strenuously desired to see established throughout the kingdom. He was satisfied that by the institution of clubs like the present, where they could meet together, and have a mutual interchange of opinion, that the wants and the protection of agriculture could best be carried out (*hear, hear, and cheers*). He regretted that the room in which they were assembled was not sufficiently large for their first meeting, and would suggest that in future a larger one should be taken, so that if possible all members might be present (*hear, hear, hear*). An observation had just suggested itself to his mind, and which indeed had been touched upon by their worthy chairman, to the effect, that they ought to have a communication with every parish and province (*cheers*). He knew, and his friend opposite Mr. Ellis, of Barming, who had worked hand in hand with him on a former occasion in another society, to relieve the agricultural interests from those burthens which pressed upon them; they now knew well enough why it was they failed—it was because of want of union (*hear, hear, and cheers*). The agriculturists in one part of the kingdom wanted this, and the agriculturists in the other part wanted that, and for want of a proper union and system agriculture went to the wall (*hear, hear, hear*). It was necessary that they should coalesce together, that they should, as their worthy chairman had expressed it, have intercourse and communication with the various agricultural societies in the kingdom (*hear, hear*). They did know that there was a society in existence (and he hardly knew whether in that meeting he ought to name it), but there was a society in existence whose energies were unsurpassed, and whose means were most extensive (*hear, hear, hear*), who had communication, not only with every parish, but with many individuals in every parish, and who were unremitting in disseminating their papers and fallacies through the kingdom, and everything that was most apt to set man against man (*loud cheers*). Were the farmers of England, under these circumstances, to be told, if they meet together in hundreds to-morrow, that they must not attempt to say one word as respects their individual interests (*hear, hear, and cheers*)? They knew moreover, that mischief was going on in the sister country, and that communications were being carried on between parish and parish, and province and province; and he had been told that a society now existed, and that an agent from the sister country had been sent out for organizing such a system of communication. Whether it might be used for the interest of the agricultural body he would not pretend to say; but while they, as farmers, have an interest in the land, while as landlords a stake in the soil—while the great mass of the population of this country were dependent, first upon the farmers, and then upon the aristocracy—while, as he would not hesitate to declare, the great manufacturing interests of this country were primarily dependent upon agriculture (*cheers*), which was the home market of nature to the world—the landed interest must be supported (*cheers*). He was afraid that he had pressed far too much upon their time (*loud cries of "go on"*), and would therefore conclude by saying that in whatever situation he might be placed, his best exertions would be directed towards the support and promotion of agriculture. The hon. gentleman resumed his seat amid long and enthusiastic cheering.

The CHAIRMAN had much pleasure in proposing for the next toast the health "of the Council and Members of the Royal Agricultural Society of England." (*Cheers*.) It was unnecessary for him to occupy their time in adverting to the great benefits of that institution. He knew full well that there was scarcely one gentleman

in the room who was not a zealous member of one or more local agricultural societies, as well as being also many of them members of the Royal Agricultural Society. The fact of that society numbering nearly 7,000 members, from amongst the leading landowners and best practical farmers of England, was sufficient evidence of its power and importance. (*Hear, hear.*) For his own part he could say that the council of that society devoted itself with the utmost attention to do that which must best promote improvements in agriculture throughout the kingdom, and he could only wish, as on a former occasion, that they could see a greater number of practical farmers numbered in the ranks of the council. (*Hear, hear, hear.*) They were, however, adding to the list, and he trusted to see the time when one-half of the fifty members of the council should be bona fide practical farmers. (*Cheers.*) He (the chairman) had had the gratification that day of introducing an additional member into the council, who was not only an extensive but an excellent practical farmer—he alluded to Mr. Hudson, of Castleacre. (*Cheers.*) In conjunction with this toast he would name his friend Mr. W. Fisher Hobbs. He (the chairman) had before borne testimony to that independence which characterized that gentleman, and who, never withheld what he conceived to be a sound opinion, however it might differ from high authority, and supported that which he considered to be truth. (*Loud cheers.*) He would propose the Royal Agricultural Society of England, associating with it the name of Mr. Hobbs, a member of the council. (*Cheers.*)

W. F. HOBBS, Esq., said he felt highly flattered in the manner in which his name had been associated with that of the Royal Agricultural Society. While that society was increasing in the number of its members, it was likewise increasing in usefulness throughout the country. (*Cheers.*) Whatever was of value in improving the breeds of stock, in diffusing useful and practical information in the improvement of agricultural machinery, or in bringing science to bear upon agriculture at large, these things were patronized and sedulously cultivated by the Royal Agricultural Society. (*Cheers.*) In connexion with the Farmers' Club, he was particularly gratified at the numerous attendance on this occasion, and though he regretted the circumstance that they were not all able to meet in one room, still he thought that in beginning in the way in which they had, they were beginning upon safe grounds. (*Hear, hear.*) He thanked them most heartily for the expression of their good wishes.

The CHAIRMAN, in proposing the next toast, said there was another institution of considerable importance, though directing its attention to different objects than those of the Royal Agricultural Society, and which was now very active in the metropolis, which they could not pass over without mentioning; he alluded to the Smithfield Club, and collectively with that the name of a gentleman present, who had filled the office of honorary secretary to that club, and who had likewise performed, to the satisfaction of every member of the Royal Agricultural Society since its establishment, the laborious duty of honorary director of its shows; he alluded to his friend Mr. Gibbs, and who had devoted his energies, both night and day, to those duties, not as a paid, but as an honorary officer. (*Loud cheers.*) He regretted, as must every one connected with the Smithfield Club, that, owing to ill health, they were about to lose his valuable services. (*Hear, hear, and cheers.*) He trusted that steps would be taken to make some suitable testimonial to mark their sense of his services. He begged to propose the health of Mr. Gibbs, accompanied by a hope that he would speedily be restored to health and strength. (*Cheers.*)

HUMPHREY GIBBS, Esq., said he felt it to be a duty no less than a pleasure to respond to a toast, expressive of so much good feeling towards himself and the Institution to which he now no longer belonged. It would be perfectly superfluous upon his part to point out the utility of that Institution, or to do more than say that it was established in 1798, and had

gone on progressively up to the present time. Although for a certain period it was much depressed by the accumulation of a large debt, he had now the pleasure of telling them that they had large available funds in their bankers' hands for the present year. (*Loud cheers.*) He had to thank them for the testimony which had been borne for his own humble services to that Institution during the past seven years, and which the state of his health, and the severe labours he underwent at the last show of the Royal Agricultural Society had rendered it necessary that he should relinquish at the suggestion of his medical adviser. He had not resolved upon this step precipitately, not without considering that in retiring from the office he had introduced into it one who was, in every respect qualified, nay, perhaps more so, to undertake the performance of that duty. (*Cheers.*) In undertaking the duties of that office, he (Mr. Gibbs) had been solely actuated by the interest which he had always felt in agriculture, from the circumstance of his friends being all of them either landed-proprietors or farmers, and from the fact of his father being the only living original subscriber to the Smithfield Prize Cattle Club. (*Cheers.*)

E. H. LATTIMORE, Esq., rose to propose the "Health of the Committee of the Farmer's Club." (*Cheers.*) It had always struck him as a great deficiency on the part of the agricultural body that there existed amongst them none of that social co-operation and union which was so absolutely necessary for the successful organization of all great bodies, and such as were to be seen in the present day established by trades—such as the Fishmonger, the Poulterer, the Goldsmith, and others. These bodies had their clubs and corporations, while the farmers of England, (perhaps one of the most important, and certainly one of the most useful class in the kingdom,) had no systematic plan of organization, or of so bringing their interests together, as to unite them for the general benefit of the mass. (*Hear, hear.*) They must be all aware how deeply they were indebted to the exertions of their excellent Chairman for the promotion of the Farmers' Club, and for bringing it to its present position; and he personally tendered him his thanks in that behalf. (*Cheers.*) Agriculture was a great and important science—it was to be looked upon as a great national interest—as an interest in which all states and countries had first been engaged when emerging from a state of barbarism into the light of civilization and improvement. It was an occupation that must naturally remain to man when artificial occupation must have perished. (*Cheers.*) No community could become celebrated, influential, or happy without the cultivation of the soil; and entertaining these sentiments, and actuated by these motives, it did not take long to persuade him in becoming one of the members of the Farmers' Club. (*Cheers.*) He should be sorry to trespass on the rules and regulations of the Club, but there appeared to him to be something mysterious in what the Chairman had hinted when he said that he would not enter further on the subject. He thought this was foreign to the principles of British farmers. Anxious as he was to promote the good of agriculture, and to see the Farmers' Club exercise its legitimate influences in that class, still he thought that there should be no mystery in their movements. (*Hear.*) He should be most happy himself to bring members to the Club; but supposing he was to go to a neighbouring farmer and say, "Oh, we have a Club formed here, and we ought to have you in it. I have joined it, and do you do the same." Would it not be natural for him to say, "Well, what do you propose to do, now that you've got the Club?" That is the question which he (Mr. Lattimore) must answer, or else the farmer would naturally say, "Don't trouble me to get subscribers to your Club." (*Cheers.*) The existence of anything like mystery about the Club would not be consistent with the character of a British yeoman. They ought to have some decided ground of action. (*Hear, hear.*) If it was the purpose of offering information it was all well and good; but they wanted even more than that. It

should be made a great national society, operating throughout the kingdom. There was also another point he would allude to. He considered that a Farmers' Club should be a club which the tenantry of the country ought to have. He did not think that it ought to be a landlord's club. The tenants should have their club, as the landlords already had theirs. Neither ought it to be a club for land-agents. He would wish not to be misunderstood as saying that they ought to exclude those gentlemen, but it ought to be more particularly a tenant club, to promote their independence, and promote the system of tenure and good farming, and to give to the tenant security for his occupation. (*Cheers.*) He thought that in many respects it was a wise determination to exclude political subjects; but he thought that in making these exceptions to this rule, they ought not to exclude agricultural politics. (*Cheers.*) He knew that the interests of landlord and tenant were by nature identical, but they must not be so misrepresented as to become enemies to each other. He was sorry to say, it had been his fate to find landlords neither conversant with business nor practical men. He did not speak of the Lord Leicesters or the Lord Spencers—at least, the late Earl of Leicester was a practical man—but he thought that landlords were very dangerous in this respect. They looked upon improvements simply with an eye to give value to their property. He considered that the great object of the Farmers' Club was to promote the security of the tenants, to furnish them with one common ground of union so that they might meet on equal terms, and exchange their ideas for their own advantage. Those were the views that he entertained when first he heard of the club. Some allusions had been made to a body acting hostile to their interests. Now agriculture was a national interest, and whatever militated against the interest of the country at large must militate against that of agriculture. (*Loud cheers.*) They were all members of one common family. The merchants and the manufacturers of this country were their customers, and if the farmers failed, they could not sell their produce, and consequently they must fail also. Agriculture in itself was a natural and noble occupation, dependent for success on the rich bounties of heaven, and the beneficence of Providence; and no true farmer, when he sees the result of his labours beaming in plenty around him, should shut his heart to their influence and say, "I care nothing for the distress of other classes." (*Loud cheers.*) That man was not the true agriculturist, but only a selfish and mercenary one. (*Cheers.*) He always felt himself called upon to speak out, when he heard arguments adduced to the effect that the British agriculturist had no sympathy in the welfare of the commercial or manufacturing classes, but that he was a mere selfish, mercenary animal, wrapped up, like the oyster, in his own shell, and indifferent to the interests of those about him. That could not be the case with the real British agriculturist. (*Cheers.*) He was quite certain that from bringing into harmonious union such an amount of influence and respectability as he then saw around him, much advantage would be derived; but unless they acted upon perfectly clear and fair and open principles, they could not attain those benefits which were capable of being derived from a club of that description. (*Hear, hear.*) He believed it to be the duty of every one present to dismiss all prejudices from their minds, to harbour no feelings of enmity against any other class in existence, to hold out the right hand of fellowship to all. The working of the present system of landlord and tenant had a great tendency to lower the character of the British yeoman, and to degrade him into a mere serf. (Cries of "what?" ) A gentleman said "what?" He (Mr. L.) would reply the present system of letting land, the system existing between landlord and tenant. He would give them an instance. He was not a very old man, but he had known nine farms within the circle of a few miles, and how many tenants did they suppose those farms had had in the space of twenty years? One farm had had five occupiers, another had had four, five

had had three, and two, two. That was the system of which he spoke. He did not say it was a common one, but it was becoming very prevalent. (*Hear, hear, and cheers.*)

Capt. AITCHESON—You do not tell us whose fault it is. (*Hear, hear.*)

Mr. LATTIMORE continued—He did not wish to deal in personalities. He spoke merely of the system, and of the principle upon public grounds. (*Hear, hear.*) He spoke of the evils of the system existing at the present moment under their own eyes, that of persons unacquainted with agriculture owning the proprietorship of the land. They were the most dangerous of landlords. (*Hear, hear.*) They never thought of granting a lease—a lease would make a farmer independent. Were they to have no security for outlay upon capital? Was this the system which the Farmers' Club intended to support? (*Hear, hear.*) It was with a secret and innate pride that he heard of the establishment of their club, from a strong desire to see the British farmer and yeoman resume his legitimate position in the scale of society. If by this means the independence of the British yeoman was to be sunk—if his was to be merely a yearly tenancy—he could not consent to uphold the principles of the club, or recognize such a principle. (*Cheers.*) The meeting would gather from these observations, that his feelings and interests were identified with those of the tenant farmers present, whose welfare and independence he believed that this club was established to promote; and so long as it subserved this noble purpose, so long should he, as a member of the body, lend his best energies in the promotion of its objects. (*Loud and long continued cheering.*)

W. R. BROWNE, Esq., a member of the committee, responded to the toast.

The CHAIRMAN, before proposing the next toast, but without any view of prolonging the discussion, would just advert to an allusion which had been made by the speaker last but one, who seemed to hint that there was something mysterious in the observations which he (the chairman) had felt it his duty to make. Now, he wished it clearly to be understood, that his words had reference to the use and establishment of certain machinery which might be useful to the purpose to which he was unwilling to advert, as being contrary to the rules of the club, and not likely to lead to a good result. He hoped that if any remarks went forth to the public, they would not be construed into anything in the shape of mystery as connected with the club, the only mystery in the matter being that he (the chairman) did not wish to touch upon matters irrelevant to the meeting. (*Hear, hear, and cheers.*) The objects of the club were involved in no mystery, but for promoting the advantages of agriculture. He only considered that the machinery which was useful for evil, might also, if properly directed, be useful for the propagation of good. (*Cheers.*) The next toast he had to propose was the "Labourers of England." (*Loud cheers.*) He knew full well that all in that assembly exercised their best energies towards making the labourer as comfortable as they could. (*Hear, hear.*) There might be circumstances over which they had no control, which might place them in situations of difficulty; and he was fully convinced that it would be far more useful if persons, in whatever situation in life, were to direct their best attention towards making the position of their labourers comfortable, rather than, as they often had occasion, lecturing the tenant farmer to take the labourers under his especial care. (*Hear, hear, and cheers.*) It was his own wish to see that such parties would practise the good advice they gave, and reflect upon the painful position in which the tenant farmer is placed, when called upon to draw perhaps his nearly empty purse-strings. (*Hear, hear, and cheers.*) He believed that much of the happiness of the country depended on the moral and physical condition of their labourers (*hear, hear*), and he felt fully persuaded that at this moment there were parts of the country where, from a variety of circumstances, great energy should be directed to the condi-

tion of that class. (*Hear, hear, and cheers.*) If any one would take the pains to peruse the publications that had recently come forth from authority on the condition of the agricultural labourers of this country, he would see that there was ample scope for the exercise of his philanthropy at home, and that he need not go beyond the border of his own country in search of objects for his charity. (*Hear, hear, and loud cheers.*) He now gave "the labourers of England," and trusted they would exert themselves to contribute as much as possible towards bettering the condition of those who were dependent upon the sweat of their brow for their daily bread and support. (*Loud cheers.*)

GEORGE EMERY, Esq. returned thanks, as an associated member of the Labourers' Friend Society, which had to deal with the practical knowledge and improvement of the agricultural labourer. (*Hear, hear.*) In consequence of the various situations which he (Mr. Emery) had held in life, during upwards of 17 years, he had been enabled to judge of the beneficial working of the field garden, and land allotment system with reference to the agricultural labourer. He had also seen the benefits which arise from associating with these labourers; not associating with them hand and glove, but showing to them acts of kindness, and more particularly in bringing them to feel an interest in the soil. He had been in various parishes where he had put in operation hundreds and hundreds of poor persons under the allotment system (*applause*); and although he had heard that system condemned, it had been only by those who were ignorant of its operation. (*Hear, hear.*) The system had produced the happiest results in a parish within 20 miles of his own neighbourhood, where the inhabitants, who had worked for 60 years on the land, had little fields and gardens of their own. The system is exceedingly simple, and beneficial in its operation. Perhaps it will be thought that he was entering too much into *minutia*, but as a corresponding member of the Labourer's Friend Society, he felt it to be his duty to state thus much. (*Hear, hear.*) He would recommend all gentlemen present not to allow another year to pass away without introducing the system into all their parishes, for he was assured that it was one of the most effectual modes of keeping the labouring man from the public-house, and uniting him with his fellow-man in brotherly love and affection. (*Cheers.*)

Hon. Mr. WILSON here rose to comment on the remarks which had been made by Mr. Lattimore, with reference to the propriety of the club, being only for the tenant-farmer and not for landlords or their agents. If such was understood to be the case—if landlords were not to appear amongst them, he must be permitted, deeply as he desired to promote the club, to make his bow and retire, apologizing for intruding on the occasion, and promising that such an intrusion should never take place again. (*Loud cries of "no, no," we wish to see you always, and "cheers."*) He had always deemed it of the last importance that the interests of landlord and tenant, of tenant and employers, should be looked upon as one and identical; and that they should always endeavour to draw a stricter bond of union between the landlord and the tenant, the poor man and his employer. (*Cheers.*) The hon. gentleman intimated that having a pressing engagement elsewhere, he was under the necessity of leaving the company, but felt it to be his duty before retiring, to express to them briefly his sentiments on the subject.

The CHAIRMAN then proposed "Success to the Local Agricultural Societies." (*Cheers.*) He would not occupy their time by descanting upon the great good which the objects of these societies were calculated to confer upon the country; but would connect with the toast he had proposed to them, the name of a most intelligent and high-spirited farmer of Essex, who was exactly, as regarded his treatment

of the agricultural labourer, the very man they would all wish to see, and who employed more labourers on his farm, in proportion to his occupation, which was considerable, and who perhaps, paid them more liberally in proportion to their work, than any other man in the county. He would give "the Local Agricultural Societies, coupling with them the name of Mr. Hutley."

WILLIAM HUTLEY, Esq., of Witham, Essex, said it was quite unnecessary for him to speak of the great value to the country of these local societies. There were several in his neighbourhood, which he had the pleasure of supporting, for not only did they benefit the poorer classes, but they brought the farmers into union, and gave them an opportunity of rubbing their minds one against another. (*Laughter and cheers.*) He was in the habit of using a great deal both of land and labour, and it was his pride to pay his labourers as much as circumstances would admit. (*Cheers.*) The more comfortable the labourers were, the more work they performed. (*Hear, hear.*) They became better servants, and looked more to the interest of their employer. (*Hear, hear.*) They were living in some of his districts without leases, which in his opinion was a very bad thing. (*Hear, hear.*) For his own part he would not live on the land unless he had a lease. (*Hear, hear.*) He was sorry to hear the Hon. Mr. Wilson's last observations; but he was pleased to see a gentleman sitting opposite to him, holding between 500 and 700 acres of land, cheer when that point was touched. He was pleased to see the farmers take up the idea of not giving leases, the want of which was a very great curse. (*Hear, hear, and cheers.*) For if your political ideas, under the system of yearly tenure, were adverse to those of your landlord, you must of necessity be turned out. (*Hear, hear, and loud cheers.*) He begged, in conclusion, to thank them for the toast, and to respond to the compliment by proposing, "May the Farmers' Club prosper for ever." (*Loud cheers.*)

The CHAIRMAN said, it again devolved upon him to propose another toast, which he was sure would be heartily welcomed by all present—"Success to the local farmers' clubs," associating with it the name of Mr. Baker—(*cheers*)—than whom there could not be a more zealous supporter of such institutions, or one whose talents were more successfully employed in promoting the success of a farmers' club. (*Cheers.*) He (the chairman) was perfectly convinced that nothing could so much tend to the advancement of the agricultural interest as the establishment of farmers' clubs, which would furnish a central point of communication for promoting practical knowledge, so that they might no longer remain in an isolated position, but associate together like other classes in society for their own advantage and advancement. (*Cheers.*) It was this association, which was calculated to unlock the faculties of the mind, and call forth the intellectual powers, and which obtained so much amongst the dwellers in towns and large communities through the kingdom, and which was so much needed at the present moment amongst farmers. (*Hear, hear, and cheers.*) Let him not, however, be understood for one moment to agree with those who set down the body of farmers as a stupid set of fellows (*cheers*): for he believed that if the farmers were accustomed to meet one another, for the constant transaction of their business, after the fashion of dwellers in towns, their intellect would become sharpened by the contact, and their minds would experience the benefit to be derived from not lying fallow. (*Cheers.*)

ROBERT BAKER, Esq., felt highly gratified at the complimentary manner in which his name had been associated with the farmers' clubs throughout the country. He felt that in the formation of farmers' clubs they were advancing science and practical intelligence among men, such as was never known in the days of their forefathers. (*Hear, hear.*) It will be readily admitted that if one hundred farmers in a district met and united together, they would speedily become so well informed on the various points relating to their interest, that they would soon form a combination of talent in the aggregate. It was one of the celebrated axioms of Lord Bacon, "that knowledge is power," and according to the means which they took to arrive at it, so must be the corresponding benefit conveyed. (*Hear, hear.*) He had been exceedingly gratified to hear during the evening the observations that had been made with reference to the club, and none felt a more ardent interest in it than he did. Some pertinent remarks had been made by a gentleman on his left, relative to the objects of the club. Now he (Mr. Baker) always considered that these were to bring the farmers together to act upon some definite principle of association, similar to the objects concentrated and sought for in other clubs throughout the country. He had never supposed that with regard to the entire construction of the club, that they were to remain an isolated few; or that because it was called a Farmers' Club, that landlords or land agents were to be exempted from it. He had considered that the door was open to all men who were desirous of acquiring agricultural knowledge; and that, as long as their conduct was correct and consistent with the rules of the society, so long should they be held to be good members of the club, whether they were tenants or—if they could accomplish it—even if they were labourers. (*Cheers.*) Another subject had been started, and that was rather an ambiguous one, as to the introduction of political discussion. (*Hear, hear.*) They, the Farmers' Club, had certainly started without any political object in view, but so soon as any political attack was made upon the occupation of tenants at large, they were bound to offer resistance to that attack. (*Loud cheers.*) They were not to appear hand-bound before the enemy without struggling legitimately for their own defence. (*Hear, hear, and cheers.*) An opinion had gone forth amongst the local societies to the effect that they were not to touch upon political subjects, and that they were to bear libels heaped upon them without animadversion or resistance. This was indeed a great mistake. He need not tell them that there was a formidable body in existence—a "great fact," as the *Times* had called it—and the great object of that body was not only to destroy the tenant farmer, but to destroy the whole of the agricultural interest. (*Cheers and counter-cheers, and cries of "No."*) And if there was any fact that could convince him of this, leaving all others out of the question, it was the fact of Lord Spencer having joined that "great fact," in the face of his whole tenantry, against the interest of himself and the whole of the agricultural body to whom he had been looked to for a long series of years. (*Cheers.*) They were now to become nothing but a mere political football; and the Earl Spencer and the men of his class were now hoping, through the assistance of the Corn Law League, to ride again into Parliament; and the agricultural interests were again to be ridden over and to be treated in the way that they might think most proper. (*Cheers.*) He did not attend that meeting of

the Club with his tongue or his hands tied, for if there was anything to convince him more strongly that Lord Spencer felt that what he had done to the agricultural interest with whom he had so uniformly acted, was inconsistent with his own feelings, and contrary to the interests of that body, by his late declaration for the League, it was the not seeing him on that day, where they had always been in the habit of seeing him, at the Smithfield Prize Cattle Show. It was evident he felt that he had done an act by which he had forfeited all regard of those agricultural friends with whom for years he had uniformly acted (*cheers*). He would not attack the noble lord further, or animadvert at greater length upon his conduct (*cheers*). It only reminded him of that ancient saying, that, like rats when they left a house, it was generally from a fear that it would fall (*cheers*). There were no fears, however, upon that score with reference to the farming interest (*hear, hear, and cheers*). Although Lord Spencer had joined the League (*disapprobation*) and united with the repealers of the corn-law in opinion, although he told his tenants and the public that he did not wish to be misunderstood, to be considered as doing anything inimical to the interests of himself or of his tenantry (*ironical cheers*); if he had thought so he could not on that day have said or done what he had. But he considered that he was not doing anything that was injurious to his tenants, because he believed that free trade in corn was carried; the price of corn would not diminish, but that it would literally rise in this country (*ironical cheers*). The mere assertion destroyed itself (*renewed cheers*). If the introduction of foreign corn would not lower the price of corn in this country, which was the crotchet Lord Spencer contended for, could it be denied that, while the object of the League was to lower the price of corn, it was no also to lower the price given for labour (*cheers*)! The Anti Corn Law League had told the people of this country that if they could import foreign corn they could export manufactures in return; just as if corn could be imported into this country to be shot into the Thames (*cheers*). A certain quantity of corn only was required in this country; the population could not eat more bread than was wanted (*hear, hear*), and how could the exportation of manufactures be increased when instead of wanting importations of foreign corn the population consumed as much as was now grown (*hear, hear*)?

Captain ATCHESON: What is to become of the overplus of the immense quantity returned in lieu of exportation?

Mr. BAKER: We can feed the pigs with it, as in 1822 (*laughter*). They might import champagne and other articles of commerce, but they could only import certain quantities of corn. He, for one, would recommend, as a great and governing principle of the Club, that the members do unite themselves with the parishes and districts in the various counties in the kingdom, and form themselves into one multitudinous head against that great monster of faction, the League (*cheers*). The papers of this body were now being circulated through the kingdom, containing the vilest falsehoods and libels against the agricultural body, which they endeavoured to make the credulous and unsuspecting farmer believe in as true (*hear, hear, hear*). Were the farmers therefore to present no point of defence—no face of opposition, no antidote to the evil (*cheers*)? He had always found an inaptitude and a slowness in the farming class in taking steps for the promotion of their own interests; what they wanted was,

that union which was strength, that knowledge which was power (*cheers*). He would call upon them in conclusion to unite with them in common cause against the great enemy of their interests, so that whatever might be the appearances against them they need not fear while they united themselves in one common brotherhood, for the purpose of carrying out these important principles, when the end would enable them to achieve a great victory. (*Loud and long applause.*)

Mr. HOBBS said that, differing as he did from Earl Spencer on the corn laws, he entirely differed with him as to the effects of free trade in corn. For he believed that if they were to carry out the opinions of his lordship, it would ruin one-fourth of the farmers, and would reduce them to pauperism. (*Cheers.*) His lordship had been engaged for four hours and a half that day on the council of the Royal Agricultural Society, which was the reason of his absence from the Smithfield show yard. Though he (Mr. Hobbs) altogether differed from Lord Spencer on the subject of the corn laws, yet he thought that the true reason for his lordship's absence from the show-yard should be stated.

After some further discussion on this particular topic—

The CHAIRMAN interfered, and said that probably he was to blame for allowing it to be carried to such an extent. He, however, generally acted on the principle of the propriety on such occasions of letting off the steam. (*Hear, hear, and laughter.*) He would now change the subject altogether, and propose to them the health of an officer of the club, to the zealous performance of whose duties he (the Chairman) was most happy to bear testimony. That gentleman, though not over largely remunerated, was most spirited and indefatigable in the discharge of his duty; and he was sure they would all most heartily unite with him in drinking "The health of Mr. Thorpe, the Secretary of the Club." (*Loud cheers.*)

Mr. THORPE returned thanks in a few brief but appropriate remarks, assuring the members that his continued exertions would be employed in carrying out, to the best of his ability, the interests and prospects of the club (*applause*).

The more formal proceedings then diverged into a social conversation amongst the members, and the conviviality of the evening remained unbroken until nearly midnight.

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## GRANTHAM AGRICULTURAL CLUB.

At the last quarterly meeting of the above useful association the subject for discussion was "The best method of managing Meadow and Grazing Land." The chair was taken by Mr. W. Sills, and the subject was very fully and ably opened to the meeting by S. HUTCHINSON, Esq., who commenced his observations by stating that moist lands were most naturally denominated meadow lands, as they were best calculated to struggle with dry and hot summers, and also least suited for grazing heavy cattle. Of these, river-side meadows were by far the most productive, contained the best grasses, and required little or no manure in return; their surface was usually even, and by means of one or more open drains into the river (if kept clean) were entirely freed from

stagnant water, which is greatly injurious to all lands. It would be very detrimental to meadow, or indeed any lands, to be poached with cattle during any season of the year, as each impression of the foot left a hole for water, which starved the herbage. High land meadows, which were perhaps the most extensive, were managed with greater difficulty and expense; inasmuch as the drainage, which, to a certain extent, was absolutely necessary, was generally not easily accomplished, and the procuring and carriage of a frequent supply of manure very serious. The greatest enemy to dry as well as wet meadows was moss; a good dressing of manure in the former case, and draining and manuring in the latter, he (Mr. H.) believed would be found to be the best remedy—but manure should not be laid on newly-drained lands until the expiration of one or two years, as the herbage would not sooner appreciate it. Very close mowing tended to weaken the herbage, especially in dry seasons; and bad raking was not only a waste, but a serious injury to the herbage, as nothing was more distasteful to vegetables than decayed substances of their own kind. Hay foddered upon the land in spring is said, by its seeds, to thicken the herbage, and that moss is also destroyed by treading of the stock; but this is not a plan to be recommended, as the stock are not comfortable, and mostly deposit their dung in the best sheltered and richest part of the land, and he was of opinion the moss disappeared more from the droppings than the treading of the stock. Grass should always be mown before it became quite ripe; it would make the best hay, and impoverish the ground least. The most legitimate plan for improving the herbage of meadows was undoubtedly a free application of manure, particularly on natural and old grass land. Laying the land early in the spring would be of the greatest advantage to it, and the best means of obtaining a large hay-stack, and a good crop might be secured at a little more expense than a bad one. Ant-hills, or other unevenness in the ground, should be carefully levelled and kept down by rolling or bush-harrowing. With regard to pasture lands, he considered the most valuable were salt marshes, and almost the only care in their management was an early and plentiful supply of mixture of stock to keep them close eaten down at all seasons of the year; open drains, as in the case of river meadows, are required to carry off the flow-water. Upland and all pastures are the best tested by the greatest number of the different varieties of grasses found in a given space; as it will be seen, by practical experience, that such lands will carry the greatest portion of stock, inasmuch as there will be every week or month a sufficient quantity of the numerous species of grasses in their highest state of perfection, so as to give a regular and an abundant supply of food at all times; and it is the duty of farmers to arrive at the same perfection in this respect as florists do in obtaining a proper succession of flowers. Whatever difference of opinion may exist as to the propriety of draining meadow lands, he (Mr. Hutchinson) imagined there would be none as regarded pasture, and every available means ought to be resorted to in order to acquire that grand fundamental improvement. Ant and mole-hills should be periodically attended to, for in this, as in other cases, prevention was more easy and less expensive than cure. The dung of cattle should be spread at least once a month; for, if left as dropped, coarse and distasteful grass would be produced from the

excess of manure, and the herbage, instead of being benefited, would be best improved by a suitable top-dressing of manure, or a judiciously mixed compost. The herbage most difficult of improvement was that where the land has at some period been under the plough, and improperly, and perhaps naturally returned to grass: unless such lands undergo a judicious course of husbandry, and are properly inoculated or sown down with a good selection of grass seeds, it would be almost impossible to arrive at any satisfactory result. Scarifying and harrowing are very beneficial, if preceded by a liberal covering of manure, as few things can be improved or fattened without extra food. Rough parts should be regularly mown, especially where cock's-foot grass predominated. Hassoeks also should be pared, and either burnt or made into compost; and wherever there was a surplus of rough grass or dry land, it was evident that an application of some mineral manure was necessary to correct the acidity of the soil. All pastures should be eaten well down at least once a year—say in the autumn—and should never be allowed to grow too much previous to being stocked in the spring; and a mixture of stock is best calculated to keep a clean pasture and return the most profit. He knew of no rule for excluding sheep, as some affirm, except the fear of rot, as they keep down and destroy many pasture weeds. Shelter for stock, by means of sheds, &c., might be more generally used, as it was well known that warmth was very necessary to promote their well-doing. Mr. Hutchinson next adverted to the subject of manure. He was of opinion that salt was almost the only manure that could be applied with advantage to river-side or wet meadows; it would create a sort of artificial marsh, and the produce both of hay and eddish would thereby be rendered abundant and agreeable to all kinds of stock. Vegetable and animal manures were, in a general way, best calculated for high land meadows—inasmuch as such lands were most deprived of those substances by the abstraction of the hay crop. Horse-dung would be the best for cold lands, and that of cows for light lands, and it should be applied in a liquid state when practicable; besides which it was important that manures should in all cases be applied in minute particles, and well brushed in without delay. Ashes may be used with great advantage upon dry coarse meadows, as they rapidly find their way to the roots of the grass; lime is also an application for pasture land overcharged with vegetable matter, arising from the neglect of spreading the dung of cattle or otherwise—he had seen even dry limestone walls built upon moor-lands, previously yielding nothing but ling, have the effect of producing, in a short time, an abundance of white clover for several feet on each side thereof, whilst no benefit resulted from walls of freestone adjoining. Lime absorbed a great deal of moisture, and was at the same time of a warm nature—thus possessing two powerful productive qualities. One good covering—for instance, from 300 to 400 bushels per acre—would be worth twice the quantity laid on at three or four different times; for by one application the full advantage of a chemical operation upon the soil was obtained and its impurities corrected, and it would afterward form a valuable component of the land. Upon lands laid down to grass with a dressing of lime, the herbage would always begin to grow ten days earlier in the spring than it would do without such treatment; at the same time, lime applied to poor meadow land where no inert substances exist,

may be injurious in its effect. Clay or marl may undoubtedly be regarded as the best management to light lands. Bones are now used to a considerable extent upon clay dairy-farms in Cheshire, with very great advantage. Mr. Hutchinson here read the following excellent letter from Lord Henry Cholmondeley:—

“The use of bones on pasture land is now becoming very general in Cheshire; the benefits to our dairy land are very great indeed. Strong lands are by far the most favourable for the application, indeed I have seldom known this manure used excepting on clays. On lands which have been exhausted by a long course of improper cropping (a common case in Cheshire), and when such lands have afterwards been converted into pasture without care in the selection of grass seeds, the effects are often almost beyond belief. I know many acres of land which, four or five years ago, would have been dear at five or six shillings, and would now readily let at twenty-five shillings or more. It is most desirable that the lands should be sound and free from wet at the same time; although no doubt the effects would be in all cases improved by draining; yet I have often seen bones applied with excellent effect to undrained clay land, although in such cases, of course, the driest and soundest fields were selected. Spring and autumn are supposed to be the best seasons for the manure; I prefer the latter, whilst there is grass to cover the bones. The expenses are considerable—farmers seldom apply less than sixty or sixty-five bushels of dry bones per acre, the price varying from two shillings and three-pence to two shillings and ninepence. In Cheshire, boiled bones from manufactories are much used; they are cheaper, not costing above 4*l.* 5*s.* per ton; a ton and a half ample for an acre. Farmers are much divided as to the merits of dry and boiled bones; I prefer the latter. It is quite certain the effects are more speedy, and I have never been able to make out (as affirmed by some) that the benefits are less lasting. Although it is only within eight or ten years that the use of bones has become general, yet I know of instances where this manure has been applied for upwards of twenty years, and the pasture is still excellent. It is almost the universal practice only to use bone manure on pasture of at least three or four years' duration. I have, however, seen a successful application in opposition to this general rule. About four years ago, I boned for a tenant a field of strong clay, which was utterly worn out from improper cultivation; crops of corn had been grown for many years without any green crop, or even a load of manure. The land was boned in the autumn, at the rate of one ton and a half per acre, on the seeds after a crop of oats. In one year the herbage was remarkably great, and I know of no other boned land in the neighbourhood where the pasture is so fine. A small portion was purposely left unmanured—it is now only a bed of weeds, and quite worthless. I am now repeating this experiment in other places. I have, in one instance, heard of a successful application of bone manure for a hay crop; a field was pointed out to me as having had a good crop of hay for ten or twelve years without any further manure. I have lately made this experiment; but, as my tenant has only taken three crops of hay, I cannot at present speak as to the permanent advantage. Our Cheshire farmers are much too poor to make these expensive improvements, but landlords are now generally finding the capital, and charging 7*l.* 10*s.* per cent. for the outlay. The bones should be well broken, but I do not like them too

fine; some farmers recommend that the bones should be almost reduced to dust. This was done once by a tenant of mine, and certainly the effect was much less than on any other boned land with which I am acquainted; at the same time it is impossible from one instance to feel sure that the smallness of the bones was the cause of the failure.

“HENRY CHOLMONDELEY.”

Mr. HUTCHINSON continued—The proper time for applying manure is of the greatest consequence. It is admitted on all hands that it should be laid upon the land whilst the grass is in a growing state, for it would be of no use offering food to either vegetable or animal life when dormant; but at the same time it may be a matter of dispute whether it is best to apply it in the spring or autumn. In grass-land districts the latter was most approved; but, as far as his own judgment went, he preferred the former, as he always considered the luxuriant growth of the grass less wasteful in the hay than in the eddish crop since the process of drying would counterbalance the disadvantage of a forced production; and by hoarding up manure from the spring until the autumn, the quality would not only be deteriorated, but much time would be lost in reaping the benefit to be derived by an earlier application. Mr. Hutchinson here read a letter from Mr. Garth, a gentleman of great practical experience, residing in the neighbourhood of Reeth, in the North Riding of Yorkshire:—

“I duly received yours of the 8th inst., and as you wish me to state any remarks I may have made relating to the cultivation of meadow and pasture land, and my attention having been long turned to that sort of land (our climate being too high for tillage), I shall with great pleasure state for your consideration a few ideas which I have long considered as bearing on the subject, and by a regular application of which, my land has been gradually very much improved without much extra expense, as every increased crop adds to the quantity of manure for the next. I have not tried any of the new varieties of manure now attracting public attention, my object always being to raise as much manure as possible (and apply it to the best advantage I could) from the produce of the land itself. It is not only the dung of animals carelessly thrown together forms the supply of manure, but any kind of vegetable matter, when it has undergone nature's process of putrefaction, produces valuable manure; and also soil, if used to take up the urine of cattle, and mixed with the other manure, increases both the quantity and quality of the whole to a very great extent—especially if attention be paid to its being such soil as possesses the inorganic substances which the soil you apply it to, or a given crop, requires. When we consider the volatile property of the best part of the manure, and the effects of the extremes of the seasons to aid in carrying it off, when it is applied as a top-dressing on the land, and also the nature and physiology of plants, and their certain powers to absorb from the air and be fed by any effluvia therein suitable to their nature, we shall see it becomes of the utmost importance to ascertain the best season to lay on manure. Under these ideas it occurred to me, that to lay on manure when the grass was in a languid or not growing state, was certain waste, and that the time to apply it was when the grass was in an active growing state, and would cover it in a short time, and

also be able to absorb its food, viz., any effluvia that was rising from it. If laid on in the latter end of April or May, and the season comes dry, it does not get down before hay-time. I, therefore, prefer just when the hay is cleared off and the fog beginning to rise; and such part of the fog as does not heat off adds to the improvement and towards economizing the manure, as it may be laid on much thinner on either meadow or pasture. Where other local circumstances admit, I think a mixed stock of horses, cattle, and sheep keep the finest pasture. A proper attention to draining is the foundation of all improvement when the land requires it. I have obtained a valuable shelter for cattle, and still more so for improving the vegetation within its influence, by planting belts of mixed trees nearly across the current of the wind to which we are most exposed; which in a few years makes the best of shelter, besides producing a great quantity of wood. In conclusion, allow me to express the pleasure it gives me to see the increased attention bestowed upon subjects tending to promote improvements in the foundation of our prosperity—the cultivation of the soil.

“RICH. GARTH.”

Mr. HUTCHINSON observed, with regard to the remaining subject for discussion, the employment of surplus labour, he should not make many remarks, as there were gentlemen in the room much better qualified than he was to give them information. The subject was certainly one of considerable interest, particularly at the present time. The few suggestions he should offer would be digging up waste lands by the sides and corners of ploughed fields—giving an extra dressing to ditches, and laying in under-drains instead, where practicable—plashing fences, especially by the sides of public and occupation roads. Mr. Hutchinson concluded by producing specimens of different dried grasses—in number between seventy and eighty—which he had collected, and which he had much pleasure in showing.

W. J. CHAPLIN, Esq., chairman of the South Western Railway Company, who attended the meeting as a visitor, made a few appropriate observations on the system of drainage, which he had adopted with advantage on pasture land, in the neighbourhood of London, by the use of the mole plough.

T. C. BEASLEY, Esq., stated that in consequence of his friend Mr. Hutchinson having so fully and practically treated on the subject under discussion, he feared he should have little to add to what had already been advanced. He considered that no food was so expensive as hay grown on land not naturally meadow land. The principle should be, therefore, to mow as little as possible, and to make that little grow all that it was capable of producing. Sufficient manure would generally be found for this purpose that was unfit for arable land, and the deficiency might be made up by a mixture of soil and lime, and also by a mixture of soil and liquid manure, which was too often allowed to go to waste. This would find employment for more manual labour there was so much complained of. His own experience satisfied him that the more manual labour there was employed on a farm, so long as it was well directed and well superintended, the greater would be the gross produce, and not only so, but the greater would be the net pro-

fit. He should be very sorry to mislead them, and induce an outlay that they were not likely to be repaid; but he was fully convinced that no outlay produced so quick and certain a return as that which was made in the employment of the labourer. They must be maintained—they ought to be employed—and unquestionably the proper place for them was the farm, and not the highways, beyond what was necessary to secure the roads being in a good state.

The CHAIRMAN next addressed the meeting, and concurred in most of the observations made by Mr. Hutchinson; high lands ought to be properly gripped, in order to carry off the water, and the less they were mown the better. He recommended the practice of mowing meadow land every year, as a change in the mode of cultivation was not beneficial to them. Manures from the barn doors, and other refuse, and inferior manures may very properly be applied to the extent of three or four loads per acre; and the best time for putting it on would be during the month of February. If oil cake were given to stock grazing on poor meadow land it would be a sure means of greatly improving it. He did not approve of too much drainage in meadow land, as it would be injurious to it. He begged to differ with Mr. Hutchinson as to the plan of mowing; he liked close mowing of meadows, as it was well known that the eddish sprung from the roots of the grass, and he did not imagine that any protection was afforded to it by a portion of the grass being left. Early stocking of eddishes was desirable—say about the middle of September; at which time he would stock them with lambs and young cattle. He (the Chairman) sometimes found one part of a field much inferior in quality to the remainder; in such cases his practice was to manure the inferior parts well, and by that means all would be made alike. Hassocks may be heaped in the field, as well as portions of the ant-hills, and mixed with quick lime, and after lying two years they would make good manure; this plan he considered preferable to burning. With regard to surplus labour, however beneficial it might be employed on the land generally, it might with truth be said, that with cheap corn and bad times, there would be great difficulty in finding the means to pay for it. He was an advocate for permanent improvements being made—such as forming new main-drains for outfalls, and new hedges in the room of old decayed ones; regard being had, where practicable, to improve lines in the formation of new hedges if they were previously crooked. These were matters which would at once afford considerable employment for the poor, but, as they were improvements which could not be expected to be made by the tenant, the proprietor of the soil would do well to turn his attention to the subject; particularly at a time when the farmer could not afford to expend any extra labour on his land. He was quite sure that improvements of this kind would be regarded by the tenant as a greater boon than the occasional return of 10*l.* per cent on his rental.

Arrangements were then made for the next quarterly meeting, which will take place on the last Thursday in December: the subject to be then discussed will be—“The use of artificial manures and the description of land on which each should be applied.” Mr. Lawrence Wyles will be requested to open the discussion.

## STATISTICAL TABLES.

AREA.—The area of England is 50,387 square statute miles; Wales, 7,425; Scotland, 29,600; Ireland, 32,445; Guernsey, 50; Jersey, 62; Alderney, 6; Isle of Man, 210.—Total, 120,185.

THE FOLLOWING STATEMENT SHOWS THE DISTRIBUTION OF THE SOIL OF GREAT BRITAIN IN STATUTE ACRES:—

	Arable and Gardens.	Meadows, Pastures, & Marshes.	Wastes capable of Improvement.	Incapable of Improvement.	Total in Statute Acres.
ENGLAND .....	10,252,800	15,379,200	3,954,000	5,256,400	32,542,400
WALES .....	890,570	2,226,430	530,000	1,105,000	4,752,000
SCOTLAND .....	2,493,950	2,771,650	5,950,000	8,523,930	19,758,930
BRITISH ISLANDS .....	109,630	274,060	166,000	569,469	1,119,159
TOTAL .....	13,746,950	20,651,340	10,500,000	13,454,799	57,952,489

TABLE shewing the Area in Square Miles and Statute Acres; also the Annual Value of Real Property, and the Annual Value of Land in the several Counties of England and Wales:—

Counties. — England.	Area in square Miles.	Area in English Statute Acres.	Total Annual Value of real Property, 1841.	Annual Value of real Property per Square Mile.	Total Annual Value of Land, 1841.	Annual Value of Land per Statute Acre.
Bedfordshire.....	463	296,320	£ 495,396	£ 1,070	£ 326,684	s. d. 22 0
Berkshire .....	752	481,280	732,116	973	477,570	19 10
Buckinghamshire .....	738	472,320	674,334	913	545,157	23 1
Cambridgeshire .....	857	548,480	868,684	1,013	581,761	21 2
Cheshire .....	1052	673,280	1,423,835	1,353	778,560	23 1
Cornwall .....	1330	851,200	909,497	683	603,119	14 2
Cumberland .....	1523	974,720	696,352	457	497,573	16 2
Derbyshire .....	1028	657,920	866,488	842	625,396	19 0
Devonshire .....	2585	1,654,400	1,852,144	716	1,241,523	15 0
Dorsetshire. ....	1006	643,840	735,234	730	550,567	17 1
Durham .....	1097	702,080	931,348	849	516,971	14 7
Essex .....	1533	981,120	1,585,719	1,034	1,018,650	20 9
Gloucestershire .....	1258	805,120	1,782,197	1,416	898,957	22 3
Herefordshire.....	863	552,320	681,235	789	552,583	20 0
Hertfordshire .....	630	403,200	667,710	1,060	386,341	19 1
Huntingdonshire .....	372	238,080	317,718	854	236,633	19 10
Kent .....	1537	996,480	2,111,675	1,356	1,044,999	20 11
Lancashire .....	1766	1,130,240	5,266,606	2,982	1,402,208	24 9
Leicestershire.....	806	515,840	933,799	1,158	690,914	26 9
Lincolnshire.....	2611	1,671,940	2,127,307	814	1,766,740	21 1
Middlesex .....	282	180,480	7,293,369	25,683	304,653	33 9
Monmouthshire .....	496	317,440	421,050	849	251,019	15 9
Norfolk .....	2024	1,295,360	1,893,824	935	1,209,181	18 8
Northamptonshire .....	1016	650,240	940,395	925	748,116	23 0
Northumberland .....	1871	1,197,440	1,326,414	708	740,609	12 4
Nottinghamshire .....	857	535,680	356,675	1,023	563,840	21 0
Oxfordshire.....	756	483,840	695,752	920	528,242	21 10
Rutlandshire .....	149	95,360	119,134	800	106,119	22 3
Shropshire .....	1343	859,520	1,170,008	871	874,316	20 4
Somersetshire .....	1645	1,052,800	2,050,516	1,246	1,361,547	25 10
Hampshire .....	1625	1,040,000	1,362,026	838	723,087	13 10
Staffordshire.....	1134	757,760	2,006,760	1,694	900,102	23 9
Suffolk .....	1515	969,600	1,297,956	856	912,062	18 9
Surrey .....	759	485,760	1,927,493	2,540	376,644	15 6
Sussex .....	1466	938,240	1,169,230	797	611,320	13 0
Warwickshire.....	897	574,080	1,609,747	1,794	713,390	24 10
Westmoreland .....	762	487,680	266,335	349	221,054	9 0
Wiltshire .....	1367	874,880	1,175,616	860	899,878	20 6
Worcestershire.....	723	462,720	995,242	1,376	605,610	26 2
Yorkshire, East Riding.	1119	716,160				
„ Cty. & Ainsty	86	55,040	1,111,807	922	760,942	19 8
„ North Riding	2055	1,315,200	1,011,885	492	845,547	12 10
„ West Riding	2576	1,648,640	3,324,802	1,290	1,449,007	17 7
Fractions.....	7	4,480				
Total England. ....	50,387	32,217,680	59,685,412	1,134	30,448,991	18 10
Total Wales. ....	7,425	4,752,000	2,854,618	384	2,206,146	9 5
England and Wales. .	57,812	36,999,680	62,540,030	1,081	32,655,137	17 8

The annual value of real and landed property in each county is given from the return made to the

FARM LEASES.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

House of Commons for 1841, being the net rental, or annual value of property assessed to the poor-rates for the year ended Lady-day, 1841.

The total annual value of real property in England and Wales in 1815 was.....£51,898,423  
 And in 1841 ..... 62,540,030

Increase since 1815.... 10,641,607

In 1841, the net rental of landed property assessed to the poor-rates in } 32,655,137  
 England and Wales ..... }  
 Annual rental of dwelling-houses .... 23,386,401  
 All other kinds of property..... 6,498,492

Total.....£62,540,030

The lowest annual value of real property per square mile in England is £549, being the county of Westmoreland; and the highest, the county of Middlesex, £25,683. In Wales, the lowest is the county of Merioneth, £175; and the highest the county of Flint, £877.

The lowest annual value of land in England is in the county of Wilts, being on an average 9s. per statute acre; and the highest the county of Middlesex, being 35s. 9d. In Wales, the lowest value of land per statute acre is 4s. 8d., in the county of Merioneth; and the highest 19s., in the county of Anglesey.

AGRICULTURE AND MANUFACTURES.

About one-third of the population are employed in agriculture; and of these fully three-fourths are directly or indirectly engaged in the raising of corn. The average growth of all sorts of corn in the United Kingdom may be safely estimated at about 64,000,000 qrs., of which about 55,000,000 are consumed by man and the lower animals. Taking the average price of the different descriptions of corn at 35s. a quarter, the total value of the corn annually produced will amount to £112,000,000, or nearly four times the annual value of the cotton manufactures.

The total annual value of the agricultural produce of England and Wales, exclusive of wood, &c., is estimated at.....£132,500,000

The following estimate of the gross annual produce of some of the great departments of manufacturing industry, is considered by Mr. McCulloch to be nearly correct:—

Cotton .....	£35,000,000
Woollen.....	22,000,000
Iron and Hardware.....	17,000,000
Watches, Jewellery, &c....	3,000,000
Leather.....	13,500,000
Linen.....	8,000,000
Silk.....	10,000,000
Glass and Earthenware....	4,250,000
Paper.....	1,500,000
Hats .....	2,400,000

The value of the above articles amounts to a gross sum of £116,650,000; but, exclusive of these, there are other departments of manufacturing industry of great value and importance—such, for example, as the manufacture of spirits and beer, cabinet makers' goods, &c.

SIR,—It is no uncommon thing for men to point out evils, without being able at the same time to suggest a remedy. The Preacher in Holy Writ states, "There is a time for everything under heaven;" and no sooner is one thing allowed to exhaust itself, but we have others immediately started. At the present time the all-engrossing subject, next to the drainage of land, is the necessity (stated by some to exist) there is for the farmers having leases of their farms; and a great deal of stress and weight is laid upon a speech made by the first minister of her Majesty's Government, at a recent meeting held at Tamworth, that he has not been sufficiently explicit in his views as to the welfare of the farmers, and that he has not stated whether he is really favourable to granting leases or not. I—humble as I am, and not able to cope with the right hon. Baronet either by speech or with my pen, and although I differ with him in a great majority of his views and arguments—still on this subject I do agree with him that it is one at the present time not sufficiently matured to bring it into practice; and I do not think it was necessary for him to allude to it in any other way than as attempting to allay their fears. How many men have erred with regard to leases! How many have wished they had never had a lease at all, when it has terminated! Who is bold enough, in the present day, to frame a lease that shall secure to the farmer the full enjoyment of it during his lease, and an ample return for the improved management during the last few years before his lease expires; that is, security for him for his course of husbandry, or tenant-right, on quitting? Why, to take the majority of the leases which have been made, they have afforded, where the parties were determined to have their rights, more funds and more amusement for the bar and the lawyers, than almost any other thing which can be named.

Let us look for their necessity, as stated by some who would point out to the farmers their real interests, if they knew the way: but I would observe to them, "beware of your friends." I know of instances in the eastern counties, where farmers and their ancestors have been upon the same place for 400 years without a lease, and have lived in comfort and affluence; and Professor Buckland, in his speech at the meeting above-named, alluded to the tenants of the Earl of Yarborough, many of whom he stated had been for a period nearly as long. If there had been any necessity with these men for leases, why have they not discovered it ere this?

I will tell you and them the cause which has led to this; and if there is any necessity for its being adopted, when I have stated my views with regard to leases, I shall be glad if some of your readers, more enlightened than myself, will endeavour to show me the way clear in this matter, so that I may not be at fault again, but become an advocate for them. 40 years ago, when we were fighting the battle of liberty with the world, and running ourselves over head and ears into debt to enrich other people, farmers were said to be doing well. Those who managed pretty well, and got good crops, got a good deal of money in return for them; and at that time, when wheat was at something like 6l. and upwards per quarter, it was thought by landlords and their agents generally, that they could bear some more rent, and consequently, to a

great extent throughout the kingdom, a revision of rents took place, not as to the relative value of land, but as to the extra quantity of rent which the farmer could bear. Men were appointed to value farms, which simply meant putting a per centage upon the rent, not ascertaining what was the value of each separate piece of land, although in many instances something having the appearance of a value was put upon it in a book. And so little regard was paid, that I could name many instances where land worth 50s. per acre to rent was put at 30s., whilst land worth 20s. was again put at 50s.; clearly showing, either that the parties who made the valuation did it at their own offices, and never looked at the land, or if they did, had forgot the worth between viewing it and looking at their plans; or else, on the other hand, that the simple process of making up a "book" was adopted. And again, where the valuation was really made, the farmer who had managed well was made to pay well, whilst the slovenly farmer was turned out, after the increased rent, to make room for a new tenant and an improved system of management; and in all probability, when this land was properly managed, it was quite as good as that which was placed at a high rent in the first instance. And here begins one of the first inequalities with regard to rents.

But let us glance at this per centage upon the rent, or improved value of grain, and let me ask any reasonable or practical man, whether the reduction since made has been at all equal to the amount put on? The amount put upon the rents was 95*l.* and 100*l.* per cent.—in some cases a little more; in fact, rents were *doubled*: and so long as the price of corn continued high, numbers were enabled to keep upon their farms; but at the same time there were many who could not continue, and that practical way of reasoning, against all their arguments, was adopted, of telling them, "If they did not like it, they could go;" so that they had no alternative but to run their chance with the times. Some did go, and left their paternal homes, to seek in other countries better landlords, or a change of land; and certainly a great number of these changes were very beneficial, as they carried their improved methods along with them.

As soon as the war was concluded, and the productions of our land were to be grown and consumed at prices which we could afford to give at home, it was immediately found that our corn was worth little more than half, or about 70s. per quarter; and even at this price, it would be difficult for the majority to pay for it. But this was not the whole of the evil connected with this doubling the rents. An example once set is very soon followed; and having had its origin with great owners, why the little ones followed in the same wake, and consequently raised their rents in a greater proportion than large ones. Everything rose with this increase. The great landlord's rental was doubled, his establishment increased, and in too many instances his expenses increased in the same proportion. In like manner, the clergy had found, that, as the rental had doubled, their tithes likewise had doubled; and we find them increasing their mode and style of living in the same ratio as their higher and more wealthy brethren. And this course of proceeding rapidly extended through all classes, from the highest to the lowest: all had alike advanced with the times, or with this increased value of land; but all were not alike dis-

posed to retrograde with them. We know what an easy thing it is to step up the ladder with *good fortune*; but how unpleasant it is for us to descend again when misfortune meets us on the road. It is too much the way of the world to smile while everything is going on well with a man; but how little sorrow or sympathy is extended to him when misfortune besets him; and this is one of the reasons that causes the backward road to be trodden with regret. It was very easy to raise rents—not so to lower them; and a very few years told the tale that they were too high. Then came a reduction of 20 per cent.; a few years more, and then an abatement of 10*l.*, and within the last ten years, 20*l.* per cent. more; and this was considered final, as the improved management of the land in the course of thirty years had brought this to something like a fair rental. But here is the baker's practice of raising his flour 4*d.* per stone, and dropping it 2*d.* It is very rarely that he can afford to drop it all at once to 4*d.*—there is such a vast difference between raising and lowering. And such has been the case with the majority of landlords. There are many exceptions to this statement, and it is well there are for those under them, as they had their rents lowered considerably at first; and some there are who had the *good sense* to lower them from the first, or rather did not insist upon the whole of the increase, and have not been meddling constantly with their rents, raising and dropping them according to circumstances; and this has been another cause why rents have been so unequal. Another, and a very bad plan, has been adopted—viz., the mode of letting land by auction, or to the highest bidder by tender: and what has been the result of this? Why, that land has been let to tenants, who have occupied it a few years, and then given it up again, to be again let, and offered to some one else; and this has been another cause for the great inequality of rents.

But I now come to a question by the reader—What has all this statement to do with leases? Why, everything: it is one of the *great causes* which has led to the question being asked about leases at all. During the period I have named, our population has increased in an extraordinary degree, and our wants in a like proportion, calling forth an improved system on the part of the farmer, to grow an extra quantity of produce to meet the demand. Has this been done? Have the productions of the land been increased; and if so, how has this been brought about? By the farmer's investment of his capital in the land, trusting to Providence and the honour of his landlord for the return to be reaped by him? What has this to do with his capital, or the investment of it? Why, simply this:—First, that the seasons may be so favourable as to give him an ample return for his seed sown; and secondly, that his landlord will be favourable in the rent, and not change it; or else, if they should differ and separate, that he may be allowed such outgoings, in the shape of tenant-right, as may in some measure remunerate him for his outlay in the last year of his holding. And in this alone comes one of the great stumbling-blocks against leases at all—viz., tenant-right.

There is an absurd and ridiculous word often made use of as connected with farmers—"custom," and the custom of the country; and many farmers have been told by agents, and there are at this moment agents who will not admit of any alteration in the shape of tenant-right, but date all their al-

allowances to tenants back to *custom*. Can any thing be more absurd than this? Why, it was customary to carry corn to market, in many parts of Lincolnshire, on horseback, along the present foot-roads. What should we say to a man doing such a thing now? It was customary formerly to manage land with two crops and a *dead fallow*; and the same land is now managed with two white crops and two green ones, and no fallow at all. What would be said to a man who was farming in that manner at the present day? Why, that he was half a century behind-hand.

It is quite clear, then, that we cannot refer to custom to guide us in the present day as to management. Why, then, should it be referred to as an argument to direct the valuer as regards the tenant-right due to the outgoing tenant? How many new modes of management have been tried, adopted, and found to answer, in the last forty years? And if these are allowed (in proportion) to be the property of the tenant in Yorkshire, Nottinghamshire, and Lincolnshire, why should they not be allowed to the tenant-occupier in the midland counties—such as manures, bones, lime, marling, draining, seeds, &c., &c.? I ask, why that which has been adopted as a rule in one county should not be practised in another, allowing to the tenant his fair proportion of the value of unexhausted manures at the time of his quitting? And until some definite conclusion can be arrived at with regard to this question, it will be impossible for the best lawyer living at the present day to frame such a lease as would secure to the landlords a proper entry—that is, one general course of good husbandry from *all* tenants up to the time of their quitting at the expiration of the lease.

H. H.

*(To be continued.)*

## WHITFIELD EXAMPLE FARM.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—I have read with pleasure your remarks respecting Whitfield Example Farm, as well as your correspondent "Headland's" letter. I also visited the farm about the same time that he did, and with equal satisfaction; and would recommend every agriculturist, who can without serious inconvenience, to do so likewise. I must, however, confess that I was disappointed at one thing, and the same was expressed by other visitors at the same time; I mean that, instead of finding the sheep and cattle upon the farm, we were told they were nearly all on the grass land of Tortworth Park, which also belongs to Earl Ducie. We were informed of the reason for this: Lord Ducie has a herd of short-horns, not part of the stock of Whitfield Farm; and as it is convenient to him to send them to be wintered at Whitfield, he takes what he considers an equivalent number of sheep belonging to Whitfield to be fed in his park in summer. It is said that by this arrangement double the number of sheep are kept at Whitfield that could otherwise be kept there, but no cattle. This is what I object to. Whitfield is intended to be an *example* farm, and too much praise cannot be given to the noble owner for his intentions; but unless it is managed without connection with any other farm or stock, it must lose

much of its usefulness. The farm produces, I may say, immense crops of corn and roots; it is also said (and I do not doubt it) to maintain a large number of sheep and cattle, but a farmer would like to see what stock it does actually maintain at *all times*; but when, upon visiting it in summer, he finds all the stock except the horses removed to another farm, he is dissatisfied. It is no example to him; it rather confirms him in his original opinion, that a farm without permanent pasture will not answer; and thus a principal feature in Mr. Morton's management, and of Scotch farmers in general, ceases to be of any use, is not appreciated, and, in fact, its feasibility is doubted by most of his English visitors.

This is a great pity. Lord Ducie's idea in originating the farm is a noble one, and worthy of imitation; but (I say it with deference), to make it as useful as it might and ought to be, he should sacrifice the convenience he derives from sending his cattle there in the winter, and allow the farm to support its own stock of sheep and cattle winter and summer. The profit on stock could then be correctly estimated, which under existing circumstances can scarcely be done.

"Headland" remarks upon the management of the sheep stock; to which he objects. From the answers I received to my inquiries at Whitfield, it is evident that Mr. Morton considers his management of that stock as one of the great features of his system, differing as it does from that of most others. The test of its utility must depend upon the profit; that is what most nearly concerns the farmer. That it may be more pleasing to see the sheep feeding at large in grass fields than in small pens upon clover in summer, and in winter in still smaller ones (only ten feet square, each containing ten sheep), in a yard under sheds, I admit; but by which system can most profit be made, and most stock be maintained, and the land be most equally manured? Mr. Morton says by his system. Certainly, when I saw his lambs last September (a cross between the south-down and Leicester), they did not appear to be very good; and yet he expects to turn them off (all, or very nearly all) fat between January and May-day, as he did last season, I understand, weighing from 18lbs. to 24lbs. per quarter, averaging 22lbs., having consumed, besides roots, ten gallons of oats each on an average. If these year-old sheep produce 44s. per head, at 6d. per lb., deducting 4s. for corn, leaves 40s., which, it must be admitted, is a remunerating price, if the loss incurred in feeding does not exceed the usual allowance of five in the hundred, and such as is rarely obtained for sheep under 18 or 20 months' old.

And here I would remark upon what appears to be wanting in Mr. Morton's accounts; I mean, the yearly profit on *each sort* of stock during the year. The value of the sheep stock on the farm at the commencement of the season (either Lady-day or Michaelmas) should be put down; added to which, the cash paid for any purchased, and also for purchased food (in which I include corn, though grown on the farm, but not roots or straw); then, at the end of the year, the value of the stock then in hand, together with the cash received for sales, the balance showing the profit to pay for attendance and roots consumed; the same plan with regard to cattle, and the profit on both will give the value of the green crops and straw, adding whatever might be judged right for the food (exclusive of corn) consumed by the eight

working horses; this is the number kept on the farm of 240 acres of ploughed land; and as only 40 acres are ever under clover at one time, it must be allowed that these horses have full employment, for the ground on which the root crops grow (80 acres) is almost incessantly worked by the horse-hoes until the crop ceases to grow.

You are quite right in saying that the report of Whitfield Farm, for the year ending at Lady-day, 1843, is a matter of some anxiety, embracing as it does a year of low prices, and moreover being the first year in which the full rent is to be paid to the landlord; for if I rightly understand the report published to 1842, comprising a period of three years, the rent therein charged is only 543*l.*, which is in fact only one year's rent at the present supposed improved value; therefore, as before observed, the report for the year ending Lady-day, 1843, and which I suppose may now soon be looked for, must prove highly interesting to all who have watched the proceedings on this farm.

If, with present prices, the farm can pay the increased rent and taxes, and afford the expected interest for the farmer's capital, it must be considered a most successful experiment for both landlord and tenant. Lord Ducie, it must be allowed, will have purchased it at a heavy sacrifice in the first instance, having given up entirely two years' rent of the farm, and also two years' interest on 7,828*l.*, which at 4 per cent. is 626*l.*; this, with 400*l.*, the two years' rent, make 1,000*l.*, which ought to be added to the above-mentioned outlay of 7,828*l.* by the landlord, but for which he will receive 390*l.* per annum, equal to 4½ per cent. This might be an encouragement to landlords to do even as much as Lord Ducie has done for this farm, though I must say I think he has done more than can be expected from a landlord. The allowance of two years' rent for damage done in removing timber appears to be unreasonable, nor do I think that a landlord could be fairly asked to subsoil-plough his farm after he has paid for draining it, nor to pay for lining it; these two last should be considered as tenant's outlay, to be repaid him by the increase in the crops.

Your obedient servant,

November 21th, 1843.

L.

**NEW FOOD FOR SHEEP.**—Whilst I was at Geneva in the autumn of 1837, I observed every one collecting carefully the fruit of the horse chestnut, and upon inquiry I learnt that the butchers and holders of grazing-stock bought it readily at a certain price per bushel. I inquired of my butcher, who himself kept a very extensive grazing farm, and he told me it was given to those sheep in particular that were fattening. The horse-chestnuts were well crushed, something in the way, so I understood, that apples are, previous to cider being made. They are crushed or cut up in a machine kept solely in Switzerland for that purpose; then about two pounds weight is given to each sheep morning and evening. Sheep eat it greedily: it must be portioned out to them, as too much would disagree with them, it being of a very heating nature. The butcher told me that it gave an excellent rich flavour to the meat. The Geneva mutton is noted for being as highly flavoured as any in England or Wales.—*F. D. Ellysés.*

## LOUGHBOROUGH AGRICULTURAL SOCIETY.

The quarterly meeting of this institution for the discussion of subjects connected with the welfare of agriculture, was held on Thursday, the 26th of October, in the long room at the King's Head Inn, after the market ordinary. The subject for discussion was "The best method of keeping Farm-horses;" and Mr. Henry Lacey, of Hoton, was announced as the person engaged to open the discussion. In consequence of an accident that happened to S. B. Wildc, Esq., that gentleman was prevented attending and taking the chair, which, however, was well sustained by Mr. C. Stokes, of Kingston, and the vice-chair by Mr. George Fowler. The meeting, we believe (whether we look at the number attending, the interest taken in the discussion, or the good feeling that uniformly and universally pervaded it), has not been surpassed, if equalled, by any the society has held.

After the usual loyal toasts had been proposed and responded to heartily,

The CHAIRMAN read the notice that had summoned the meeting, and called upon H. Lacey to introduce the subject for discussion.

Mr. LACEY, on rising, said—Mr. Chairman and Gentlemen,—I am quite sure you will sympathize with me on this occasion. I hope I am not that vain man (I believe you will not think so), as, when I see such a number of gentlemen and wealthy individuals, to think that it is out of regard to what I have to say on this occasion, that has induced you to come here; no, it is to me a proof of the hold which this society has upon your attention. I am much gratified to see such a spirit of inquiry and investigation as is exhibited by you. I must say I am only sorry that I shall not be able to do justice to the subject entrusted to me; you will, however, give me credit for doing my best. (*Hear, hear.*) I certainly feel bound, as a member of this society, to contribute my share, as far as lies in my power, to promote its interests; nevertheless, I cannot but lament the choice of the officers, in fixing upon me to introduce this discussion. They have given me, however, a kind of apology for my observations, by saying they want a plain statement of the manner in which I keep my horses. Most of you may know that I have been in the habit of using steam for the purpose of preparing their food, for some time past; without, however, taking particular notice of the quantity of food consumed; and it was not until I entered into this subject, and resolved to test the matter fairly, that I made such observations as I have subsequently done. In June I took a particular account of the value and quantity of the food consumed by ten horses in a week—that is, from the 12th to the 18th, both inclusive, which was as follows:—

	£	s.	d.
New beans, 7 bushels, at 3s. 6d. . . . .	1	4	6
Bran, 2 cwt., at 4s. . . . .	0	8	0
Malt-combs, 28 stones, at 5d. . . . .	0	11	8
Cut chaff, a mixture of barley-straw, chaff, and hay, about a third of it being hay, 8 cwt. 3 qrs., at 3s. . . . .	1	6	3
14 strikes of potatoes, at 1s. . . . .	0	14	0
	£4	4	5

The total weight of all sorts of material for this week's consumption was as follows:—

	lbs.
Beans .....	441
Malt-combs .....	396
Bran .....	224
Potatoes .....	1120
Chaff .....	980
<b>Total.....</b>	<b>3161</b>

So that the average amount of keep is something like 8s. 5d. per horse per week, exclusive of 3d. per day for fuel used in the preparation. And the average consumption is about 316lbs. per week per horse, of all sorts of food I gave them. Gentlemen, I should be ashamed to give you a wrong statement if I knew it; the amount I have stated is the real *bona fide* quantity, as they had it, and the regular average amount given to them at other times. I can find them work proportionate to their number, and with the above sustenance I can keep them in good working condition, whether for ploughing or going long journeys to fetch coals. I have further examined, and find from the week just past—that is, from the 18th of October to the 24th, both inclusive, the following result:—

	£	s.	d.
Potatoes, 14 strikes, at 1s. ....	0	14	0
Malt-combs, 3 cwt., at 4s. ....	0	12	0
New beans, 7 strikes, at 3s. 3d. ....	1	2	9
Hay at nights, 3 cwt., at 3s. ....	0	9	0
16 cwt. of cut chaff, one-third straw and the other two-thirds clover and dried dills, both very much weathered, and tasteless, at 2s. 6d. ....	2	0	0
	<hr/>		
	£4	17	9

The total amount of this week's consumption was as follows:—

	lbs.
Beans .....	441
Malt-combs .....	336
Potatoes.....	1120
Chaff .....	1792
Hay .....	336
<b>Total.....</b>	<b>4025</b>

So that I find the horses' keep this week averaging about 9s. 9d. per head, having consumed more by 86lbs. per week at this time of the year than they did at the earlier part, the average in this week being about 402½lbs. per horse, and which proves that they want more food at the latter end of the year than they do at the spring. I observe here, however, that they had 2 cwt. of bran in the spring, which I admit is equal to 4 cwt. of chaff, which would, therefore, reduce the difference in weight to 640lbs., or 64lbs. per horse per week, or a little more than 9lbs. per day. As it regards the charge of the articles, some gentlemen may think it too low; I would just say, therefore, in reply, that I have given them at cost price, and the dills and clover were tasteless before subjected to the operation of the steam. With a view to test the thing thoroughly as to its results, I can say, I reduced my horses by excessive labour previous to weighing their food, and yet found them equal to the task afterwards assigned. And then, as it regards the advantages, I may offer a remark or two. I have been a farmer a good many years, and on my land I have found it difficult to keep my horses in good condition, and often had to buy hay in the spring.

I applied my mind to ascertain how I could improve in this respect, and found that I could take the mouldy hay and bad-got hay, and cut up, and by the application of steam with malt-combs, potatoes, broken beans, &c., produce a nutritious and palatable (and I think cheap) provision; for I find, in general, I have hay to spare, and mow six acres less now, and make my manure better through this process than on my former plan. Then, gentlemen, as this subject embraces the farmer's manner of summer keep, I would just add that I have been in the habit of cultivating about one acre of rye for them, afterwards dills, then two crops of clover: all of which I cut for them, for the waste and havoc in dills has always been an annoyance to me. I have thought some farmers, by their manner of throwing dills down for horses to eat or trample under their feet, have considered them of little value, saying sometimes, "We have plenty of them, and they will make good manure." My plan in general is, to cut the dills, spread them on the floor, and by so doing keep them from heating; after which I steam a quantity of chaff, which I mix with the dills, by which means I consider I have made the value of 2s. per cwt. of my chaff. I kept them all last summer, having a quantity of good barley-straw, which I mixed with a quantity of cut dills and some malt-combs, and I found it to answer very well; and, gentlemen, I can assure you, I have never had a greasy-heeled horse by this method, nor but one with inflammation, and that (an old one) through improper usage. This is my unvarnished statement, and if I have given satisfaction to those gentlemen who called upon me to give it, or by giving it should render an advantage to any individual present, or in any way promote the interests of the society, I shall be happy in having done so.

Mr. Lacey then resumed his seat, amidst loud cheers; and the CHAIRMAN rose to propose his health, with thanks for the statements he had given them.

Mr. LACEY, in returning thanks for the manner in which his health had been received, and the attention given to his remarks, said, since he sat down, he had been informed he had not given them the expenses of his cooking, or told them how he obtained such cheap potatoes. As to the latter, he bought them out of a field of Mr. G. Pagett's, of Sutton, at 1s. per strike; and in reference to the former, from his servant's statement, he estimated the fuel at 3d. per day. As to cutting chaff, and fetching the materials to cut—as to the operation of crushing beans, corn, and so forth, there was no particular expense more than all knew of; but as to steam, it was *ad infinitum*, for the more it does, the more it wants to do; and the more done, the cheaper. The principal matter was "getting the steam up" (*laughter*); then a person throwing on a shovel-full of cinders will be able to effect an almost incredible amount of cooking. It was, however, a fixed thing; the man who adopted it must light his furnace as regularly as he lights his kitchen fire: and, he might add, if at any time they were straitened in the kitchen by entertaining a number of friends, it would be easy to steam half-a-dozen plum-puddings, or, as he had done on one occasion, cook a ham; there is no difficulty when once you have "got the steam up." (*Cheers and laughter.*) At any rate, the engine-house is a nice place for a stray servant to lay in (*cheers*); instead of the hay-loft or stable, as some servants, alas!

had done; or, on certain occasions, for a starved lamb, instead of putting it in the dung-hill to warm, as many did. He (Mr. L.) had one, and he took the poor little thing, almost dead, and tucked it into a heap of steamed chaff, with its head out, and it was soon restored.

The CHAIRMAN said: I am sure I shall have the concurrence of all present in giving, as the next toast, "The Leicestershire Agricultural Society," coupling the name of Mr. Kilby with it.

Mr. GEORGE KILBY, of Quenborough, on rising, said he was quite unprepared to answer the compliment which his friends had just paid him. He could only say, that that society and all others throughout the kingdom were of the greatest benefit, not only to agriculturists, but to the community at large. Mr. K. then enumerated some of their advantages, particularly those resulting from discussion, and afterwards descanted on the improvements in mechanics, science, and philosophy; observing that, from a review of the last 30 years and the present state of science, it was impossible to say whether the time would not come when all the operations of agriculture would be performed without a single horse being used; and if so, what a blessing it would be to the country at large, if we were only to look at the quantity of food now raised for horses, which, in that case, would be adapted to human consumption. With such a supposition before them, the subject of discussion might seem to be Utopian; they were not, however, to leave their own duty for the speculation of what might come to pass in the days of those who would follow them. He (Mr. K.) must confess his ignorance of the subject before the meeting. He conceived all the importance, as it regards the steam, was here—can Mr. L. thereby make that good and nutritious which before was bad? Now, the expense is very considerable—between 30*l.* and 40*l.* first of all, for the operation, which is of importance; and when we look at the different implements wanted in the various operations of farming, it is a very serious matter; but then the question is, whether, after all, it is or it is not the best and cheapest. Mr. L. has said that he used a variety of articles, such as malt-combs, beans, bran, potatoes, hay, clover, dills, and chaff; now they are various and numerous, and it requires considerable caution in the management. If he has calculated right in his statistics, I must confess it is a cheap process; I cannot say but I think it is cheaper than mine, although I have not taken particular notice. My plan is this—in the first week in May I think I should have a portion of green meat for my horses; I sow rye and tares for this purpose, which I add partly to the dry food until I give them full green food. Mr. L. has mentioned his cutting tares throughout the summer to prevent waste; I think a little may be wasted by putting it in the crutch, which waste, however, will make good manure. There I lay down this rule, there should nothing be given in the rack at night. Everything should be cut for them in the autumn, whether the corn be in the straw or not. I commence giving them dry food at an early period, thinking it not to be prudent to keep them out in cold nights. I come, however, to learn better plans; not to propose my plans for your adoption (*hear*), but to compare and improve. I give them cut clover and half a gallon of beans per head until we have done with wheat-sowing. In the spring I grow some peas, which I boil, and that is tantamount to Mr. L.'s steaming [Mr. L.—Not so good],

which I allow with clover; but now I cannot give the cost, being ignorant of the particulars as to the expense. It behoves every one of us to search into and acquire that plan which is the most economical, not only in this particular, but in every department of agriculture. The land is depreciating in value, and we need the establishment of more farmers' clubs, and the introduction of greater improvements, if we are to meet the difficulties; and I do not fear them. I must confess, I believe there is in the British farmer a something which will support him, while he contends with all that makes against him. I do not say this of the mere occupiers of the land, unless the owners of the soil and the nobles of this country are found supporting them; but that they are doing already. Mr. Kilby went on to remark upon the advantages to the owners of the land by co-operation, and the benefits to the farmer and the community at large, by the adoption of a good system of cultivation; and afterwards concluded by wishing success to that and every similar institution throughout the country. (*Cheers.*)

The CHAIRMAN, having proposed "The health of their President, G. W. Packe, Esq." (which was received with cheers), said he should be very glad to hear the opinion of any gentleman who had any remarks to make upon the subject before the meeting.

Mr. WALKER, of Bradmore, rose and said, he trusted he should be excused by the chairman and gentlemen, in not waiting until called upon. Nothing was of greater importance to that society than free discussion; whether the sentiments spoken emanated from rich or poor, he was satisfied they would always be accepted with courtesy; and very careful should they be to weigh the remarks of the practical farmer; for though of apparent little worth, and clothed in homely guise, still, when investigated, they might involve some great principle and its consequent results. Everything was supposed easy after its discovery, however difficult or insurmountable; the story of Columbus, on being taunted with the trifling merit of the discovery of the new world, was familiar to them all. Mr. W. was much pleased by the careful manner in which Mr. Lacey had conducted the details of the subject; no doubt it was an act of reciprocity on the part of Mr. Lacey, that had induced him to come forward and cast his valuable information into the common stock for the benefit of others. He would excuse him if he (Mr. W.) tested his remarks by a few queries. First, the amount of work done, or number of acres cultivated by the horses so kept; and since he had observed that cows kept on hot grains and warm food did not come up in condition afterwards, when otherwise fed, to equal those fed on natural food, he would ask, in reasoning by analogy, whether steamed food might not weaken the stomach of the horse? Another thing which had escaped Mr. Lacey's notice was the practice of feeding horses on lucerne. Necessity (said Mr. W.) is the mother of invention; and having a farm with little natural meadow or pasture, I sowed some lucerne on land with a dire marl bottom; this, as gentlemen well know, is of a dry nature, and on all such bottoms, wherever situated, will grow luxuriantly. He (Mr. W.) had four acres as described the last three years, and had had it mown nine times, generally beginning about the 12th of May; afterwards vetches, back to lucerne, &c., taking care to have the horses lie in yards, and well bedded. Mr. Kilby referred to corn and straw

being cut up together: if I cut up straw (said Mr. W.), it is by itself. I always thrash out the corn and break it, as in that state it is easier of digestion; I am able to consume three times the quantity of chaff that I could with unbroken corn. I would further remark, in our efforts to assist nature, it is of importance we should be careful of the length we have the stuff cut; I am of opinion it should be sufficiently long to render mastication necessary, instead of bolting it. I have no weighed amounts of food to submit to your notice; my horses have half a strike of beans per week the year round, and which, with chop in winter, one-third straw or chaff, keeps them in fair condition. Mr. W. concluded by replying to objections he had heard against agricultural societies.

Mr. STOKES proposed "The health of the Stewards," which was acknowledged by Mr. T. C. ANGRAVE.

The Rev. J. POWELL, having proposed "The health of Mr. C. Stokes," which was received with applause, Mr. S. offered some remarks upon the advantage of such institutions, and regretted the absence of Mr. Wild. It was his opinion that Mr. Lacey's plan was as yet untouched; he should be glad, therefore, to hear any other observations.

Some one calling out for Mr. G. Bakewell, of Lockington, to speak,

Mr. BAKEWELL rose and said: Gentlemen, had my friend Mr. Kilby called upon me to have given you the best and cheapest method of keeping farm-horses, I should certainly have declined responding to his call; but as I am to give you a plain statement of the manner in which I keep my waggon-horses, I shall answer it with pleasure. Gentlemen, I commenced farming in the year 1815. It was the practice in our neighbourhood at that time to farm on the six-course system—viz., first and second seeds, wheat, barley, turnip-fallows, and harley; it was then customary to mow the clover for the horses, and to keep them on clover, and in spring and autumn on corn. Having also a large dairy, I was always short of hay and clover in the spring. No one but a practical man knows what a team of ten or twelve horses will consume. At length, gentlemen, I was determined to alter my plan; I then began to eat my seeds with sheep, and I found that the first crop of seeds would keep twice as much stock as the second, which was only rye-grass, for the months of May and June; I likewise found the wheat better on the clover brush than after second seeds. After the wheat, I sowed the crop for the horses (which is the partridge pea); this crop I always consume on the farm. I cut up the peas in the straw for my horses, letting the peas be a year old before I use them. I am quite convinced that one acre of good peas will keep a horse the year in the stable, letting him go to grass the latter end of May or the beginning of June, and keeping him up to the latter end of October or the beginning of November, giving him cut peas all the time nights and mornings; with this kind of keep, there is no other corn or hay required, either in the spring or latter end of the year. (*Hear, hear.*) I can say from experience that my horses are in good condition, and fit for work; nor do they flag at their work (*laughter and applause*), but are always ready for hard work. Gentlemen, I think steamed warm food good for some horses; there are some horses that never go out of the stable in the winter, except about once a week to take out the corn—these

horses would be better with soft wood; but my opinion is, that those horses that are always at work, when it is possible for a man to be out, for eight or ten hours a day, are much better with dry food; but, gentlemen, I did not come here to give advice, but to hear and learn, and especially from those who are practically acquainted with the keeping of farm-horses; and, seeing so large and respectable a company, and some of the most opulent and best farmers of the two counties (Leicester and Nottingham), I feel much flattered by the attention you have paid me; and I hope some other gentleman will give us his experience on the subject, and teach us to keep horses *cheap and without flagging at their work.* (*Hear, hear.*) Mr. Bakewell resumed his seat amidst loud cheers; which having subsided,

Mr. LACEY rose to propose "The health of Mr. Attenborough, of Bradmore," in a brief though appropriate speech.

Mr. ATTENBOROUGH rose to thank them for the honour they had done him by drinking his health, and expressed his happiness to see so many practical farmers at the table, and in hearing the statements of Mr. Lacey. He was confident, with reference to Mr. Walker's horses, that they were in good condition; but attributed their condition to his lucerne, and not to the bean flour. It was his opinion, from personal observation and experiment, that lucerne was the most substantial food that can be produced for horses, and if the farmers and gentlemen knew its value, they would more generally cultivate it where it was practicable. He was aware all soils were not suitable, but where it could be cultivated he should advise it; and he believed the change from lucerne to dills, and then back to lucerne, was so advantageous that whoever adopted it would not repent. He would repeat it, he believed the principal thing in Mr. Walker's case was the use of lucerne. Mr. A., having thanked them for their kindness and attention, sat down amidst loud cheers.

Mr. ANGRAVE very much regretted that, in his former remarks, he had forgotten to acknowledge the satisfaction he had felt in listening to the remarks of Mr. Lacey, and in an ingenious manner proposed "The health of Mr. J. Fowler;" for which thanks were returned in his felicitous mode of expression, assuring them he felt the honour done to him in the position they had assigned him, and apologizing for any defect, being deprived of his brother's services through sickness.

Mr. G. EATON, of Castle Donington, one of the stewards, was then called upon, who said he had no plan to propose, and but few remarks to offer. He should, however, be glad to hear from Mr. Lacey how many arable acres he had for ten horses; and he should be glad to hear the same from Mr. Walker, whose horses, by his grinding half a strike of beans a day, were in a run-away condition. (*Cheers and laughter.*) [A reply.—Not Mr. Walker's, but his neighbour, Mr. Attenborough's.] Oh! but was it not Mr. Walker's corn that Mr. Attenborough ground (*cheers and laughter*); and were not his own horses in equal condition? He would also be glad to know whether those persons who had not given their expenses, have greater work to perform than Mr. Lacey in proportion (*cheers*); and also, whether Mr. Lacey's horses are also in a run-away condition. Mr. Eaton resumed his seat amidst loud cheers and laughter in parts of the room.

The CHAIRMAN having proposed "The health of the Farmers' Sons" (to which Mr. Birchall, jun., replied), said—there could be no good ploughing without good instruments; and proposed "The health of Mr. Hanford," who acknowledged the compliment.

"The Press" having been proposed by Mr. KILBY,

Mr. WALKER rose and said—it appeared to him that it would be better for Mr. Lacey to reply to *all* at once; he, therefore, while up, would attempt an answer to Mr. Eaton, who inquired the number and labour of his (Mr. Walker's) horses. He had fifteen horses, and 350 acres—that is a little better than 23 acres per horse; but the real labours of his fifteen horses was about 150 acres of cropping, and 60 of fallows. He would, however, be understood to speak in round numbers, and not positively.

J. BUCKLEY, Esq., of Normanton Hills, rose to propose "The health of S. B. Wild, Esq.," which was received with loud cheers. Mr. B. wished, while on his legs, to ask how Mr. Lacey's waggon-horses stand the green food after the dry food steamed in winter. He then gave an outline of the manner in which he managed his horses, which was received with applause.

Mr. LACEY, on rising to reply to the different queries proposed, said: Gentlemen, I have great pleasure in attempting to satisfy your minds on the subject under discussion, and only feel sorry that I was not a member of an agricultural society twenty years ago. Declining age obliges me to use these glasses, in order to see a number of notes I have made on your questions: I hope, therefore, your indulgence will be afforded me, if I trespass too long upon your time and patience. I am asked, how many horses I have, and how many acres of land. I reply, I have 10 horses, and 300 acres. I have two which are chiefly occupied for my own use, being unable to get over my ground without their assistance, either so often or so rapidly as I now do. I am further asked what quantity of work my horses perform. I consider myself a green-crop farmer; I cultivate about 120 acres of corn, 20 of potatoes, and 20 of turnips. I am quite an enemy to dead fallows. I hold that nature intended a crop every year; and as there are no dead fallows in the rent-roll, so there ought to be no dead fallows on the farm. I have no rest-horses; they are no good. If they have nothing to do, as my waggoner told me this morning, they will eat the more. My conclusion is, that idle horses and idle men are a nuisance wherever they are found. You may take it for granted that my horses are to work from eight to ten hours a day the year round. I am not otherwise prepared to answer the question in figures. They are generally worked in pairs, and every physical exertion is brought into demand. The next question is, how cows do after steam food. I reply, I have not cows, but horses, in question; but I will give a satisfactory answer. Mr. Lacey then said: I have had cows who, being fed on steamed food, did well—very well; liked it, and loved after it, as they would after turnips; these made beasts which would have borne examining. Mr. Buckley has asked how the horses would stand green food, after steamed food had been given in the winter. I would ask, whether food which keeps a beast well all winter, will not keep it *in order* for the spring? To Mr. Kilby's question, whether I cut up the straw with the corn in, I have written *no go*; not from any disrespect—I

highly esteem him—but because I cannot afford to give them the corn, but can the straw; and of all straw for horses, I believe oat-straw to be the best. I believe oats to be their legitimate food, and therefore I consider oat-chaff, of all chaff, to be preferable. Mr. Walker has offered some remarks upon the advantages of thrashing out the corn and breaking it, but could not tell the expense; yet he had an honest miller by his side, who could have told the charge for grinding, if he could not tell the toll taken out. (*Laughter.*) Now, my beans, being new, cost me 1s. per bushel less, and there will be 25 per cent. towards the wear and tear of machinery, and I can steam and crush my beans for 1s. per quarter, which is another advantage; and then I have another advantage, which, when there is a scarcity of capital, is worth attention. (*Hear, hear.*) I have no sooner got my peas than I can begin to use them directly, however soft (if they are not rotten), and they will do as well as old ones; here is another saving, for there is 1s. a bushel difference between new and old ones, as used by Mr. Bakewell. (*Hear, hear.*) There is another saving which will help to pay for the apparatus and labour on my plan, and that arises from the capital being turned quicker; now the slow movement of capital is the greatest curse on the farm; therefore to quicken it is an advantage, not only to ourselves, but to society at large. Malt-combs were next a subject of question. I am a great user of them, and they cost me about 4l. per ton. I got a friend of mine at Leicester to analyze them, and he found there was a very considerable quantity of saccharine matter and alcohol in them. I used them at the rate of six stones a day; and my ostler said to me, the more they had the better they did and looked, and that is my answer. That bran, malt-combs, oil-cake, &c., should not be calculated at cost price, appears to me reasonable; I think there is one-third of the value to be put to the manure; this, in my mind, is another important consideration, and would lower my calculated costs. In the remarks of Mr. Attenborough about lucerne I fully concur, but cannot grow it, because my land is unsuitable, otherwise I should grow it; and as it can only be grown upon particular soils, I would advise those who have the soils suitable to take the advantage. Mr. Kilby had asked the expense of my apparatus. Gentlemen, you will excuse me if I manifest a little egotism. He has asked me because he has some thought of adopting my plan; I believe he is half a convert, and I can assure him, if he once begins to steam, there is something so subtle, so insinuating, he is sure to go on until he steams his beans, peas, bran, chaff, and straw; and should he have the misfortune to have a cow die, a hundred to one, if he has a litter of pigs, if he does not hash up the carcass for them, and take off the fat to grease his cart and waggon wheels. (*Laughter.*) I should like to make him a convert. (*Continued cheering.*) I have several already [whom he mentioned], and I hope to have more. Every day my furnace is lighted, and beans, potatoes, chaff, &c., is put in a process of preparation for my cattle as uniformly as for my servants or myself. As it regards the question of warm food not being suitable, I admit that nature at first did not ordain for them warm food, nor am I sure it did for anything; but does warm food do best for the cottager's pig, or cold? When your horses come home heated from plough, or flag on a journey, would you give them

cold water, or warm oatmeal and water, or a warm mash? Why, doubtless, one of the latter, in preference to the former. If your servant comes home from the field, where he has laboured hard all day, do you set before him a piece of cold bacon, or a basin of cold broth three days old, with the fat set over the top; or do you say, "Give him a good hot dinner—it will do him good?" (*Cheers.*) And yet man, as it regards his body is but another animal. I say, assimilate the nature of the material to the temperature of the animal system, and it will be all the better, whatever the nature of the food. As it regards steamed food not preparing animals for green meat, I humbly submit that, of all others, it must, most and best of all kinds of food, prepare them for it; for which is, in its nature and action upon the system of the horse, the most like green meat, steamed food or dry food? Gentlemen, I have used food of this kind for the last five years, and have had less farrying than before; my old horses have worn better and done more work, and my young ones have improved thereby; and that, gentlemen, is my apology. I am much obliged to you for your attention.

Some remarks having been offered by Mr. KILBY, in commendation of Mr. Lacey's answer, and explanatory of other observations by himself,

Mr. STOKES rose and said, he had no details to present to them, but he would offer a remark upon Mr. Lacey's system. At present it stood perfectly uncontradicted, and he (Mr. S.) could not bring forth any statement to contradict it; and he hoped the subject would be thoroughly investigated by the keepers of horses; it was a subject of great importance to them as agriculturists. If they could not keep them so cheap as Mr. Lacey, they could improve, and every improvement should be adopted by them. In this neighbourhood there had been no system of keeping horses; one had adopted this plan and another that plan; he was sure, however, the more they could introduce system in all their operations, the better for themselves and those with whom they associated.

After a few more remarks from other gentlemen, the CHAIRMAN gave the concluding toast, "Happy to meet, happy to part, and happy to meet again."

## ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

At a Weekly Council, held at the Society's House in Hanover Square, on Wednesday, the 29th of November, present, Thomas Raymond Barker, Esq., in the chair, Colonel Austen, French Burke, Esq., F. C. Cherry, Esq., Henry Colman, Esq., Humphrey Gibbs, Esq., Brandreth B. Gibbs, Esq., and Professor Sewell.

### GOLD OF PLEASURE FLAX.

Mr. Kimberley informed the Council that having last Spring sown a portion of the Gold of Pleasure Flax Seeds, presented to the Society by Mr. William Taylor, and also grown as usual about 4½ acres of the common Flax from seeds of his own growth, and from others imported from abroad, he had found among the plants grown from the foreign seed a considerable quantity in every respect like those of the cultivated Gold of Pleasure, which, upon examination and comparison, appeared to him to be nothing more than a bastard variety of the Flax, not so good he conceived for the purposes of spinning on account of its having

more branches, but more valuable, probably, for the production of oil of a lighter colour, and therefore better adapted to the use of artists in paintings requiring great delicacy of colour.

### DAIRY MEASURE.

Mr. Arkwright, of Sutton Hall, Derbyshire, presented to the Society a very useful and economical measure for the use of the dairy, adapted to ascertain by simple inspection the quantity of milk or other liquid passed through it for the purpose of being strained. This measure is formed of a tinued-iron cylinder, about a foot high, and the same in diameter, open at the top, but having a curved bottom, with a cylindrical neck proceeding downwards from its middle, to which is fitted on, outside, a rim containing the brass wire-gauze which constitutes the strainer. In vertical lines along opposite sides of the inner surface of the measure, rise small studs in the metal, which mark the amount of liquid poured into it. The aperture at the bottom of the vessel, and above the strainer, is about half an inch in diameter, and is stopped before pouring in the liquid, by means of a wooden handle about a foot long, and furnished at one end with a brass ferule, accurately fitting the aperture in question, and serving as a plug to intercept the passage of the liquid as long as it is desired to be retained, but allowing the whole to pass off the moment it is withdrawn. It was stated that measures of this construction, capable of holding eleven quarts, were supplied by the tinman who had been employed to make them at the price of 4s. 6d. each.

The thanks of the Council were ordered to Mr. Arkwright for the present of this measure, which Professor Sewell stated would prove of the greatest utility in the Veterinary College, where he should immediately introduce it.

### CHEESE-MAKING.

Mr. Arkwright having had a series of observations instituted in his dairy at Sutton, on the conditions under which the process of making cheese is most favourably conducted, and of the changing circumstances of stock, pasture, temperature, and weather affecting the quality and amount of cheese produced, had found that a certain combination of such circumstances induced in their recurrence almost an invariable result. On the completion of these enquiries he would communicate the details to the Society, presenting to the Council in the meantime the tabulated observations of the past year, which were received with thanks and referred to the Journal Committee.

### DRAINING TILES.

Mr. Arkwright also presented to the Society specimens of draining tiles from twelve to fifteen inches long, of which, during the past season (from May to September) 235,000 had been made by hand, on his estate at Sutton, at a very cheap rate, from an inferior clay—the tiles, however, when burnt, being found to be of a very sound and compact quality. The Council received these tiles with thanks, and referred the details connected with their manufacture to the Journal Committee.

### SEED-WHEAT.

Mr. Shelley communicated his Report on the trial of the Bristol Seed Wheat with other varieties commonly grown in Sussex, which was read and referred to the next monthly council, when the question of an award of the prizes for red and white wheats would be taken into consideration.

### SCOUR IN LAMBS.

Mr. Fisher, of Alceston, near Stratford-on-Avon, Warwickshire, informed the Council of the success which had attended his adoption of the plan of dipping lambs affected with the scour in cold running water; and Professor Sewell undertook, at the request of the Council, to report to them his enquiries on that subject.

### CLAIM FOR EXHIBITION.

Mr. Shelley informed the Council, that having received from the parties who had been excluded from

exhibiting at the Society's future Shows, on the ground of an alleged attempt on their parts to effect an irregular entry beyond the limits prescribed to other exhibitors, a satisfactory explanation on that subject, he gave notice that he should move at the next monthly meeting, that the Council should take into consideration the removal of that disqualification accordingly.

#### PROFESSOR BRANDE'S LECTURES.

The Secretary was directed to announce by public advertisement the Lectures which Professor Brande, at the request of Earl Spencer, had kindly undertaken to give to the Members on the evenings of Wednesday and Thursday next, in the Theatre of the Royal Institution of Great Britain, in Albemarle-street.

A letter from the Rev. George Thompson, of Abbots-Ann, near Andover, on the best mode of placing horses for efficient draught in dung-carts and waggons, having been read, the Council adjourned to Wednesday next, the 6th of December.

At a monthly Council, held at the Society's House in Hanover-square, on Wednesday, the 6th of December, present, his Grace the Duke of Richmond, in the chair, Colonel Austen, Thomas Raymond Barker, Esq., French Burke, Esq., Henry Blanshard, Esq., F. C. Cherry, Esq., Henry Colman, Esq., W. S. Dugdale, Esq., M.P., Henry Handley, Esq., and Professor Sewell,

#### FINANCES.

Mr. Raymond Barker, Chairman of the Finance Committee, presented to the Council the monthly Report of the state of the Funds of the Society, and the amount of receipt and expenditure respectively during that period; the current balance in the hands of the bankers on the 30th of November, being £243, and the amount of capital invested in the funds, £7,700.

#### EXEMPTION FROM RATES.

The Duke of Richmond having called the attention of the Council to a recent Act of Parliament by which all Societies instituted for the purposes of Science, Literature, or the Fine Arts, were rendered exempt from County, Borough, Parochial, and other Rates, the necessary steps were directed to be taken to obtain for the Society the benefit of that exemption.

#### GREAT PAINTING OF THE SOCIETY.

Mr. Thomas Agnew, of Exchange-street, Manchester, the Proprietor of the great painting, by Mr. Ansdell, of the Society's Trial of Implements at the Country Meetings, presented to the Society a proof impression of the engraving of Mr. Handley's portrait, taken from that painting, which was received with the best acknowledgments of the Council. The following communication addressed to the Council has been also received from Mr. Ansdell, in reference to that print and the destination of the original picture:—"I beg your acceptance of a portrait of Henry Handley, Esq., framed complete. It is one of a series of portraits of distinguished agriculturists which I have arranged to publish; they are all to be uniform in size and style. I shall have great pleasure in presenting the Society with one of each as they are completed. I take the present opportunity of repeating what I have already stated to the Right Hon. Earl Spencer to be my intentions relative to the large picture of the Meeting of the Society for the trial and inspection of implements. The painting has cost me 1000 guineas. It is my intention to present it to the Society, as soon as 300 names are registered for the engraving; upwards of 200

are already subscribed, and I have great hopes of being able to complete my wishes previous to the next annual Country Meeting of the Society."

#### BELGIAN CARROT.

Mr. Lister Maw communicated, through Mr. Gibbs, the success which had attended his cultivation of the white or Belgian carrot on land "which four or five years ago was so foul and run out that it would produce little or nothing," but by judicious drainage and manuring had produced the fine specimens of carrot he then presented to the Society, and which he found to be best adapted as food for horses of every kind after being suppered up for the night.

#### PHOSPHATE OF LIME.

Mr. Pusey having signified to the Council that Dr. Daubeny was desirous of instituting certain enquiries on the agricultural applications of the phosphate of lime he had brought from Spain, and presented to the Society, the Council ordered that Dr. Daubeny should be allowed to have such a portion of the Society's stock of the mineral in question as he might require for the purpose of his proposed investigations.

The Council then adjourned to the special meeting of the following day.

A Special Council, for the transaction of such business connected with the period of the December meeting, as might be postponed from the monthly Council, was held at the Society's House in Hanover-square, on Thursday, the 7th of December; present—The Right Hon. Earl Spencer, president, in the chair, Duke of Richmond, Viscount Campden, Hon. Capt. Spencer, Colonel Austen; Charles Arkwright, Esq.; Henry John Adeane, Esq.; David Barclay, Esq., M.P.; Thomas Raymond Barker, Esq.; Robert Beart, Esq.; Samuel Bennett, Esq.; French Burke, Esq.; Colonel Challoner; F. C. Cherry, Esq.; Henry Colman, Esq.; John Bell Crompton, Esq.; W. S. Dugdale, Esq., M.P.; John Ellman, Esq.; Humphrey Gibbs, Esq.; Brandreth Gibbs, Esq.; Henry Handley, Esq.; C. Hillyard, Esq.; W. Fisher Hobbs, Esq.; Wm. Henry Hyatt, Esq.; Samuel Jonas, Esq.; George Kimberley, Esq.; John Kinder, Esq.; Fielder King, Esq.; John Morton, Esq.; Sir Robert Price, Bart., M.P.; Philip Pusey, Esq., M.P.; Francis Pym, Esq.; Professor Sewell; William Shaw, Esq.; John Villiers Shelley, Esq.; Charles Stokes, Esq.; and W. B. Wingate, Esq.

#### AGRICULTURAL LABOURERS.

On the motion of Mr. Shaw, seconded by Mr. Raymond Barker, it was resolved that a Committee for considering in what manner the 10th object of the Society enumerated in the charter, "to promote the comfort and welfare of labourers, and to encourage the improved management of their cottages and gardens," can be carried out, should be appointed, and consist of the following gentlemen:—Earl Spencer, Duke of Richmond, Mr. Pusey, Mr. Shaw, Mr. John William Clark, Rev. C. T. James, Mr. Burke, and Mr. Hobbs.

#### IMPLEMENT REGULATIONS.

Mr. Gibbs submitted to the Council the additional regulations for implements he proposed should be incorporated with those already agreed to by the Council, and offered suggestions respecting the mode in which the whole of them might be most conveniently classed; when the Council resolved on

the motion of Mr. Barelay, to refer the subject to a committee, consisting of all the Stewards of Implement and Cattle Yards at the Derby Meeting, including Mr. Gibbs himself, with a request that they would report to the Council, on or before the first Wednesday in March; with an instruction that the price of admission to the implement yard on the Tuesday and Wednesday should be half-a-crown each day, instead of five shillings, as formerly.

#### CLAIM FOR EXHIBITION.

Mr. Shelley read a letter from the parties who had been disqualified for future exhibition, on account of an intention on their part, as inferred from the terms of their own written communication to the Director of the Show Yard at the Derby Meeting, to obtain an irregular entry and admission of one of their implements; disclaiming any such intention as that imputed to them, and expressing a hope that, on the explanation they had thus communicated to the Council, the disqualification might be removed. On the motion of the Duke of Richmond, seconded by Mr. Shelley, it was resolved that a committee, consisting of the same gentlemen who compose the Finance Committee, be appointed to enquire into this case, and communicate personally with all the parties concerned.

#### WHEAT PRIZE.

The reports of Mr. Pusey, Mr. Shelley, and the Rev. Dr. Webb, on the trial and cultivation of the wheats selected as the best samples exhibited at the Bristol meeting, having been read, the Council decided, on the motion of Mr. Barker, that none of the results were of such a nature as to justify the award of the Society's prize; but that, as the white wheat appeared likely to become useful on certain soils, it was resolved, on the motion of Mr. Bennett, that a further trial should be made of its value.

#### WEIGHTS AND MEASURES.

Mr. Colman called the attention of the Council to the great inconvenience found at present to arise in all comparative trials in agricultural enquiries, from the want of a uniformity of the weights and measures employed in ascertaining the resulting produce, and a conventional standard of comparison to which the terms of every expression of value in these trials should have reference. In travelling through England, he had himself found it difficult to draw accurate conclusions from the results communicated to him; in some districts the load being said to contain three, and in others five quarters, the bushel on one occasion being estimated as equal to thirty-eight quarts. In weight, on the other hand, he sometimes found the pound to be made up of sixteen, and at other times of eighteen ounces; while in Cambridge butter was sold by the yard, and in Nottingham by the pint. The Council concurred with Mr. Colman on the desirableness of a uniform system of weight and measure in all comparative trials. The President suggested that it would be found convenient if all results of measure were expressed in bushels and parts of a bushel. Mr. Pusey, as Chairman of the Journal Committee, was careful to reduce all foreign quantities into terms of English value; and it was a regulation of the Society that "the imperial weights and measures are those only by which calculations are to be made." Mr. Hyett thought that, in the wheat trials especially, a model plan of cultivation and an uniform system of comparison were essential.

#### SOUTHAMPTON MEETING.

The reports of Mr. Miles, Mr. Shelley, and Mr. Gibbs, on the sites best adapted for the Show-yard

and Pavilion; and Mr. Moyes's letter to the President on the grant of any portion of the race-course required to complete the space required for the Show-yard; Mr. Milburn's communication of the plan of the Doncaster Pavilion, and Mr. Sandford's of that erected at the Belfast meeting, were referred to the General Southampton Committee.

#### VACANCIES IN THE COUNCIL.

The Council then proceeded, according to the charter, to fill up the vacancies in their body, occasioned by the decease of Mr. Woods Page, Mr. Webb Hall, and the Rev. Mr. Rham; and duly elected Mr. Compton, M.P., Mr. Etwall, M.P., and Mr. John Hudson, of Castleacre, Norfolk, to occupy the places respectively of those gentlemen deceased.

#### STANDING COMMITTEES.

The Council then re-appointed, agreeably with the by-laws, the following standing committees for the ensuing year, namely, the Finance, Journal, House, Southampton, Veterinary, and By-law committees; Mr. Hyett's name being added to the Journal committee in the place of that of the late Rev. W. L. Rham, a new form given to the constitution of the House Committee, and the By-law committee requested to report the result of their inquiries at an early date.

The Netherland Government transmitted, through their Minister residing in England, a copy of a work on "Barrenness in Cattle," recently published by Professor Numan, Director of the Royal Veterinary College at Utrecht; the Royal Academy of Sciences at Munich, presented their last volume of Transactions, and series of proceedings; his Grace the Duke of Portland presented a copy of "Extracts from the works of the late Mr. Arthur Young, on the Cultivation of Beans, and the application of Manure," edited by his Grace, and printed for distribution among his tenantry; Mr. Allen Ransome, a copy of his work on the "Implements of Agriculture;" Mr. Colman, the second volume, just published, of the transactions of the New York State Agricultural Society; Mr. Shaw and Mr. Cutbert Johnson, a copy of the Farmers' Almanac for 1844; Mr. Parkes, copies of his Papers on Steam-engines and Steam-boilers, read before the Institution of Civil Engineers; Mr. Henderson, a copy of his Meteorography; Mr. Dean, a copy of his work on Tottenham and its Institutions; Mr. Blurton and Mr. Brown, their respective Essays on Draining; the Highland, Royal Asiatic, Statistical, Labourer's Friend, and Geological Societies, their latest transactions; the editors of the Farmer's Magazine, Veterinarian, Polytechnic Review, Farmer's Herald, West of England Almanac, British American Cultivator, and American Agriculturist, their last publications; the Regulations of the Guernsey Agricultural Society, and the fourth report of the Framlingham Farmer's Club, from their respective bodies: for all of which the Council ordered their best thanks to be returned to the several donors.

The Council then adjourned to the following Saturday, at eleven o'clock; and resolved, at its rising on that day, to adjourn over the Christmas recess to the first Wednesday in February.

#### NEW MEMBERS.

The following gentlemen were elected members of the Society:—  
Baldock, Edward Holmes, 5, Hyle Park Place, Cumberland Gate

Beesley, G., Agent's Office, Lytham Hall, near Preston, Lancashire  
 Browne, Richard Thomas Staples, Launton, Bicester, Oxon  
 Burden, Rowland, Castle Elen, Stockton-on-Tees, Durham  
 Burgess, Stephen, Westbrook, Lydd, Kent  
 Carnac, John Rivett, F.R.S., Warborne, near Lymington, Hampshire  
 Engold, John, her Majesty's Bailiff for the Home Park, Windsor  
 Frere, George Edward, C.E., F.R.S., Bilton, near Bristol  
 Guy, John, Viddlevan Farm, Millford, Lymington, Hampshire  
 Henry, Howard, St. Cross, near Winchester, Hampsh.  
 Holdsworth, George, Fair Mill, Cobham, Surrey  
 Jenner, Montague Herbert, 1, Chesterfield Street, May-Fair.  
 Lines, Edward A., Hillenden, near Buckingham  
 Markham, Charles, Jun., Northampton  
 M'Taggart, James, Foxlease, near Lyndhurst, Hants  
 Nightingale, Richard, Lyndhurst, Hampshire  
 Pain, Henry, Manor Farm, Mitcheldever, Andover Road, Hampshire  
 Pope, William, Toller Whelme, Beamster, Dorset  
 Quartly, James, Molland House, South Molton, Devon  
 Raine, William Surtees, 9, Lansdowne-place East, Bath  
 Salmon, William, Park Fields, near Stowe, Bucks.  
 Salmon, Perridge, Luffield Abbey, near Stowe, Bucks.  
 Scott, Sir Edward, Bart., Great Barr, Lichfield, Staffs.  
 Simmonds, Henry, Hadlow, Tonbridge, Kent  
 Worsley, the Rev. Peunymman Warton, Little Ponton, Grantham, Lincolnshire  
 Wise, John Ashford, Clayton Hall, Newcastle, Staffs.

## GENERAL MEETING OF THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

The members held their half-yearly general meeting, at the Society's house in Hanover-square, on Saturday the 9th of December, present—

The Right Hon. Earl Spencer, President, in the chair.

Duke of Richmond, Sussex; Henry Handley, Linc.; Philip Pusey, M.P., Berks.; W. H. Hyett, Glouc.; Geo. Kimberley, Surrey; F. Burke, Middx.; Thomas Raymond Barker, Bucks.; Colonel Challoner, Surrey; H. Balshard, Essex; S. Druce, Oxon.; J. Druce, Oxon.; G. E. Haunam, Kent; Geo. Crundwell, Kent; T. Umbers, Warw.; S. Umbers, Warw.; R. Rigg, Middx.; R. Hornsby, Linc.; R. Hodgkinson, Notts.; G. Cottam, Middx.; R. Parkinson, Jun., Notts.; J. Houghton, Berks.; H. Gibbs, Beds.; J. Kinder, Herts.; R. W. Crowley, Berks.; David Barclay, M.P., Surrey; Capt. Randolph, Kent; C. Stokes, Notts.; S. Bennett, Beds.; J. F. Potterton, Northamp.; J. Walter, Kent; C. Tawney, Oxon; G. Kilby, Leic.; John Wood, Middx.; H. Ingram, Sussex; C. Alderman, Berks.; C. Hillyard, Northamp.; F. Wratislaw, Warw.; Rev. J. R. Smythies, Heref.; W. F. Hobbs, Essex; Rev. John Mills, Camb.; E. Matson, jun., Surrey; W. Walter, Kent; Geo. Webster, Leic.; B. Almack, Middx.; J. F. Baines, Essex; J. Parkes, C.E., Middx.; F. W. Etheredge, Hamp.; A. Spong, Kent; H. Price, Kent; R. Herbert, Surrey; J. Allen Ransome, Suff.; S. R. Solly, Herts.; J. H. Turner, Sussex; G. H. Peppin, Som.; J. Holder, Heref.; W. Shaw, Middx.; Prof. Sewell, Middx.; A. Leighton, Northamp.; Sir R. P. Todrell, Bart., Derb.; W. S. Graburn, Linc.; W. S. Tomkias, Hamp.; W. Holbech, Oxon; J. Bromley, Derb.; W. Astbury, Middx.; G. E. Henry, Somerset; R. T. Staples Browne, Oxon; H. Putland, Sussex; Sir Robert Price, Bart., Hereford; J. Read, Mid-

dsex; T. Tweed, Kent; R. W. Baker, Rutland; J. W. Bury, Middx.; W. Garrett, Suff.; C. J. Andrews, Berks; Peter Purcell, Dublin; W. Shaw, Jun., Northamp.; J. Jeffery, Som.; Colonel M'Donall, 2nd Life Guards; H. Paget, Leic.; R. Fulshaw, Leic.; W. Wright, Suff.; J. A. Williams, Wilts; R. Cobb, Kent; E. Hill, Middx.; J. Ransome, Suff.; J. Stephens, Berks; W. Smith, Herts; T. Jones, Herts.; Colonel Blane, Middx.; H. Cobb, Middx.; C. Toogoe, Linc.; S. B. Hodgkinson, Notts.; W. Y. Freebody, Middx.; J. Hedding, Hunts.; W. Skirving, Lanc.; R. Biddulph, Heref.; C. Hill, Northamp.; R. Burgess, Notts.; R. Matson, Kent; Captain Gardiner, Surrey; W. Fanner, Sussex; Dr. Hamel, St. Petersburg; C. W. Hoskyns, Warw.; T. J. M. Bartlett, Middx.; J. Hunt, Middx.; F. C. Cherrv, Surrey; T. Mount, Kent; N. Blake, Oxon.; R. Brice, Kent; T. Crisp, Suff.; E. Lawford, Beds.; W. Burt, Dorset.; Henry Colman, United States.

The CHAIRMAN opened the proceedings by stating that he was happy to observe the society was in a very flourishing state, and was improving year by year in the extent of its usefulness. But this was not to be wondered at when the principal part of the business of that society was confined to "practice with science." (*Cheers*.) The Noble Earl stated his conviction that the study of agricultural mechanics would increase in importance in the minds of all engaged in the cultivation of the soil. If that should not be observed for the moment, it would in the long run; and which the noble Chairman felt assured would be principally through the instrumentality of the Royal Agricultural Society of England. "Although," said Lord Spencer, "we have received during the past year a large accession of members, I am sorry to say that our financial affairs are not in a favourable state. It should be borne in mind that our annual country meetings, though necessary, are very expensive to us. For instance, the Derby Meeting this year was productive of a loss to the Society, after allowing 1,95*l.* to be distributed as prizes, of between 1,600*l.* and 1,700*l.* This, it will be seen, is one great means of our outlay; yet that outlay is unavoidable. The show-yard and dining-rooms at Derby cost a large sum, but unfortunately they were not filled. At Southampton, next year, I trust we shall not be in such difficulties. The amount of arrears has, I am glad to say, been very much reduced since last year. As a corporate body, we have now a legal right to sue for all these debts; but really it is due to the Council of this society to say that they have not proceeded to harsh measures in the matter in any one instance. Still, if these arrears be not paid up, we must take means to have them settled. I have no doubt that, in many instances, these debts to our funds have arisen from negligence. However that may be, I trust to see more attention in future. I shall not detain you longer, but shall call upon the secretary to read the Society's Report.

Mr. HUNSON, the Secretary, then read the following report:—

### REPORT OF THE COUNCIL.

The Annual Country Meetings of the Royal Agricultural Society of England have already been attended with so many important results to the particular districts in which they have taken place, and to the kingdom at large, that the details affecting their future regulation, and the best means of rendering them still further useful and effective, are topics which have engaged much of the attention of the Council during the past half-year.

The Meeting at Oxford was eminently successful; and its arrangements, for so novel an undertaking, were in every respect adequate to the occasion. As a spon-

aneous assemblage of the friends of agricultural improvement, formed for the purpose of carrying out a great national object, that memorable first Country Meeting of the Society will perhaps never be rivalled; but, in point of magnitude and detail in the department of the exhibition of stock and implements, a rapid increase has annually taken place, and in a ratio this year so unprecedented, that at Derby the Show-yard occupied twice the space of that of either Oxford or Cambridge, and contained nearly four times the number of animals, and more than seven times the number of implements, than at Oxford; exceeding, in this amount, the successful exhibition even of Bristol by 165 animals, and 251 implements; there having been exhibited at the recent Derby Meeting in July last no less than 878 head of stock and 700 distinct implements. While, however, the excellence of the stock, and the number, variety, and importance of the agricultural implements, exhibited on that occasion, formed a most gratifying proof of the success resulting from the Country Meetings of the Society, the corresponding increase in the details of the arrangements, and the general expences attending the Show, are circumstances which have required and received the serious consideration of the Council. The Society have already voted their best thanks to the Mayor and Corporation of Derby for the aid they so efficiently rendered to the meeting in the preservation of the peace and good order of the town; to Mr. Colville, M.P., and the Local Committee, for their zealous co-operation in carrying out the details of the business immediately connected with the local arrangements; and to the various Railway Companies for the accommodation of special trains, and the remission of one half the usual charges in favour of agricultural implements conveyed along their respective lines, which they granted to the members and the public. The Council are also sensible of the attention shown to the Society by the Magistrates, in the grant of the use of the County-Hall for the purpose of the Council dinner; by the various owners and occupiers who placed their land at the disposal of the Society; and by Mr. Bromley, the Secretary of the South Derbyshire Agricultural Society, in the devotion of his time and exertions in fulfilling the duties of Secretary to the Local Committee.

The Council and Members of the Society, as well as the implement-makers and public at large, experienced considerable disappointment at the Derby Meeting, that they were deprived of the opportunity of witnessing a trial of implements on lighter soil than that at Rough Heaton, on which the heavy land implements were worked, and for the use of which the Society were indebted to the liberality of Mr. Chandos Pole, the proprietor. The Council have taken every measure which they think best adapted to prevent the recurrence of a similar disappointment; and in the meantime, at the suggestion of the Judges of Implements, they have requested Mr. Jaques, of Easby Abbey, near Richmond, in Yorkshire, to subject Lord Ducie's Uley Cultivator, and Messrs. Ransome's improved Biddell Scarifier, with the consent of the respective makers, to the comparative trial of a whole season's work on soils of various texture: the Duke of Richmond, the Hon. Captain Spencer, and Mr. Jaques having undertaken to test the respective merits of the Dynamometers of Messrs. Cottam and Hallen, and Mr. Clyburn, when applied to the trial of the draught of agricultural implement; and Mr. Graburn has expressed his willingness to ascertain the effects of Messrs. Ransome's and Mr. Alexander Dean's portable metallic and stone corn-mills by constant use in his own household.

A deputation of the Society was appointed to visit Southampton, immediately at the close of the Derby meeting, for the purpose of inspecting the various sites for the show-yard, pavilion, and council dinner; and being received by the Mayor and Corporation, they were conducted to the several localities considered to be most suitable for those objects. After receiving their report, the Council decided to select as the site of the show-yard, a portion of the Southampton common, originally offered to the Society by the Mayor and Cor-

poration, and directed a communication of that decision to be made to the Mayor, who has since that time transmitted to the Council the resolutions of a public meeting of the rate-payers and commoners of the town, unanimously expressing their most cheerful and cordial co-operation with the corporation in sanctioning the application of any portion of the common that may be required for the purposes of the Society. Mr. Miles, M.P., Mr. Shelley, and Mr. Gibbs, were deputed accordingly to inspect the localities most suitable for the show-yard and pavilion; and those gentlemen having made their report to the Council on those points, it was found that the site most advantageously situated for the show-yard would comprise a considerable portion of the race-course; and the President having, therefore, communicated that circumstance to the Mayor, he informed the President in reply, that the portion of the race-course thus included within the proposed area of the show-yard would be willingly ceded, and every accommodation in the power of the authorities and inhabitants of Southampton to grant, would be readily arranged on their part to meet the wishes of the Society.

The Council have appointed Mr. Miles, M.P., and Mr. Shelley to be the stewards of the implement department, with full power to take every measure to render the exhibition and trial of implements in every respect satisfactory at the Southampton meeting.

The Council have appointed Mr. Parkes to be the consulting engineer of the Society; to be remunerated, when employed in that capacity, either by the Council, from the funds of the Society, or by individual members, at the usual rate of professional charge. Mr. Parkes, as a civil engineer, has long maintained a high standing in his profession; and as a judge of implements, and author of the valuable reports on the exhibition and trial of the implements at the Liverpool and Bristol meetings, is well known to the members of the Society at large.

In addition to Mr. Parkes, as the Consulting Engineer of the Society, the Council have decided that a greater number of Judges of Implements, including practical farmers, shall be appointed: also that the exhibition of implements on the Tuesday and Wednesday previously to the principal day of the show shall be open at half-a-crown on each of those two days, instead of at five shillings as heretofore. They have limited the accommodation in the Pavilion to the number of 1400 persons at dinner, and decided that tickets for the Pavilion Dinner shall be reserved for members until 12 o'clock of the day of dinner, and afterwards sold to the public. They have fixed the time of the meeting as the fourth week of July—Thursday, the 25th, being the principal day of the show. The Council have settled all the prizes for the Southampton Meeting, including among those for stock special local prizes for cattle of the Channel Islands breed, and for short-woolled sheep not qualified to compete as Southdowns: all certificates for implements being required to be sent to the Secretary on or before the 1st of May, and all others on or before the 1st of June; and the Council have decided that, after those dates respectively, no certificate shall be received under any pretence whatever.

The Finance Committee have laid before the Council the detailed Balance Sheet of the Derby Meeting Account; from which it appears that the receipts on account of that meeting were £3,390, while the expenditure had been £5,075 3s. 7d., being an excess of expenditure over the receipts of £1,685 3s. 7d., chargeable on the funds of the Society. The Council trust that they will be enabled to prevent the recurrence of such a deficit at the ensuing country meeting.

The Finance Committee have also laid before the Council the following statement of the arrears of subscription at the present time, in comparison with their amount at the last December meeting:—

Total amount of arrears in December 1842..	£3705
Do. do. do. in December 1843..	1614
<hr/>	
Total amount of arrears paid or discharged during the last 12 months.....	£2091

By the new regulation, all subscriptions of the present year, due in advance on the 1st of January last, became in arrear on the 1st of June ensuing; and agreeably with such rule, the amount of subscriptions in arrear for 1843 is only 1,879*l.*; a proportion of the year's subscriptions by no means great, when it is taken into consideration that the fact of such new rule being in operation may not be known by the members generally who are thus in arrear.

The Committee have laid before the Council the following census of the Members remaining on the list of the Society after the removal of such names as were referred to by the Council in its last Report to the

General Meeting in May.

108 Life Governors.
193 Governors.
434 Life Members.
6115 Members.
13 Hon. Members.
6863

The Journal Committee have reported to the Council the adjudication of the Society's gold medal, along with Mr. Slaney's addition of 10*l.* to the prize, for the best essay on the construction of cottages, to the Rev. Copinger Hill, of Buxhall, near Stowmarket; and the completion of the new part of the Journal, which will be published in a few days.

The Council have to acknowledge the favour Professor Brande has conferred on the members, in delivering to them, at the request of Earl Spencer, your president, two lectures in the theatre of the Royal Institution, on the chemical properties of lime and clay.

The judges of the seed-wheat selected for trial at the Bristol meeting, having made their respective reports of the results obtained in cultivating the selected wheats along with well known varieties of the neighbourhood in which each trial was made, the Council have decided, that although the white wheat promised favourably under certain circumstances, the Council had not sufficient proof that it had the requisite merit for the society's prize, while the two reds were very inferior in every respect. As the trials had been made during an unfavourable season, the Council have decided that the white wheat will have advantage of further trial.

Agreeably with the charter, the Council have filled up the vacancies in their body, occasioned by the lamented deaths of Mr. Woods Page, Mr. Webb Hall, and the Rev. Mr. Rham, by the election of Mr. Compton, M.P., vice Mr. Page, to go out by rotation in 1844; Mr. Etwall, M.P., vice Webb Hall, to go out by rotation in 1844; Mr. John Hudson, of Castleacre, Norfolk, vice the Rev. Mr. Rham, to go out by rotation in 1845.

In conclusion, the Council have much satisfaction in reporting the increasing recognition of the utility of the society, by the accession of members of all classes throughout the various districts into which the kingdom has been divided for the purposes of holding its country meetings; and though the increasing numbers will severally be found in the peculiar locality of the year, still a very large addition is at the same time going on from every part of the country.

Mr. EMERY moved that the report be adopted, and ordered to be printed and circulated.

Mr. RAYMOND BARKER then read the following half-year's Balance-sheet of the Society:—

AUDITORS' HALF-YEARLY BALANCE SHEET, FROM  
JAN. 1, TO JUNE 30, 1843.

RECEIPTS.	£	s.	d.
Balance in the hands of the bankers, Dec. 31st, 1842	656	3	4
Balance in the hands of the secretary	26	12	4
Dividends on Stock	114	0	6
Governors' Life Composition	90	0	0
Members' Life Annuities	345	0	0

Governors' Subscriptions	£890	10	0
Members' Subscriptions	3688	9	0
Sale of Cottage Tracts	13	19	8
Sale of samples of waste butter, sent in to compete for the Society's prize	0	14	8
Receipts on account of the Bristol Meeting during 1½ year	1	10	10
	£5,855	18	6

(Signed) THOS. RAYMOND BARKER, Chairman,  
C. B. CHALLONER,  
THOS. AUSTEN,  
HENRY BLANCHARD.

DISBURSEMENTS.	£	s.	d.
Investment of stock	1013	6	8
Permanent charges	531	5	0
Taxes and rates	50	1	10
Establishment and building-work	1235	5	11
Postage and carriage	61	15	11
Advertisements	95	15	0
Expenses of Journal	564	2	6
Country meetings' charges during the half-year	701	3	3
Prizes for essays—half-a-year	60	0	0
Miscellaneous and returned permanent subscription account	31	16	8
Balance in the hands of the bankers, June 30, 1843	1509	19	10
Do. in the hands of the secretary	1	6	4
	£5855	18	6

Audited on behalf of the Society,  
8th December, 1843.

(Signed) C. H. TURNER  
CHAS. TAWNEY.

The above report having been carried, Mr. BARKER said, with reference to the arrears which Lord Spencer had referred to, he was glad to find they were diminishing. The noble lord had wisely said that they principally arose from incautiousness; while he (Mr. Barker) had thought that many of the circulars which had been transmitted to those who had not paid up their subscriptions had been thrown aside and forgotten.

A MEMBER stated that he, for one, had no objection to make a personal application to those who were indebted to the Society in his own immediate neighbourhood.

Mr. RAYMOND BARKER said he felt obliged by the offer, but he was fearful it would lead to no good result. For instance, two gentlemen had taken the trouble thus to solicit, but their efforts were quite futile: one of them, who had 40*l.* to collect, not having received a farthing; while another, who had 35*l.*, procured only 1*l.* (Laughter.) Still, he (Mr. Barker) felt much obliged by the offer then made.

The balance-sheet of the Derby meeting was next read, and from which it appeared that the excess of payments on that occasion exceeded the income by 1,685*l.* 3*s.* 7*d.*

ANNUAL COUNTRY MEETING ACCOUNT,  
DERBY, 1843.

RECEIPTS.	£	s.	d.
Dinner Tickets	1,077	16	0
Ladies Gallery Tickets	63	0	0
Show-Yard Receipts	1,969	11	8
Sale of Catalogues	268	13	4
Sale of Hurdles	1	12	0
Sale of Badges for Council and Stewards	9	7	0
Excess of Payments over Receipts at the Derby Meeting, chargeable on the Funds of the Society	1,685	3	7
	5,075	3	7

PAYMENTS.

Contracts for dinners .....	£982	10	0
for ladies' refreshments .....	25	0	0
and extra work for Pavilion ..	955	3	8
Show-yard expenses .....	1835	14	1
Trial of Implement ditto .....	111	17	8
London Police .....	186	0	6
Judges .....	266	19	6
Auctioneer .....	21	0	0
Printing .....	322	12	6
Stationery .....	17	5	0
Advertisements .....	174	16	5
Carriage and Porterage .....	23	18	4
Expences of Official Staff .....	30	3	6
Surveyor's Plaos .....	16	2	6
Registration of Lodgings .....	97	15	7
Miscellaneous .....	7	19	4

(Signed) £5,075 3 7

THOS. RAYMOND BARKER, Chairman.  
C. B. CHALLONER.  
THOS. AUSTEN.  
HENRY BLANSHARD.

Lord SPENCER next proposed the thanks of the Society to the judges of the stock at Derby, for their services.—Carried.

The Noble CHAIRMAN said he had to propose a vote of thanks to Professor Brande, for having given two lectures at the Royal Institution. Although those lectures did not supply much practical information, they were extremely interesting.—Carried amidst applause.

The Duke of RICHMOND here intimated that those gentlemen to whom medals had been awarded would have them presented to them by the Secretary at the close of the meeting.

A proposal was now made to have catalogues published of the various animals intended for sale. Such a plan was calculated to secure a larger sale.

The CHAIRMAN intimated that the Council would take the plan into consideration.

Mr. COTTAM said, with the noble chairman's permission, he had a suggestion to make to the meeting of interest. It was evident, he intimated, that those who had gone through the various show-yards of the society, must have been pleased with the mechanical skill therein observed. The society had given great support to agriculture in general, yet he (Mr. Cottam) was firmly convinced, if gentlemen would turn their attention more to implements, the society would obtain great benefits. He (Mr. Cottam) considered that the machine makers were not exactly represented at the council. At Derby, several little difficulties arose, but which might have been wholly avoided had the subject been better understood by the council. What was required was, that the machine makers be heard "at the bar" of the council, by some one being called upon to represent them. He hoped he was not asking too much. Doctor Buckland pressed forward the necessity of a mechanical science in agriculture, but the machine makers had never had a powerful organ to make known their plans. It was evident that more attention should be paid to mechanics; of their value he required only to refer to what had been accomplished by Mr. Smith, of Deanston, and Earl Ducie (applause). He (Mr. Cottam) was confident that a lecture on mechanics would be attended with beneficial results.

Mr. Pusey was glad to find the subject alluded to by Mr. Cottam; but, as there was already a long report being drawn up by Mr. Parks, and which would be in the hands of members in a few days, he would say no more on the subject.

Thanks having been voted to the Chairman, the meeting concluded.

THE SMITHFIELD CLUB  
CHRISTMAS SHOW OF  
CATTLE, IMPLEMENTS, &c.

This great national exhibition—the greatest of its kind in the world—was opened to the public at an early hour on Wednesday, December 9, and attended throughout the day by a much larger number of visitors than has been known to have attended upon any previous occasion. It might be fairly supposed that the inspection of fat stock would be interesting only to even a portion of the male sex, but it is a remarkable fact that this exhibition has become attractive to ladies of the highest rank. Indeed a large proportion of the visitors at the bazaar were females, who contemplated the different specimens of animal beauty with a mixed feeling of curiosity and admiration.

The collection of animals this year is not only more numerous, but of a more varied description, than at any previous exhibition. It will be found, on reference to the award of prizes by the judges, that the competition has not, as heretofore, been limited to districts adjacent to the metropolis, but that it has taken a much wider scope, extending to the more remote parts of the kingdom. This may be accounted for in part by the facility of transit afforded by railways, but is in a greater degree attributable to the encouragement held out by the Smithfield Cattle Club and the Royal Agricultural Society of England, which has induced cattle breeders to abandon their old-fashioned treatment of animals, and to adopt such of the newly-discovered scientific principles as had met with the sanction of competent judges and practical graziers. The consequence of this overthrow of old prejudices is evident in the large number of new competitors from parts of the kingdom in which the idea of fattening an animal for the Smithfield Cattle Show was never entertained.

The local agricultural associations, it must be confessed, have had no inconsiderable influence in promoting this spirit of emulation. Many members of these bodies, although good practical farmers, and thoroughly conversant with the treatment of stock, would have deemed it presumptuous to enter the lists against noblemen and gentlemen of condition, were it not that at the meetings of the local associations they have been invited and stimulated to do so.

The principal contributors to the present exhibition are Lord Spencer, president of the club, the Duke of Richmond, vice-president, the Duke of Bedford, the Earl of Warwick, Sir William Wake, Lord Western, the Earl of Hardwicke, the Earl of Radnor, Sir Charles Tempest, the Marquis of Exeter, the Duke of Manchester, the Hon. W. Wilson, and Mr. Fisher Hobbs.

The appearance of his Royal Highness Prince Albert as a competitor for prizes at this annual exhibition will not fail to raise the character of the Smithfield Club still higher in the estimation of the agricultural community. The Prince has been unsuccessful this year, but it should not be forgotten that his royal highness has only recently turned his attention to those practically useful pursuits, and that this is the first time he has entered the field. His royal highness exhibited two Scotch oxen, and three Suffolk pigs, all of which have been bred and fattened at his royal highness's farm near Windsor, under his own immediate superintendence. Although not considered by the judges entitled to prizes, the animals were much commended by all

who saw them. These specimens attracted a great deal of curiosity throughout the day.

There was never, perhaps, a fuller attendance of agriculturists in the metropolis on any similar occasion than at present. Besides the annual exhibition of the Smithfield Cattle Club, the Royal Agricultural Society of England holds its *soirées* in Hanover-square: and Professor Brande delivers two lectures on the application of chemistry in connection with agriculture, in the theatre of the Royal Society, Albemarle-street; and the Farmers' Club, recently established, holds its meetings at Radley's Hotel, Bridge-street, Blackfriars. These friendly reunions are in every respect desirable, as they must necessarily tend to the diffusion of knowledge upon various points essential to the well-being of that important body.

#### CATALOGUE OF STOCK AND AWARD OF PRIZES.

N.B. The figures at the commencement of each description signify the judge's number, and those at the end of each animal the number of entry.

##### OXEN.

CLASS I.—Oxen or Steers, of any breed, under five years of age, without restrictions as to feeding, yet the kind or kinds of food must be certified.

4. Mr. Robert Burgess, of Cotgrove Place, Notts, a 3 years and 8½ months old Durham Ox, bred by himself, from the stock of Earl Spencer, and fed on grass, vetches, hay, clover, cabbages, turnips, oil cake, and boiled barley. Travelled to the show by van 6 miles and by railway 130 miles.—197. The 3d prize of 10*l*.

13. Mr. H. Mann, Pigburn, near Doncaster, an under 3 years and 6 months old short-horned Ox, bred by himself, and fed on hay, sainfoin, green clover, tares, white turnips, Swedes, potatoes, and linseed cake. Travelled to the show by van 9 miles and by railway 176 miles.—188. Commended.

19. The Right Hon. Earl Spencer, of Althorp, near Northampton, a 4 years and 6 months old Durham Ox, bred by his lordship, and fed on Swedes, mangold wurzel, cabbages, hay, oil cake, and bean meal. Travelled to the show by van 10 miles and by railway 66 miles.—182. The 1st prize of 20*l*., and a silver medal.

23. Mr. J. Watson, of Thorney, near Peterborough, a 4 years and 8½ months old Hereford Ox, bred by Mr. C. Blakeney, of Shelderton, near Ludlow, and fed on hay, cake, barley and bean meal, linseed, tares, carrots, and cabbages. Travelled to the show by van 31 miles, and by railway 95 miles.—178. The second prize of 15*l*.

CLASS II.—Oxen or Steers, of any breed, under 6 years of age, weight 90 stone and upwards, that shall not have had cake, corn, meal, seeds, grain, or distillers' wash, during 12 months previous to the 1st of August, 1843.

24. Mr. John Beasley, of Chapel Brampton, near Northampton, a 4 years and 8 months old short-horned Ox, bred by himself from a bull of Earl Spencer, and fed on mangold wurzel, turnips, hay, and 1,770 lbs. of oil cake. Travelled to the show by van 10 miles, and by railway 60 miles.—177. The first prize of 30*l*. and a Silver Medal.

25. His Grace the Duke of Bedford, of Woburn Abbey, Bedford, a 4 years and 7 months old Hereford Ox, bred by his grace, and fed on grass, hay, turnips, carrots, mangold wurzel, 1,000 lbs. of barley meal, 340 lbs. of oatmeal, and 1,000 lbs. of linseed. Travelled to the show by van 42 miles.—176. Highly commended.

31. Mr. A. Perkins, of Arnesby, near Leicester, a 4 years and 11 months old Hereford Ox, bred by Mr. J. Williams, of Kingsland, near Leominster, and fed on grass, hay, turnips, and 1,200 lbs. of oil cake. Travelled to the show on foot 9 miles and by railway 100 miles.—170. The 2nd prize of 20*l*.

33. The Right Hon. Earl Spencer, of Althorp, near Northampton, a 4 years and 7 months old Durham Ox, bred by his lordship, and fed on Swedes, mangold wurzel, cabbages, hay, 1,143 lbs. of cake, and 12 bushels of bean meal. Travelled to the show by van 10 miles and by railway 66 miles.—163. Commended.

34. The Right Hon. the Earl of Warwick, of Warwick Castle, a 4 years and 8 months old Hereford Ox, bred by Mr. W. Perry, of Monkland, near Leominster, and fed on grass, hay, turnips, potatoes, 951 lbs. of cake, 450 lbs. of barley meal, and 390 lbs. of bean meal. Travelled to the show by van 11 miles and by railway 84 miles.—167. The 3rd prize of 10*l*.

CLASS III.—Oxen or Steers, of any breed, under 5 years of age, under 100 stone and above 70 stone weight, that shall not have had cake, corn, meal, seeds, grains, or distillers' wash, during 12 months previous to the 1st of August, 1843.

35. His Grace the Duke of Bedford, of Woburn Abbey, a 4 years and 3 months old Hereford Steer, bred by Mr. Thomas Davis, of Dilwyn, near Weobly, and fed on grass, hay, turnips, mangold wurzel, clover chaff, 925 lbs. of cake, and 5 bushels of bean flour. Travelled to the show by van 56 miles.—166. Commended.

36. Mr. Bouverie, of Delapre Abbey, near Northampton, a 4 years and 8 months old Hereford Ox, bred by Mr. J. King, of Colwall, near Ledbury, and fed on grass, hay, mangold wurzel, turnips, potatoes, 632 lbs. of cake, and 1 bushel of barley flour. Travelled to the show by van 4 miles and by railway 60 miles.—165. Commended.

43. Mr. J. T. Senior, of Broughton House, near Aylesbury, a 3 years and 6 months old Hereford Steer, bred by Mr. P. Stephens, of Hampton, near Kingston, and fed on grass, hay, and 730 lbs. of cake. Travelled to the show by railway 50 miles.—158. The 2nd prize of 10*l*.

45. Mr. George Turner, of Barton, near Exeter, a 3 years and 7 months old North Devon Steer, bred by Mr. R. Moggeridge, Molland, South Molton, and fed on hay, mangold wurzel, 360 lbs. of cake, and 4 bushels of barley meal. Travelled to the show by van 25 miles and by railway 170 miles.—156. Commended.

46. Mr. Thomas Umbers, of Wappenburg, near Royal Leamington Spa, a 3 years and 7 months old North Devon Steer, bred by himself, and fed on grass, hay, turnips, 850 lbs. of cake, and 800 lbs. of barley and bean meal. Travelled to the show on foot 9 miles, and by railway 83 miles.—155. The first prize of 15*l*. and a silver medal.

CLASS IV.—Oxen or Steers, of any breed, not exceeding 4½ years of age, under 85 stones weight, that shall not have had cake, corn, meal, seeds, grains, or distillers' wash, during 12 months previous to the 1st of August, 1843.

54. Mr. Thomas Umbers, of Wappenburg, near Royal Leamington Spa, a 3 years and 6 months old North Devon Steer, bred by himself, and fed on grass, hay, turnips, 850 lbs. of cake, and 800 lbs. of barley and bean meal. Travelled to the show on foot 9 miles, and by railway 83 miles.—148. The first prize of 10*l*. Silver medal.

55. Sir W. Wake, Bart., of Courteen Hall, Northampton, a 3 years and 8 months old Hereford Steer, bred by Mr. J. Williams, of Staunton-upon-Wye, and fed on grass, hay, mangold wurzel, turnips, carrots, and 1,098 lbs. of cake. Travelled to the show on foot 1 mile, and by railway 60 miles.—147. The second prize of 5*l*.

CLASS V.—Oxen or Steers, of any breed, under 4½ years of age, under 80 stone weight, without restrictions as to feeding, yet the kind or kinds of food must be specified.

56. Mr. W. J. Bailey, of Shenley House, near Stoney Stratford, a 3 years and 1 month old Hereford Steer, bred by Mr. Stubbs, of Wheatmore, and fed on grass, hay, and oil cake. Travelled to the show on foot 2 miles, and by railway 52 miles.—146. Highly commended.

59. Mr. T. Bridge, of Butisbury, near Ingatesone, a 3 years and 11 months old Hereford Steer, bred by Mr. Arden, of the Ley, near Woboly, and fed on vegetable roots, grass, hay, oil cake, and bean meal. Travelled to the show by van 24 miles.—143. The prize of 10*l.*, and a silver medal.

63. Mr. J. Manning, of Harpole, Northampton, a Scotch Ox, fed on oil cake, bean meal, grass, and hay. Travelled to the show on foot 4 miles, and by canal boat 72 miles.—139. Highly commended.

64. Mr. J. Miller, of Ballumbie, near Dundee, a 3 years and 8 months old Durham Ox, bred by himself, and fed on turnips, potatoes, cut clover, tares, hay, oil cake, and bean meal. Travelled to the show by van 15 miles, and by steam-boat 400 miles.—138. Commended.

65. Mr. J. Tucker, of West Ham Abbey, Stratford, a 3 years and 1 month old Hereford Steer, bred by Mr. Roberts, of Invingtonbury, and fed on cake, meal, hay, Swedes, and parsnips. Travelled to the show by van 8 miles.—137. Commended.

66. The Right Honourable Lord Western, of Felix-hall, Kelvedon, a 3 years and 6 months old Devon Steer, bred by his lordship, and fed on turnips, cake, hay, mangold wurzel, and bean meal. Travelled to the show by van 45 miles.—135. Highly commended.

## COWS.

CLASS VI.—Fattened Cows or Heifers, under 5 years of age. Free-martins and spayed Heifers are not qualified.

68. Messrs. Fudlington and Kemp, of North Elington, near Louth, a 4 years and 3 months old short-horned Heifer, bred by themselves, and fed on grass, hay, cake, turnips, and bean meal. Travelled to the show by van 30 miles, by railway 256 miles, and by boat 3 miles.—134. The second prize of 10*l.*

69. The Right Honourable the Earl of Hardwick, of Wimpole, near Arrington, a 4 years and 3 months old short-horned Heifer, bred by his lordship, and fed on bean and barley meal, mangold wurzel, and hay. Travelled to the show by van 45 miles.—133. Commended.

70. Mr. William Ladds, of Ellington, near Huntingdon, a 4 years and 1 month old Durham Heifer, bred by himself, and fed on grass, Swedes, cake, and bean meal. Travelled to the show by van 68 miles.—132. Highly commended.

71. The Right Honourable the Earl of Radnor, of Cole-hill, near Farringdon, a 2 years and 7 months old Hereford and short-horned Heifer, bred by his lordship, and fed on hay, roots, corn, and cake. Travelled to the show by van 6 miles, and by railway 74 miles.—131. Highly commended.

73. Sir Charles Tempest, Bart., of Broughton Hall, near Skipton, a 4 years and 9 months old short-horned Heifer, bred by himself, and fed on hay, cake, and turnips. Travelled to the show by van 30 miles, and by railway 196 miles.—129. The first prize of 20*l.*, and a silver medal and a gold medal.

74. The Hon. H. W. Wilson, of Keythorpe Hall, near Leicester, a 2 years and 11 months old short-horned and Ayrshire Heifer, bred by himself, and fed on cake, barley meal, beans, peas, hay, and vegetables. Travelled to the show by van 30 miles, and by railway about 100 miles.—128. The second prize of 5*l.*

CLASS VII.—Fattened Cows, of 5 years old and upwards. Freemartins and spayed Heifers are not qualified.

76. Mr. Barnett, of Stratton-park, near Biggleswade, a 5 years and 6 months old Durham cow, had 1 calf, bred by himself, and fed on grass, hay, oil cake, linseed, bean meal, and carrots. Travelled to the show by van 45 miles.—126. The first prize of 20*l.*, and silver medal.

78. Mr. J. T. Smith, of Thornby Grange, near Northampton, a 5 years and 2 months old short-horned Heifer, bred by Mr. Cooke, of Cunnington, and fed on cake, bean meal, carrots, and hay. Travelled to the show on foot 5 miles, and by railway 78 miles.—124. The second prize of 5*l.*

CLASS VIII.—Fattened Cows, of 5 years old and upwards, that shall have had at least 2 live Calves at separate births.

80. The most Hon. the Marquess of Exeter, of Burghley, a 7 years and 2 months old Durham Cow, had 2 calves, bred by himself, and fed on oil cake, barley meal, and turnips. Travelled to the show by van 84 miles.—122. The second prize of 5*l.*

81. Mr. Edward Lakin, of Beauchamp Court, near Worcester, an 11 years and 9 months old short-horned Cow, had 6 calves, bred by himself, and fed on hay, grass, vetches, straw, cabbages, turnips, mangold wurzel, potatoes, oil cake, and bean meal. Travelled to the show by van 9 miles, and by railway 140 miles.—121. The first prize of 15*l.*, and a silver medal.

## EXTRA STOCK—CATTLE.

98. Mr. James Webster, of Peakirk, near Peterborough, a 3 years and 8 months old short-horned Ox, bred by himself, and fed on cake, bean meal, turnips, and hay. Travelled to the show on foot 5 miles, by van 45 miles, and railway 78 miles.—105. A silver medal.

## SHEEP.

CLASS IX.—Long-wooled fat Wether Sheep, 1 year old, that have never had cake, corn, meal, seeds, or pulse.

102. Mr. Thomas Twitchell, of Willington, Beds, a pen of three 20 months old Leicester Wethers, bred by himself, from rams hired of Mr. S. Bennett, of Bickering Park, Woburn—10*l.* The first prize of 20*l.*, and a Silver Medal.

103. Mr. Thomas Umbers, of Wappenbury, near Royal Leamington Spa, a pen of three 20 months old New Leicester Wethers, bred by himself, from rams hired of Mr. W. Umbers, jun., and Mr. J. Buckley—100. The second prize of 5*l.*

CLASS X.—Long-wooled fat Wether Sheep, 1 year old, under 8 stone weight, that have never had cake, corn, meal, seeds, or pulse.

104. Mr. J. S. Burgess, of Holme Pierrepont, near Nottingham, a pen of three 20 months old long-wooled Wethers, bred by himself—99. The prize of 10*l.*, and a Silver Medal.

CLASS XI.—Long-wooled fat Wether Sheep, 1 year old, without restrictions as to feeding.

108. Mr. J. S. Burgess, of Holme Pierrepont, near Nottingham, a pen of three 20 months old long-wooled Wethers, bred by himself—95. Commended.

112. Mr. George Piercy, of Kirkburn, near Driffield, York-shire, a pen of three 20 months old Leicester Wethers, bred by himself, from rams hired of Sir T. Sykes, Bart.—91. Highly commended.

114. Mr. William Sandy, of Holme Pierrepont, near Nottingham, a pen of three 20 months old long-wooled Wethers, bred by himself—39. The second prize of 5*l.*

117. Mr. Thomas Twitchell, of Willington, near Bedford, a pen of three 20 months old Leicester Wethers, bred by himself, from rams hired of Mr. S. Bennett—86. The first prize of 20*l.*, a silver medal and a gold medal.

CLASS XII.—Long and short woolled cross-bred fat wether Sheep, 1 year old, without restriction as to feeding.

121. His Grace the Duke of Manchester, of Kimbolton Castle, Kimbolton, a pen of three 21 months old South-down and Leicester cross Wethers, bred by Mr. G. Edie, Wytonhill Lodge, near Huntingdon, from Rams of his Grace.—82. The second prize of 5*l.*

122. Mr. Charles Tomsoa, of Sundon, near Luton, Beds, a pen of three 21 months old Down and Gloucester Cross Wethers, bred by himself.—81. The first prize of 10*l.*, and a silver medal.

## EXTRA STOCK—LONG-WOOLLED SHEEP.

129. Mr. Charles Large, of Broadwell, near Burford, a 56 months old long-wooled Ewe, bred by himself.—74. A silver medal.

CLASS XIII.—Short-wooled fat wether Sheep, 1 year old, without restrictions as to feeding.

138. Mr. Grantham, of Stoneham, near Lewes, a pen of three 20 months old South-down Wethers, bred by himself.—65. The first prize of 20*l.* and a silver medal and the gold medal.

142. Mr. S. Webb, of Babraham, near Cambridge, a pen of three 20 months old South-down Wethers, bred by himself.—61. The second prize of 5*l.*

CLASS XIV.—Short-wooled fat wether Sheep, 1 year old, under 8 stone weight, without restrictions as to feeding.

149. Mr. Samuel Webb, of Babraham, near Cambridge, a pen of three 20 months old South-down Wethers, bred by himself.—54. The prize of 10*l.* and a silver medal.

CLASS XV.—Short-wooled fat wether Sheep, 2 years old, without restrictions as to feeding.

153. Mr. Grantham, of Stoneham, near Lewes, a pen of three 32 months old South-down Wethers, bred by himself.—50. The prize of 20*l.* and a silver medal.

156. Mr. Samuel Webb, of Babraham, near Cambridge, a pen of three 32 months old South-down Wethers, bred by Mr. H. J. ADean, of Babraham.—47. The second prize of 5*l.*

EXTRA STOCK.—SHORT WOOLLED SHEEP.

161. Mr. W. B. Harris, of Hinton Farm, Abingdon, a seven years and nine months old South-down Ewe, bred by himself.—42.

166. Mr. Thomas Higgins, of Woolton, near Northampton, a 20 months old Down and Leicester Wether, bred by himself.—21.

#### PIGS.

CLASS XVI.—Pigs, of any breed, above 13 and under 26 weeks old.

167. Mr. William Hobman, of Ewell Marsh farm, near Epsom, a pen of three 24 weeks and 5 days old Neapolitan pigs, bred by himself, and fed on peas, barley meal, and middlings—38. The first prize of 10*l.*, and a silver medal.

CLASS XVII.—Pigs, of any breed, above 26 and under 52 weeks old.

168. His Royal Highness Prince Albert, Windsor Castle, a pen of three 28 weeks old Suffolk and Bedfordshire pigs, bred by his Royal Highness, and fed on meal, milk, and peas—1. Highly commended.

171. Mr. W. F. Hobbs, of Markshall, near Coggleshall, a pen of three 30 weeks and 6 days old improved Essex pigs, bred by himself, and fed on peas, barley meal, steamed potatoes, mangold wurzel, and milk—35. The first prize of 10*l.*, and a silver medal.

176. The Right Hon. Lord Western, of Felix Hall, near Kelvedon, a pen of three 27 weeks and 2 days old improved Essex pigs, bred by his lordship, and fed on barley meal and beans—30. The second prize of 5*l.*

#### EXTRA STOCK—PIGS.

178. Mr. Jacob Cawther, of Isleworth, near Brentford, a 31 weeks old improved Middlesex pig, bred by himself, and fed on boiled potatoes, fine middlings, and skimmed milk—23. Commended.

182. The Right Hon. Lord Western, of Felix Hall, near Kelvedon, a 27 weeks old improved Essex pig, bred by his lordship, and fed on barley meal and beans—24. A silver medal.

#### IMPLEMENTS.

We are happy to state that the Show of the Smithfield Cattle Club continues to improve both in cattle and agricultural implements. Amongst the latter we particularly noticed the following.—Several implements of agriculture, manufactured by R. Garrett and Son, Leiston Works, Saxmundham, Suffolk, particularly his drill for general purposes, with its patent improvements; the machinery for dropping the manure and seeds makes

it complete for every purpose. The following prizes have been awarded to Messrs. G. and Son for these machines:—At Cambridge, in 1840, the Royal Agricultural Society, 10*l.*; same Society at Liverpool, 10*l.*; and at Bristol, in 1842, 20*l.*; the East Norfolk Agricultural Society, in 1842, 4*l.*; Royal English Agricultural Society, at Derby, in 1843, 30*l.* Mr. W. Crosskill, of the Beverley Iron-works, Yorkshire, exhibited his celebrated patent clod-crusher, which was the prize implement of the Great Yorkshire Agricultural Society, 1843. This implement has been tried for several years by some hundreds of the first agriculturists in the kingdom, and its efficacy ascertained from practical experience. It is now acknowledged to be the most useful implement upon the farm, and is in general use in the highly cultivated districts of Yorkshire and Lincolnshire. Upon some of the larger farms two clod-crushers are considered indispensable. The patentee has been assured that, in a few years, when its real value is generally known, every farmer will have them in use, both upon light and strong land farms. For rolling corn upon light lands soon as sown, and in the spring after frost, it is invaluable; and to stop the ravages of the wire-worm and grub it is found a complete remedy. The clod-crusher consists of twenty-three roller parts, placed upon a round axle, 6 feet wide, by 2½ feet diameter. Also Crosskill's iron liquid manure-cart, with improved apparatus for watering hilly or uneven land, upon a very simple and perfect principle, and for two rows of turnips. Also a portable patent iron pump, with seven feet flexible leather pipe, and three feet copper tube. Small-sized cart, to contain 100 gallons. Also Crosskill's new patent wheels for carts and waggons, made by machinery, which received the honorary medal of the Royal Agricultural Society at Derby, and of the East Riding of Yorkshire Agricultural Society, 1843. By the invention of machinery, these wheels are made better, firmer, and mathematically true; combining lightness with strength, and great durability with cheapness. The wheels are fitted up with iron axletrees, iron naves and hoopire; also patent axles and oil-boxes. Farmers can be supplied with patent wheels and axles, and fit up their own carts or waggons. Also Crosskill's improved potato steamer and apparatus for steaming food for cattle, which may also be used as a brewing or washing copper, by using the boiler only, and removing the apparatus when not required. Also Gillett's patent rick-ventilator for hay and corn stacks, and for trying the quality of hay, &c., before making a purchase.

From the Earl of Ducie's Iron Works, Uley, Gloucestershire, some fine specimens of ploughs, drills, cutting machines, rollers, &c., &c., all manufactured in the most workman-like manner, and calculated as well for the uses for which they are intended to be applied as for durability and strength. We also observed, among the many implements exhibited, some of a very superior description, manufactured by Mrs. Mary Wedlake, widow of the late and much-respected Thomas Wedlake, of Hornchurch, Essex. Attention was particularly drawn to the superior manner in which

these implements are produced, and in particular to a horse-power chaff-engine, to cut any length required; also to an improved double-action turnip-cutter, which cuts for lambs, sheep, or bullocks without altering the knives. Some very good mills for oat-bruising or bean-splitting, to work with horse or hand labour; some very excellent oil-cake breakers, to break for sheep or bullocks. On the whole the implements were very superior to former years, and was much praised. Also the celebrated patent turnip and chaff-cutting machines, manufactured by Gardiner, of Banbury, Oxon. The single and double ploughs, winnowing machines and thrashing machines, &c., by Barrett, Exall, and Andrews, of Reading, Berkshire, were greatly admired. R. Horsby, of Grantham, Lincolnshire, had several specimens of thrashing, drilling, and corn-dressing machines, scarifiers, corn rectifiers, &c., &c. The 12-coulter drilling machine received three prizes, viz., from the Royal Agricultural Society at Liverpool, in July, 1841, 25*l.*; at Bristol, in 1842, 30*l.*; and at Derby, in July, 1843, 10*l.* A newly-invented barley hummeller, by Cooch, which received the Royal Agricultural Society's prize at Derby and Worcester; also a winnowing machine. A patent iron plough and harrow, by John Howard, of Bedford. Plenty's newly-invented horse power to thrash on wheels, for thrashing-machines. This instrument gained the prize at the great Bristol Meeting, in 1842. The vapour-inhaler, and improved hollow probang, by J. Read, of Piccadilly; a great variety of patent scales, by Burchfield, of West Smithfield; a double-action horse-hog, by Warner and Sudbury, Loughborough, Leicestershire; patent machines by Hall, Cambridge; a great number of beautiful specimens of agricultural implements by Cottam and Hallen, of Winsley-street, Oxford-street, amongst which the serrated chain harrow, turnip and chaff-cutting machines were much noticed. A patent lever horse-rake, for hay, corn, stubble, &c., &c., by Grant, of Stamford, Lincolnshire, was greatly admired. Mr. Grant received a premium at Liverpool for this excellent instrument. A patent machine for making drain-tiles. This particularly attracted the attention of his Royal Highness Prince Albert, who conversed for some time with the patentee, Mr. Etheredge, of Southampton. Several improved thrashing, cutting, hay-making, and other machines by J. Ferrabee, Stroud, Gloucestershire; a patent fire-pump, by Freeman Roe, Strand, London; specimens of guano manure, from Boyd and Co., London Bridge; safety reins, of Putland and Co., London; Carson's instrument for salting and curing meat; specimens of stack-cloth, tarpawling, &c., &c., by Davis and Co., Bow, and Orchard and Co., of Smithfield, London; patent asphalted felt, by M'Neill and Co., of Bunhill-row, London.

#### ROOTS, SEEDS, &c.

On entering the Implement Gallery, the first stand was one of considerable interest—we allude to that of Messrs. Thomas Gibbs and Co., the seedsmen to the Hon. Boards of Agriculture of England and Sweden, whose names are two well known to the agricultural public to render any

comment necessary; but we cannot in justice to the public refrain from noticing some of the articles exhibited, especially their mangold-wurtzel, of the yellow globe kind, which is daily increasing in reputation. The white carrot, of which such enormous crops are obtained, and of which their specimens from field-crops were most extraordinary for size and quality; some Swedish turnips, which were marked "Gibbs' Purple-top Swede," were of surpassing beauty of form; and the flavour of some of those which were cut plainly proved their nutritive qualities. Messrs. Thomas Gibbs and Co. also exhibited a large collection of dried specimens of grasses, the importance of which must be too evident to every agriculturist desirous of possessing pastures containing a proper collection of the grasses best suited to the nature of his soil—which mixtures those gentlemen have been most successful in supplying during nearly half a century.

Messrs. George Gibbs and Co. had an excellent display of roots; some of the mangold-wurtzel, both the globe and long red varieties, weighing 33 lbs. each. We noticed some remarkable Swede turnips, weighing 24 lbs. each; some very large white and other carrots and sugar-beet. These gentlemen had good collections of wheats and other grains, and their varieties of natural grasses in seeds and dried specimens are well deserving the attention of those who are desirous of improving their grass-land.

Mr. Lance exhibited some fine specimens of oats, wheat, rye, flax, barley, &c. &c., grown on Bagshot sand from his manures.

New editions of the following valuable works, edited by W. Youatt, Esq., and W. C. Spooner, veterinary surgeon, were exposed for sale on a stand:—"Clater's Every Man his own Farrier," "Clater's Every Man his own Cattle Doctor," and "The Complete Grazier," also "Johnson and Shaw's Farmers's Almanack," published by Ridgway.

The area of the Cattle Show was again covered in by Mr. Benjamin Edgington, and the effect superior to last year. The pointed roof and great width of the pavilion gives it a noble appearance, the cattle have every comfort secured to them, it is well ventilated, and the visitors are protected from any unpleasant weather.

In the Implement Loft, Mr. B. Edgington exhibited models and drawings of his temporary pavilions, marquees, and rick-cloths, now so generally in use, and much admired. There were also horse-cloths, sheep-nets, sacks, waterproof-dressed cloths, flags in silk and buntin, &c.

The Queen's Tent, as used at Dunkeld last autumn, was much admired.

## SMITHFIELD CHRISTMAS CATTLE MARKET.

MONDAY, Dec. 11.

The great Christmas show having been appointed to be held to-day, the market this morning exhibited a degree of animation and bustle seldom or never before witnessed in this or any other similar place of business

in the United Kingdom. Not only was the attendance of London and country butchers large, but the market was crowded throughout the day by agricultural and other visitors, who expressed themselves highly gratified with the stock brought forward.

In particularizing the stock, we shall commence with the beasts, as is our usual custom. In taking a comparative view of it, we may safely venture to intimate that a finer, more symmetrical, a heavier, or better conditioned supply of those animals was never witnessed by the oldest grazer living. In many respects, it was decidedly superior to that exhibited at the corresponding period in 1842; while, if we take its average quality, we must give our opinion in favour of this day's show. For a series of years the Hereford breeds have held the first position on these interesting occasions; and we have to observe that that position was never before so marked as to-day: in fact, without detracting from the merits of some of the Herefords shewn in the yard at Baker-street, and which carried off prizes, we cannot but express our surprise and regret that some of these beasts should not have been entered in the lists for competition at the Smithfield Club's show. Take, for instance, the 25 pure Herefords and Sussex beasts brought to this morning's market, by Mr. Senior, of Broughton House, near Aylesbury. These wonderful creatures—5 years old—were estimated to weigh, on the average, 250 stones each. For weight of fat, and symmetry, these, we unhesitatingly affirm, were never before excelled by any grazer in the kingdom; hence worthy of our especial notice. Even these, however, we do not consider the prodigies of the show, as we accord that honour to Mr. Terry's seven Hereford Steers, bred and fed by that gentleman, on his farm, near Aylesbury. These beasts were wonderful indeed—showing, in our judgment, the greatest weight, in the same compass, ever observed in any similar breed in the world. And this, by the way is not saying too much for them; therefore, we place them as the *first* and most valuable beasts—in other words, as the wonder of the market. The next, in point of excellence, we consider the twenty superior Devons shown by Mr. Chacln. The twenty-six Devons, the property of Mr. John Somers, of Saltmoor House, near Bridgewater, were very wonderful animals, as will be perceived when we observe that their weight was from 140 to 170 stones each, and that some of them found purchasers at 36*l.* per head. Mr. H. Brown, of Stawell, near Bridgewater, had also some remarkably good Devons, bred by Mr. John Birch, of Bridford, near Taunton, and by Mr. T. Danger, of Trunstile, near Bridgewater, which elicited much approbation. We have also to notice favourably the 26 Devons shown by Mr. W. Bond, of Bishop Lydiard, near Taunton, Somersetshire; as also some by Mr. G. Bond, of Oak Farm, near Taunton, and which reflected the highest credit upon those gentlemen's skill as breeders. The 20 Devons exhibited by Mr. Harman, of Barrow, near Bridgewater, were well made-up beasts, though not such heavy weighters as those above-noticed. Mr. Gurrier had also an extraordinarily fine show of Herefords, Devons, Rents, and Scots; while Mr. Collins had two of the best shorthorns, bred and fed by Mr. Simpson, near Cambridge, we ever saw, exceeding in weight 170 stones each. The 10 Herefords, the property of Mr. Layton, of Thorney, near Peterborough, and offered for sale by Mr. Collins, were first-rate animals. Mr. Robert Morgan had also 20 very superior short-horned and Hereford Oxen, grazed by W. Goodall, Esq., of Market Deeping, Lincolnshire. These beasts were greatly admired by the butchers, and allowed by judges to be the 20 best beasts shown in London, of any one gentleman's feeding. Mr. Morgan had, likewise, some very good Oxen on sale, the property of W. Wiseman, Esq., of Mount Enauget, and some remarkably fine Scots, belonging to G. Hay, Esq., of Aberdeen (N. B.) The short-horns and Herefords last referred to weighed quite 200 stone each. Mr. Verley had on show 14 Herefords, sent by Mr.

B. Simpkins of Oby, Leicestershire, and which were justly admired by all present.

Having now given our readers a faithful statement of the quality and condition of the Bullock supply—which, as we have before observed, was never before excelled—we shall now refer to the aggregate numbers and general demand. With respect to the former, they were quite as large as those brought forward on any similar occasion during the last six years; but we certainly consider there was more weight of flesh, both lean and fat, than ever before recollected. It is true, we did not see quite so many good Scots as formerly—the best in the market being those shown by Mr. Maidwell, of Leatherhead. But this comparative deficiency was more than made good by the Herefords and Devons—not forgetting some unusually fine pure Durhams. Such being the state of the bullock supply, we could have wished to report equally favourable of the Beef trade. Notwithstanding the large attendance of buyers it ruled heavy, and the prices realized were certainly beneath those that could be considered remunerative. For instance, though a few of the finest Scots, Durhams, Herefords, and Devons were disposed of at 4*s.* 6*d.*, the highest general figure for Beef did not exceed 4*s.* 4*d.* per 8*lbs.* The trade for the best qualities—and for which scarcely any comparative advance in value was realized, considering their extraordinary excellence—was by no means brisk, yet a good clearance of such was effected. For the middling and inferior kinds of Beef—of the latter of which scarcely any was on offer—the sale was likewise slow, yet their currencies had an upward tendency. In comparing the rates of Beef obtained to-day with those at the same market in 1842, a present decline in value must be observed of nearly 6*d.* per 8*lbs.*, some of the Scots and Herefords last year producing as much as 5*s.* per 8*lbs.*, and that too at a period when the supply was not, taken as a whole, so good as that shewn this morning.

Although the epidemic is still complained of, we observed scarcely a single instance to-day in which it had committed any serious ravages, the stock being mostly well on its legs.

The arrivals of beasts from Lincolnshire, Leicestershire, Northamptonshire, &c., consisted of about 3,000 short-horns, &c.; from the western and midland districts, 600 Herefords, Devons, Durhams, &c., were received; while for other parts of England the numbers were rather over 800; those from Scotland amounting to 125 Scots, by steamers.

We now come to the Sheep, but in which, with some exceptions—to which we shall presently allude—there was a slight falling off in quality, but not in numbers (the latter being about the average of those shewn on this occasion). Prime old Downs being scarce were taken off somewhat freely, at currencies fully equal to those obtained on this day 5*s.* 2*d.*, or from 4*s.* to 4*s.* 3*d.* per 8*lbs.*; but with polled and other breeds the trade was in a very depressed state, at barely stationary prices.

In glancing through the supply of Sheep we perceived some unusually fine creatures amongst it—Mr. Weal having on offer 16 polled sheep, the property of E. F. Whittingstall, Esq., of Langley-Berry, Herefordshire; as, also, 20 remarkably fine Downs, bred by the same gentleman. Some of the former produced 6*l.* per head. Mr. Weal likewise showed two wonderful Downs, sent by Mr. Addams, of Ware, Herts, and which were justly praised. There were shown by other salesmen some remarkably fine Downs, bred and fed by Mr. Tuckwell, of Signett; five polled Sheep, bred and fed by Mr. C. Large, of Broadwell; and some exceedingly fine Downs, belonging to Mr. Faulkner, of Berry Barns, which were certainly the prodigies of the supply of Sheep.

The numbers of Calves were seasonably good, yet the sale for them was tolerably steady, and the late improvement in their quotations was well supported.

The show of Pigs was good, but not quite equal to that of other former years. Neat small Porkers sold freely; other kinds of Pigs slowly, at late rates.

REPORT ON THE EXHIBITION OF IMPLEMENTS AT THE DERBY MEETING OF THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND, IN 1843.

(From the Journal of the Royal Agricultural Society of England.)

With a few preliminary remarks, the Judges proceed to lay before the Council their award of premiums, and an analysis of the implements exhibited at Derby.

They have already stated, at the desire of the Council, the motives which induced them to withhold particular prizes offered by the Society; advising, for certain specified implements, a more lengthened and accurate trial than circumstances permitted at the Meeting. The adoption of this advice by the Council, together with the new and improved rules already made known or under consideration, for the management of trials at future shows, spares the necessity of alluding further to the reasons which induced the Judges so to act, borne out, too, as they were, by a previous resolution of the Council to that effect.

The Judges have again the gratification of recording that, in number, variety, and perfection, this exhibition greatly excelled all that preceded it; and their thanks are due to the Council for sanctioning their application of the pecuniary value of the withheld prizes to the rewarding of many useful and unexpected implements, which were not and could not be classed by the Society as special objects for encouragement. Justice to the exhibitors, and the fulfilment of the intent of the Society, required this appropriation of the funds set apart for the furtherance of agricultural mechanism; and, perhaps, a more substantive proof of the progress made in this great department of the Society's solicitude cannot be adduced, than that the exhibitors annually outgrow enlarged show-yards, and entreat more stringent and exact trials of their implements.

It is thought that the following analysis of the contents of the show-yard may not only serve to convey a just idea, but be a proper historical record of the magnitude and variety of the collection; and that it may tend to confirm the Council in their desire to render the catalogue of implements a perfect register of the exhibition. As such, the catalogue would become not merely a momentary guide, but a useful annual work for native and foreign pur-

chasers to consult, after as well as during the show. With the appendage of an analytical index, the agriculturist, on entering the yard, would at once be enabled to direct his attention to the more particular objects of his search, and the document would thus contribute equally to the advantage of exhibitors and the public. The analysis now given as prefatory to the award of premiums and usual short account of some of the implements, presents a concise classification of the machinery employed in various departments of British husbandry; and it may possibly aid the Council in selecting the objects or classes which more particularly demand future encouragement by the Society. With this view, the number of prizes allotted to each class and object is also tabulated.

As a digest of the nature, number, and value of the implements in habitual use by farmers, it cannot fail to impress the mind with the importance of agricultural mechanism as a branch of national industry, and as consuming an immense amount of native materials. Nor will it, perhaps, be uninteresting to the agriculturist and his mechanic to learn that not a few highly skilled Lancashire manufacturers and mechanicians, attracted by proximity to the meeting, expressed unqualified admiration of the workmanship and constructive skill displayed, with no slight surprise that so many varied and necessary tools were used in the culture of the soil and preparation of animal and human food.

The award of premiums has been arranged on this occasion with a reference to the page of the published catalogue, the number of the exhibitor's stand, and that of the article rewarded. A reference to the article forming the subject of a prize has been deemed advisable, in order to define it; as, in many instances, an exhibitor produced a large variety of implements of the same class, having an apparently similar but really a distinctive character and application, each being adapted to some specific operation in the art of agriculture.

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## ANALYSIS OF THE EXHIBITION.

ANALYSIS OF THE EXHIBITION.	No. of Articles.	No. of Exhibitors.	No. of Prizes.	ANALYSIS OF THE EXHIBITION.	No. of Articles.	No. of Exhibitors.	No. of Prizes.
<b>TILLAGE IMPLEMENTS.</b>				<b>DIBBLERS:—</b>			
<b>PLUGHS:—</b>				Five-row horse dibbling machine and sower.....			
Swing, moulding and ridging, included .....	48	..	..	Two-row do.....	1	..	..
One-wheel .....	15	..	..	Two-row hand or horse dibbling wheel.....	1	..	1
Two-wheel, double-furrow included	55	..	..	One row hand do.....	1	..	..
Subsoil, common.....	3	..	..		4	4	1
Ditto, various .....	6	..	..	<b>HORSE-HOES:—</b>			
Sub-pulverizers .....	4	..	2	Broad, narrow, and variously contrived, to suit drilled crops....			
Ditto and surface-ploughs.....	3	..	1		20	13	3
Ditto and hoes.....	2	..	..	<b>HARVESTING MACHINES.</b>			
Stubble and paring.....	4	..	1	<b>HAY-MAKING:—</b>			
Water-furrow clearing, or boat-plough .....	1	..	1	Tedding machines.....			
Draining .....	3	..	1	<b>HORSE-RAKES:—</b>			
Drill-ploughs, one-row .....	3	..	1	Hay, corn, and stubble.....			
Ditto, three-row .....	1	..	..		7	..	..
	148	41	7		11	9	1
<b>HARROWS:—</b>				<b>BARN MACHINERY.</b>			
Common, and improved.....				<b>HORSE-ENGINES:—</b>			
Drag, and scarifying .....	2	..	1	Various powers, travelling and fixed			
Extirpating .....	1	..	..		7	5	..
Lever .....	2	..	..	<b>STEAM-ENGINES:—</b>			
Revolving and sowing.....	1	..	..	Travelling for threshing, &c.....			
Ditto, vertically .....	1	..	..	Applied to corn-mills, &c.....			
Ditto, horizontally .....	1	..	1		3	..	2
Chain-web .....	3	..	1		3	..	..
Folding.....	1	..	..		6	2	2
	31	24	5	<b>THRESHING-MACHINES:—</b>			
<b>SCARIFIERS:—</b>				Driven by hand .....			
Cultivators, grubbers, scufflers, included .....				Driven by horse or steam power..			
	25	17	2 reserved for future trial.		4	..	..
					11	..	..
					15	6	..
<b>CLOD-CRUSHERS:—</b>				<b>WINNOWER, CORN-CLEANING, AND BARLEY-HUMMELLING:—</b>			
Various .....				Various .....			
	7	7	..		20	14	3
<b>ROLLERS:—</b>				<b>CRUSHING AND SPLITTING MILLS:—</b>			
Various, cast and wrought iron ..				Various .....			
	12	7	..		36	10	2
<b>COUCH-RAKES:—</b>				<b>CORN AND MEAL MILLS:—</b>			
Various .....				Metallic hand corn-mills .....			
	4	4	1	French burr do.....			
<b>DRILLING, SOWING, MANURING, &amp; HOEING MACHINES.</b>				Grey stone do.....			
<b>DRILLS AND PRESSERS:—</b>				Mill, with two-horse power engine.			
Drills for corn and seed, with manure .....				Mills for animal, engine, or other power .....			
	14	..	4	Metallic meal-mills .....			
Do., do., without manure.....	1	..	..	Hand dressing-machine.....			
Do. for turnip-seed, with manure.....	16	..	1		20	4	2 reserved for future trial.
Do., do., without manure.....	1	..	..				
Do., do., with manure-cart.....	1	..	1	<b>CHAFF-CUTTERS:—</b>			
Do. for seeds, with manure.....	3	..	1	Various, adapted to manual, animal, and steam power .....			
Do., do., without manure.....	10	..	1		51	22	2
Do. and pressers, with manure....	6	..	1	<b>CAKE-CRUSHERS:—</b>			
Do., do., without manure.....	4	..	..	Various .....			
Do. for solid manures only.....	1	..	..		14	9	1
Do. for liquid manures only.....	1	..	1				
Pressers without drills .....	2	..	..				
Seed-sowing barrow, without manure .....	1	..	..				
Drill-ploughs—(see <b>PLUGHS</b> )....							
	61	34	10				

ANALYSIS OF THE EXHIBITION.	No. of Articles.	No. of Exhibitors.	No. of Prizes.
<b>CORN WEIGHERS AND METERS:—</b>			
Weighter .....	1	..	..
Meter, self-registering .....	1	..	1
	2	2	1
<b>FIELD, FOLD, AND YARD MACHINERY.</b>			
<b>TURNIP CUTTERS:—</b>			
Hand and portable .....	11	..	1
Attached to cart .....	1	..	..
	12	10	1
<b>ROOT-GRATING AND SQUEEZING MACHINES:—</b>			
Graters .....	2	..	..
Cider-mill, turnip and potato Squeezzer .....	1	..	1
	3	3	1
POTATO WASHERS.....	2	2	..
<b>STEAMING APPARATUS:—</b>			
Various .....	5	5	1
<b>FEEDING APPARATUS:—</b>			
Consisting of iron pig-troughs, pens, cow and sheep cribs, on wheels, mangers, racks, &c.....	..	3	1
Fodder preserver .....	..	1	..
	..	4	1
<b>WEIGHING MACHINES:—</b>			
For carts, cattle, sheep, &c. ....	4	2	1
<b>FIRE ENGINES &amp; C.:—</b>			
Fire-engine, with irrigator, attached to steam-engine .....	1	..	..
Ditto, hand and portable .....	4	..	..
Garden-engines, various.....	6	..	..
	11	5	..
<b>STACK-YARD:—</b>			
Proposed substitute for thatch ....	5	..	1
Rick ventilator .....	1	..	1
Hay sample borer; assortments of rick-cloths, iron rick-stools, and frames, &c. ....	..	..	..
	..	9	2
<b>SUNDRIES:—</b>			
Iron barrow for heating and transporting tar .....	1	..	1
Machine for breaking stones .....	1	..	..
Fan blower, for out or in-door forge .....	1	..	..
Iron field-gates .....	3	..	1
Assortments of iron hurdles, fencing, seats, barrows, trucks, &c. Saw-machines, screw-jacks, cranes, pumps, garden-tools, &c. ....	..	..	..

ANALYSIS OF THE EXHIBITION.	No. of Articles.	No. of Exhibitors.	No. of Prizes.
<b>SUNDRIES:—(continued.)</b>			
Weed and bush extractor, assortment .....	..	..	1
	..	12	3
<b>AGRICULTURAL CARRIAGES, HARNESS, AND GEAR.</b>			
<b>WAGGONS, CARTS, &amp; C.:—</b>			
Waggons, without springs .....	7	..	..
—, on springs .....	3	..	1
Harvest waggon, on springs .....	1	..	..
Market and corn delivery carriage, on springs.....	1	..	1
Waggon, formed of two combined carts .....	1	..	1
Carts, without springs .....	10	..	..
—, for general and harvest work, on springs.....	3	..	..
—, for harvest, without springs..	5	..	..
—, market and family, on springs	2	..	..
—, for liquid manure .....	3	..	..
—, for solid manure, with drills	1	..	..
—, for solid and liquid manure bodies .....	1	..	1
	38	15	4
<b>BREAKS:—</b>			
Applicable to waggons, carts, and carriages of all kinds .....	..	1	1
<b>SETS OF WHEELS, AXLES, &amp; C.:—</b>			
Various .....	..	6	1
<b>HARNESS AND GEAR:—</b>			
Set of single-horse Scotch harness	..	..	..
Sets of improved hames, saddles, bits, and reins .....	..	..	..
Whipple-trees, or coupling bars ..	..	..	1
	..	8	1
<b>DRAIN-TILES AND IMPLEMENTS.</b>			
Machines for making tiles and bricks .....	2	..	2
Set of tools for forming concrete drains .....	1	..	..
Sets of specimens of tiles .....	3	..	2
Drainer's levels.....	2	..	1
Screen for sorting drain-stones ...	1	..	..
Draining-ploughs—(see PLOUGHS.)	..	..	..
	9	8	5
<b>DAIRY IMPLEMENTS.</b>			
<b>CHURNS:—</b>			
Upright, various motions .....	4	..	1
Box, ditto.....	4	..	..
	8	8	1
<b>CHEESE PRESSES:—</b>			
Single .....	4	..	1

ANALYSIS OF THE EXHIBITION.			ANALYSIS OF THE EXHIBITION.				
	No. of Articles.	No. of Exhibitors.	No. of Prizes.		No. of Articles.	No. of Exhibitors.	No. of Prizes.
<b>CHEESE PRESSES :— (continued.)</b>				<b>MISCELLANEOUS :—(Continued.)</b>			
Double .....	1	..	1	Odometer, or land measurer .....	1	..	..
Single, with curd crusher attached	1	..	..	Veterinary instruments, various .....	..	..	..
	6	6	2	Collections of soils and manures ..	..	..	..
<b>CURD MILKS :—</b>				Map in relief, for exhibiting the water-levels, undulations, and geology of a district .....	1	..	1
Various .....	3	..	..		..	6	1
Milk truck and cask .....	1	..	..	<b>DOMESTIC.</b>			
	4	4	..	Cast-iron barrel thrawl, or tilter ..	1	..	1
<b>MISCELLANEOUS.</b>				Meat-salting machine .....	1	..	..
Dynamometers, two kinds .....	4	..	Reserved for future trial.	Egg-hatching ditto .....	1	..	..
				Flour-mills, garden-engines, and tools—(see BARN MACHINERY.)			
					3	4	1

Aggregate value of the implements, according to the selling price declared by the makers, about £7,400.

AWARD OF PREMIUMS.

AWARD OF PREMIUMS.	Prize.	Reference to Catalogue.		
		Page.	Stand.	Article.
<b>1. PLOUGHS.</b>				
To David Harkes, of Mere, near Knutsford, for his Draining Plough; his own invention .....	£10	18	14	1
To Hugh Carson, of Warmminster, for his Subsoil Pulverizer; his own invention .....	£10	61	49	1
To John Bruce, of Teddington, near Stratford-on-Avon, for his Plough with Subsoil Apparatus; his own invention .....	£5	38	31	1
To the Earl of Ducie, of Tortworth, near Wootton-under-edge, for a Subsoil-Pulverizer; invented by the Hon. M. W. B. Nugent, with additions by John Morton of Chester Hill .....	Silver Medal.	6	5	8
To Edward Hill, of Brierley Hill Iron-Works, near Dudley, for an Iron Skin-Plough, for paring Stubbles; improved by J. A. Stokes, of Harvington, near Evesham .....	£3	22	16	9
To John Meakin, of Spondon, near Derby, for his Plough and Drill combined; his own invention .....	£2	40	36	1
To John Caborn, of Denton, near Grantham, for his Boat Plough, for clearing water-furrows; the invention of A. Stickney, of Ridgemont, Holderness. ..	Sil. M.	26	20	3
<b>2. DRILLS.</b>				
To Messrs. R. Garrett, and Son, of Saxmundham, for their Drill for general purposes; their own invention .....	£30	41	39	1
To Richard Hornsby, of Spittlegate, near Grantham, for his Twelve-coulter Drill; his own invention .....	£10	34	26	2
To Richard Hornsby, of Spittlegate, near Grantham, for his Thirty-coulter small-seeds Drill; his own invention .....	Sil. M.	35	26	4
To Richard Hornsby, of Spittlegate, near Grantham, for his Manure Cart with Drills attached, both for ridge and flat culture; his own invention .....	Sil. M.	35	26	9
To Thomas Hunter, of Ulceby, near Barrow-on-Humber, for his Ridge-turnip and Manure Drill; the invention of Mr. Cartwright .....	£5	39	34	2
To James Smyth, of Peasenhall, near Yoxford, for his Nine-coulter Corn Drill, particularly adapted for hilly land; his own invention .....	£5	74	65	3
To John Caborn, of Denton, near Grantham, for his Corn and Turnip Drill; his own invention .....	Sil. M.	26	20	2
To William Crosskill, of Beverley, for his patent Grass-land Cultivator, with Seed and Manure Drills; his own invention .....	Sil. M.	28	21	2
To Thomas Huckvale, of Over Norton, Oxon, for his Liquid Manure Drill; his own invention .....	£5	101	84	2

AWARD OF PREMIUMS.

	Prize.	Reference to Catalogue.		
		Page.	Stand.	Article.
<b>3. CHAFF CUTTERS.</b>				
To the Earl of Ducie, of Tortworth, near Wootton-under-edge, for his patent Chaff Cutter; invented by himself, R. Clyburn, and E. Budding.....	£10	7	5	14
To James Smith, of Gloucester, for his Chaff Cutter; invented by himself..	£3	48	40	1
<b>4. DRAINING TILES.</b>				
To the Tweeddale Patent Drain-Tile and Brick Company, London, for a Hand-Tile Machine; invented by the Marquis of Tweeddale .....	Sil. M.	20	15	1
To Messrs. J. A. and R. Ransome, of Ipswich, for a Patent Tile and Brick Machine; the invention of R. Beart, with improvements by A. Stickney .....	Sil. M.	80	06	26
To F. W. Etheredge, of the Woodlands, near Southampton, for his Drain Tiles with covers; his own invention .....	Sil. M.	113	135	1
To J. Read, of London, 35, Regent Circus, for his Cylindric Drain Tiles; his own invention.....	Sil. M.	115	113	4
<b>5. HARROWS.</b>				
To John Howard, of Bedford, for a set of Four-beam Iron Harrows; invented by W. Armstrong .....	£5	67	57	8
To Messrs. Sanders and Williams, of Bedford, for their Patent Iron Harrows..	£5	105	89	15
To Robert Hopkin, of Hartington, near Ashbourne, for his Circular Horizontal Revolving Harrow; his own invention .....	£5	25	17	1
To William Abraham, of Barnetby-le-Wold, near Brigg, Lincolnshire, for his combined Drag Harrow and Scarifier; invented by Joseph Miller.....	Sil. M.	38	30	1
To Messrs. Cottam and Hallen, of London, Winsley-street, for a Chain-web Harrow, with serrated rings; invented by James Smith, of Deanston, improved by G. Cottam.....	Sil. M.	100	97	19
<b>6. AGRICULTURAL CARRIAGES.</b>				
To Richard Stratton, of Bristol, for his Spring Waggon on the equi-rotal cross-lock principle, with Thatcher's Breaks attached; his own invention.....	£20	51	44	3
To Richard Stratton, of Bristol, for his low Manure Tipping Cart, with a Liquid Manure Cistern Body to fit; his own invention.....	Sil. M.	52	44	16
To Daniel Coombes, of Sbipton, near Burford, Oxon, for his Two Carts, convertible into a Waggon; his own invention .....	£5	91	77	1
To A. White, of Old Sleaford, Lincolnshire, for his Spring Carriage for delivering corn and other purposes; his own invention.....	£10	89	74	1
To William Crosskill, of Beverley, for his Cart-wheels with cast-iron Naves and turned Axles; his own invention.....	Sil. M.	31	21	14
<b>7. DRILL PRESSERS.</b>				
To John Caborn, of Denton, near Grantham, for his two-wheel Land Presser, with Manure Drill attached; his own invention.....	£10	26	20	1
<b>8. CHURNS.</b>				
To William Wood, of Knutsford, for his improved motion to an upright Churn; invented by Thomas Wood .....	£5	107	93	8
<b>9. ROOT STEAMERS.</b>				
To James Richmond, of Salford, near Manchester, for his Apparatus for Steaming Roots; his own invention .....	£5	72	63	6
<b>10. COUCH RAKES.</b>				
To Richard Stratton, of Bristol, for his Revolving Couch Rake; his own invention.....	£2	54	44	28
<b>11. HORSE HOES.</b>				
To Messrs. R. Garratt and Son, of Saxmundham, for their Improved Patent Horse Hoe; their own invention.....	Sil. M.	44	39	8
To Joseph C. Grant, of Stamford, for his Patent Lever Steerage Horse Hoe; his own invention .....	Sil. M.	65	55	3
To Joseph Seurch, of Crakehall, near Bedale, Yorkshire, for his light Horse Hoe, with Rake attached; his own invention .....	£3	73	64	7
<b>12. CHEESE PRESSES.</b>				
To James Smith, of Gloucester, for his single Lever and Screw Press; his own invention .....	£3	49	40	6
To Richard Stratton, of Bristol, for a double Lever Press; invented by W. Jas Gingell.....	£3	54	44	32

AWARD OF PREMIUMS.	Prize.	Reference to Catalogue.		
		Page.	Stand.	Article.
<b>13. HAY-MAKING MACHINES.</b>				
To Thomas Wedlake, of Hornchurch, near Romford, Essex, for his Improved Spreading or Tedding Machine; his own invention .....	Sil. M.	88	73	3
<b>14. TURNIP CUTTERS.</b>				
To Thomas Wedlake, of Hornchurch, near Romford, Essex, for his Turn Plate Turnip Cutter; his own invention .....	£2	88	73	4
<b>15. CORN AND CAKE CRUSHERS.</b>				
To James Spencer, of Hopton, near Wirksworth, Derbyshire, for his Oat and Bean Mill; his own invention .....	£5	50	43	3
To the the Earl of Ducie, of Tortworth, near Wootton-under-edge, for a Corn Crusher; invented by R. Clyburn.....	Sil. M.	8	5	15
To Richard Hornsby, of Spittlegate, near Grantham, for his Cake Crusher; his own invention .....	£5	36	44	13
<b>16. CORN CLEANERS.</b>				
To B. Millington, of Asgarby, near Sleaford, Lincolnshire, for his Corn Chaffer and Dresser; his own invention .....	£5	26	19	1
To Joshua Cooch, of Harleston, near Northampton, for his Barley Hummeller, attached to a Winnowing Machine; his own invention .....	£3	86	71	2
To John Newham, of Kegworth, near Loughborough, for his Double-blast Winnowing Machine; his own invention. ....	Sil. M.	10	6	1
<b>17. DIBBLING MACHINES.</b>				
To Messrs. Cottam and Hallen, of London, Winsley-street, for their Two-wheel Double-row Hand or Horse Dibbling Wheels; invented by G. Cottam.....	£2	108	97	9
<b>18. STEAM ENGINES.</b>				
To William Cambridge, of Market Lavington, near Devizes, for his Travelling Steam Engine; his own invention .....	£10	90	75	1
To Alexander Dean, of Birmingham, for his Travelling Steam Engine; his own invention.....	£10	91	78	1
<b>19. WEIGHING MACHINES.</b>				
To H. G. James, of London, 3, Great Tower Street, for two Patent Weighing Machines, of his own construction; invented by M. George, of Paris. ....	Sil. M.	101	85	1 and 2
<b>20. MISCELLANEOUS.</b>				
To C. R. Colvile, M.P., of Lullington, near Burton-on-Trent, for his Iron Wheelbarrow and Furnace for melting and transporting gas-tar; his own invention .....	Sil. M.	3	1	2
To John Gillett, of Brailes, near Shipston-on-Stour, for his Patent Rick Ventilator; his own invention. ....	Sil. M.	4	2	1
To the Earl of Ducie, of Tortworth, near Wootton-nder-edge, for a Self-Registering Corn Metre; invented by R. Clyburn .....	Sil. M.	8	5	16
To Edward Hill, of Brierley Hill Iron Works, near Dudley, for his Wrought-iron Cow-crib and Sheep-rack; his own invention .....	Sil. M.	22	16	11 & 12
To Edward Hill, of Brierley Hill Iron Works, near Dudley, for his Wrought-iron Farmers' Field Gates and Posts; his own invention. ....	Sil. M.	22	16	
To George Parsons, of West Lambrook, near South Petherton, Somerset, for his Stack-roof or covering; his own invention.....	Sil. M.	49	41	1
To Charles Thatcher, of Midsomer Norton, near Bath, for his Patent Self-acting and Self-regulating Breaks, for carriages, waggons, and carts; his own invention .....	Sil. M.	58	44	1
To Messrs. J. R. and A. Ransome, of Ipswich, for their Patent Iron-truss Whippletrees and Pomeltrees; their own invention.....	Sil. M.	84	66	57
To Alexander Dean, of Birmingham, for a Cider Mill; invented by Jas. Ashwid, of Bretforton, Worcestershire .....	Sil. M.	98	78	49
To Joseph Hall, of Cambridge, for his Weed and Bush Extractor; his own invention .....	£2	100	82	6
To J. B. Denton, of Southampton, for his Map in Relief, showing the water-courses, levels, &c., of a district; his own invention .....	Sil. M.	113	106	1
To William Hutchinson, of Derby, for his Cast-iron Thrawl, or Barrel-tilter; his own invention .....	£2	114	109	1
To Andrew Notman, of Painswick, Gloucestershire, for his improved Drainer's Level; his own invention.....	Sil. M.	115	111	1
To Messrs. J. R. and A. Ransome, of Ipswich, for their general Collection of Implements, and superior workmanship .....	Gd. M.	75	66	1 to 58

**Ploughs.**—A chasm will this year appear in the record of the draught and performance of the general collection of ploughs, first commenced at Liverpool. This is the more to be regretted, since at no previous Meeting had the exhibitors exerted themselves so strenuously to present this implement in a state of high perfection, and adapted to so many varieties of soil. A great number of ploughs were put to work on Mr. White's farm at Rough Heanor, and inspected by the Judges; many of them with unqualified satisfaction. They would particularize, as worthy of high commendation, those produced from the manufactory of Messrs. Ransome, composed entirely of iron and steel. The beams of these ploughs are constructed on the *truss* principle, which, though novel in its application to the plough, has long been appreciated by mechanics as possessing the greatest stiffness combined with lightness. It is this consideration which has induced those makers to abandon the use of wood, heretofore chiefly used by them for this part of the plough in preference to a beam of solid metal. The structure of their improved iron beam is such as to destroy lateral vibration, particularly at its roof or junction with the body of the plough; it admits also of a neat and powerful fixing, as well as ready adjustment of the coulter.

Tremor in mechanism is well known to consume power uselessly; and, in the case of the plough, vibration in the beam, though it be insensible to the eye, renders the guidance of the implement more difficult and its work less exact. The circumstance of increased stiffness attending mere weight of matter, may have been one cause why the heavier ploughs have not unfrequently been found to require less force of draught than lighter ones, for an equal weight of soil moved; but stiffness is not incompatible with lightness, and a diminution in the weight of an implement, when perfect action is otherwise secured, must be attended with economy of power, or, what is the same thing, with a diminution of resistance, whence truer work results.

It is also important that the stils or handles should be stiff enough to transfer the effort of the holder to the body of a plough, with the least expenditure of his strength; for, the easier its guidance, the greater will be the certainty of the labourer's attention to his business. This property has also received the care of Messrs. Ransome, and, together with the simple means applied for adjusting and replacing the mould-boards, shares, and wearing parts of the various ploughs exhibited by them, testified to the thought and ability bestowed on the most minute details of an implement which still maintains its claim to be the most indispensable, as it was probably the earliest invented, auxiliary to human labour in tilling the soil.

Mr. Howard, of Bedford, again produced his wheel-ploughs, so much admired and rewarded at the Bristol Meeting, which appeared from their action to have lost nothing of their excellence.

Mr. Hill, of the Brierley Hill Iron-Works, near Dudley, exhibited several specimens of Mason's plough with pulverizing knives. On trial they were found to effect an amount of comminution which the Judges had scarcely anticipated in a soil of such tenacity as that at Rough Heanor. From experience in the use of this implement by two of their number since the Bristol Meeting, and by accounts received from other agriculturists, the expectations expressed in the last Report, of the practical utility

of this combination in certain suitable soils, may be considered to be in course of realization.

The stand of Mr. E. D. Falkner, of Fairfield, near Liverpool, contained a variety of substantial and well-constructed ploughs, by Mr. E. Brayton, of Dykesfield, near Carlisle, which acted well; and it was a matter of particular regret to the Judges that they were unable to compare the work and draught of a three-wheel implement, by this maker, with others.

A double-furrow plough, by Messrs. Barrett, Exall, and Andrews, of Reading, gave great satisfaction; as also some single ploughs by the same firm, especially their one-wheel light-soil plough, rewarded at Liverpool.

The swing-ploughs exhibited by the Earl of Ducie, and manufactured by Mr. Clyburn, were specimens of excellent workmanship and construction, and justified on this occasion the opinion formerly given of their merits. The same may be said of Mr. Law's of Shettleston, near Glasgow, of Messrs. Ransome's, Mr. Howard's, Messrs. Barrett and Co.'s, Mr. Brayton's, Mr. Scurreh's, Messrs. Sanders and Williams's, and those of other makers. Of the wheel-ploughs several were readily convertible to the swing kind, and furnished with variously formed mould-boards to suit the condition of different soils.

**Drill-Ploughs.**—Three Ploughs, with single-row drills, were produced; to one of which, constructed by Mr. John Meakin, farmer, of Spondon, near Derby, a silver medal was awarded, it being in the opinion of the Judges, the best implement of the kind they yet had seen: Motion is communicated to the seed-apparatus from the plough-wheel, and the seed is immediately covered by a small light harrow, or roller, according to the kind of seed sown. This plough executed its work neatly, and the drilling apparatus was readily thrown out of gear at the land's end.

**Sub-Pulverizers.**—Under this, or some synonymous title, a variety of implements was exhibited, of greater or less merit. The object of by far the larger number was to effect pulverization, or comminution of the soil below the depth of common ploughing—not the breaking of it up in lumps or masses. In this respect, the makers may be said to have profited by the example set by the many-tined tool of the Hon. M. W. B. Nugent, shewn and rewarded at Bristol, which again appeared, with improvements for its management, from the hand of Mr. Clyburn; but the opportunity did not serve for ascertaining their value, much to the regret of the Judges.

Mr. Carson, of Warminster, produced a sub-pulverizer, on three wheels, having a lever for raising the tines out of the ground at the land's end, or when meeting any formidable obstacle. This machine acted in a manner to elicit warm encomiums. The main frame is disposed in the shape of a right-angled triangle, the fore wheel being placed at the vertex, and the hind wheels at the extremities of the base. The leading and right-hand hind wheels are in a line, and travel in the furrow made by a plough; thus assisting to guide the machine, and to determine in part the depth to which the tines plunge: whilst the left-hand wheel rolls on the land side, and serves to maintain the whole *in equilibrio*. From this arrangement of parts, it is evident that *fair swimming* must result; and it was found that the disposition to pitch and roll, common

to the ordinary swing subsoil-plough — properties which render it difficult to be handled and managed so as to preserve even tolerable uniformity of depth and action in many soils—is entirely overcome.

As respects ease of guidance, this implement worked, under the eye of the Judges, through long spaces without holding, maintaining a straight path and very even depth in the stiff clay operated upon. At the end of a bout, the tines were raised out of the ground and set in again without stopping the horses, and with no greater trouble to the holder than is required by the common plough. The leading wheel is on the castor or Bath-chair principle, and therefore turns with the horses; the hind-wheels can be set to various depths below the frame, in order to regulate its parallelism with the surface.

On first examining this machine in the show-yard, it was feared that the hind-furrow wheel might press too heavily, and flatten the lightened earth; but, on trial, no such effect was perceptible. In fact, some additional weight was requisite to bring that wheel to a bearing; its principal use is for turning and setting in at the land's end. The horses may be yoked in line or abreast, as may seem best to the farmer, according to the state of his land.

It will be understood that there is a second frame, in which the working tines are fixed. This is also of the right-angled triangular shape, and is supported by and under the main frame. The apex of this frame is jointed to one extremity of the lever, having its fulcrum on the beam; the after part or base of the triangle swings upon a rod or centres above the hind-wheels. Thus, by elevating or depressing the lever, the tines fixed in this frame are lowered into the soil or raised out of it, the degree of depression being determined by a stop and holes in an arched guide through which the lever passes. Each tine is separately adjustable. A general resemblance of arrangement between this implement and that of the brakes or scarifiers will be observed; but, on closer examination, it will be acknowledged that no slight originality of design has been grafted by Mr. Carson on a practical acquaintance with the requirements of a subsoil-pulverizer. Five tines, set at different depths, may be used in the furrow, or one only; and it is capable of being employed as a scarifier with ten tines; but the Judges did not see its action in the latter capacity. The moderate price of this implement, stated to be 8*l.*, is also no slight additional recommendation of it to agriculturists. A premium of 10*l.* was awarded to Mr. Carson for this admirable invention.

An excellent many-tined pulverizer and stirrer for lighter operations, was exhibited by the Earl of Ducie, deriving its origin from Mr. Nugent's instrument, and adapted by Mr. John Morton, of Chester Hill, to sub-pulverizing after the common plough, and for stirring the soil between the rows of turnips, &c. This light and easily-managed implement is furnished with one leading wheel. The frame contains eight mortices for narrow tines, and is so disposed that the tines may follow the plough in a nine-inch furrow, and loosen the subsoil, or be set to comprehend a breadth of 18 inches, and pulverize the general mass of upturned soil, or, as aforesaid, work between rows. The Judges observed its action when five tines were set at different depths (all being adjustable), acting in a clay soil, at Rough Heanor, which had fortunately been brought into proper condition to exhibit the pro-

perties, of such a tool. It worked cleverly with a pair of horses, and as it passed along, the soil had the appearance of being thrown into a perfect state of commotion and mixture. The style in which it was turned out of hand did great credit to the maker Mr. Clyburn. The Society's silver medal was awarded for this implement.

*Surface and Subsoil.*—To Mr. John Bruce, of Tiddington, near Stratford-on-Avon, 5*l.* were adjudged for a novel and apparently very useful combination of two subsoil tines with the common wheel-plough. The show-yard contained implements having stirrers upon the plan of the Charlbury subsoil, *i. e.*, affixed to the hinder part or heel of the plough. Mr. Bruce's contrivance is on a different, and it is thought a superior, principle. He applies to the right-hand side of his plough-beam, and about parallel with the point of the share, a frame containing two tines, adjustable as to width and depth, which, by means of a lever brought convenient to the ploughman, can be raised out of work at the land's end, and set in again on the next bout with great readiness. The tines stand off from the beam so as to work to the depth of about 5 inches below the furrow-slice last turned, and thus loosen the soil previously trodden by the horses, leaving the slice also in no inconsiderable state of division. On trial, the action of the tines did not at all appear to derange that of the plough, or throw additional labour on the holder. The Judges have learnt that this combination has been used and much approved by practical farmers in the inventor's neighbourhood.

From observing the effect of this arrangement, it has been suggested to Mr. Bruce, that in certain soils, with the addition of Mason's knives, a very complete disintegration of the surface, as well as the loosening the subsoil, would be effected off the plough at one operation. This is in course of trial. The treble combination may be found to be too complicated for general purposes, but yet very manageable in many soils, and particularly suitable for drill husbandry, which requires a finely comminuted preparation, rather than that the furrow-slices should be packed into masses, as for the broad-cast system.

Neither agriculturists nor their mechanics seem yet to have quite comprehended that the machinery for executing the drill system in perfection should be accommodated expressly to the object in view. The broad-cast system, or sowing after the plough, necessitates the formation of angular-topped, ridged furrows, for the reception of the seed, and the harrow is necessary to cover it. But a strict adherence to these methods is obviously unnecessary for drill-husbandry, as the masses must be broken up and pulverized by some means before the surface be fitted for drillage. The more recent addition of manure to that of seed in drilling also renders a thoroughly pulverized and clean condition of the soil still more important, as the manure must be buried at a greater depth than the seed. The present preparation for the drill consists in pulverizing the ploughed surface by the harrow, which has to tear to pieces the roots of plants, such as rye-grass and timothy; an operation which requires several passages of the harrow. These considerations lead to the suggestion that, by the use of the skim-coulter with the plough, which divides the roots of plants and buries them, together with the application of Mason's knives, and perhaps a pair of vertical dividing blades, a clearer and more perfect pre-

paration of the soil would be obtained for the autumn drilling of ley lands with wheat than by the present system. The good effect of the skim-coulters is well known; it is highly prized and much used in some districts; and the plough furnished with it was proved at Bristol to require no additional power. It was also proved that Mason's knives did not add more than 15 per cent. to the draught of the plough.

The object of the foregoing observations is to engage the implement-makers and agriculturists to consider whether preparative tools may not be devised better calculated to economize and perfect the preparation of land for drill-husbandry than those now employed. Constructive skill has triumphed over the mechanical difficulties of the drill; but it seems to have been forgotten that the previous tillage operations are also susceptible of a special adaptation to the final process; and that, by diminishing the number of operations, and consequently the number of times necessary for horses to travel over and poach the surface, economy and profit will result.

*Water-Furrow, or Boat Plough.*—This implement was not tried in the field, but was known to the Judges as useful in clearing the bottoms and levelling the sides of the furrows in clayey soils; also for forming channels for carrying off flushes of surface-water. It is a cheap tool, principally formed of wood, its section representing the fore-part of a boat, whence its name. The two wings overlap the edges of the furrows, leaving them and the bottoms smoothly rounded and clean; giving an exceedingly neat finish to a newly-sown wheat field. It is the invention of a celebrated agriculturist, Mr. Stiekney, of Ridgemont, in Holderness, where it is highly appreciated. A silver medal was awarded to the maker, Mr. John Caborn, of Denton, Grantlam.

*Stubble-paring or Skim Plough.*—Four implements appeared in the show-yard, responding to the Society's wish for the exhibition of improved stubble-paring ploughs. The Judges had no hesitation in selecting for reward the iron skim in the collection of Mr. Hill, of Brierley Hill Iron-works, near Dudley.

This plough was invented by an amateur, nearly twenty years since, in the neighbourhood of Pauntley in Gloucestershire, and had scarcely travelled out of its native parish until Mr. John Allen Stokes (to whom the Society is already chiefly indebted for disinterring and making known Mason's pulverizing plough), struck by its effective appearance at a blacksmith's shop, ordered one, and introduced it into his own neighbourhood, "where its use," he observes, "has extended more rapidly than any other implement I am acquainted with, excepting Gardener's turnip-cutter." The judges cite this opinion, given in reply to their subsequent inquiries, as the same effective appearance struck them, and induced them to reward it with a medal, though unable to test its qualities on a stubble. This skim cuts a slice of two feet in width, and is adjustable from two to eight inches in depth. It is represented as capable of completing three acres per day, with a team of three or four horses, according to the depth of cut. Mr. Stokes speaks of it as an excellent instrument for preparing the cleansing of stubbles, and it is constructed by Mr. Hill at a very moderate price.

*Draining Ploughs.*—Three forms of plough for economising the labour and cost of drainage, were produced by different machine-makers, without the

stimulus of any prize offered by the Society. Of these there could be no question as to superiority in design and probable effectiveness; and 10*l.* were awarded to Mr. David Ilarkes, of Mere, near Knutsford, for his implement. A partial trial was made of it in the grass-land of the show-yard, the cut being about twelve inches deep and as many wide. The sod was well raised, and thrown to a distance from the excavation in a continuous line; and gave promise of this implement's fulfilling the intentions of its inventor, and becoming a valuable addition, in suitable soils, to the stock of agricultural mechanism in one of its fundamental and most important branches. The acting parts are supported on four wheels, with simple and efficient contrivances for determining the depth of cut, the raising of the excavator from the ditch at the end of a land, and its easy guidance.

*Harrow.*—The Society's offered prize of 10*l.* for the best set of harrows was divided between Mr. Howard, and Messrs. Sanders and Williams, of Bedford. Both these makers produced the implement in so effective a form as to render a judgment as to any decisive superiority extremely difficult without a lengthened practical trial.

Mr. Stratton, of Bristol, exhibited the harrow contrived by Mr. Evan W. David, of Rudyrcourt, rewarded at Bristol, and which is again highly commended for its strength, lightness, and adaptation to general purposes. A harrow constructed on an original principle was produced by Mr. Robert Hopkin, of Hartington, near Ashbourne, Derbyshire, which appeared on trial to be worthy of encouragement, and 5*l.* were awarded to the ingenious inventor. The harrow is circular, like a cart-wheel, and lies flat on the ground, the tines passing through the fellos. A horizontal revolving motion is communicated to it, as it is drawn forwards, by means of an endless chain proceeding from a carriage in advance, and passing round a pulley fixed upon and concentric with, the rim of the harrow, but of smaller diameter. The power is derived from the carriage-wheels, as in other cases. The execution of the apparatus was very imperfectly adapted to give effect to this novel idea, but the principle, perhaps, merits the attention of mechanics, as the double action compounded of the progressive and circular movements appeared to produce a very considerable comminution of the soil. Several circles of teeth may be inserted in the same wheel; and if it be found that the power used in giving the spinning or revolving motion be paid for in the quantity or quality of the effect, this construction might prove advantageous as a surface-pulverizer. The experiment should be made with short small teeth.

Mr. Smith's (of Deanston) chain-brush or web-harrows, rewarded at Liverpool, where exhibited by Messrs. Cottam and Hallen, of London, with a change in the structure of the edge of the rolling-rings, or discs, the latter being notched or serrated instead of plain, and therefore presenting increased abrading surface. The harrow tried was five feet square, covering, therefore, an area of twenty-five square feet, and weighing 392 lbs. This implement is adapted for merely superficial operations, such as covering small grass-seeds, &c., as it rubs or brushes the finest pulverulent soil upon the seed; in addition to which it acts as a light compressor or roller; for, though the direct pressure is only about 16 lbs. per square foot, this weight continues to act through five feet in the space passed over, and

tends to set down the earth upon the seed, which the common harrow cannot effect. It may also prove useful for spreading and pulverizing manure laid upon meadow-land in the winter, and for operations where the teeth of harrows might be injurious or unsuitable. It is right that the Judges should observe that they noticed its action at a time when the clay soil at Rough Heanor was very dry, and in a peculiarly fit state for displaying its good qualities. A silver medal was awarded to Mr. Cottam for his improvement.

A variety of other harrows was offered to the agricultural world, among them a new lever-harrow, by Mr. Joseph C. Grant, of Stamford, and a new revolving and sowing harrow by Mr. Harkes, scarcely yet perfected; the merits of which, [with others of the revolving kind, time did not suffice for ascertaining.

*Scarifiers.*—After a minute examination of the various implements contained in the show-yard under this or other nearly synonymous title, the Judges determined on recommending the Council to appoint a future and more accurate trial than could be then entered upon, of the respective merits of the Uley cultivator exhibited by the Earl of Ducie, and of Biddell's scarifier as improved and exhibited by Messrs. Ransome. Both these powerful implements have received prizes at previous meetings, and are most effective for breaking up and cleaning land after lying long under crop, or infested with couch, &c. The scarifier is, indeed, become little less indispensable to the agriculturist than the plough, and its utmost attainable perfection well deserves the Society's earnest encouragement.\*

Mr. Wm. Abraham, of Barnetby-le-Wold, near Brigg, Lincolnshire, produced an implement invented by Mr. Joseph Miller, for which the silver medal was considered to be due; being a cheap, light, and effective tool for cleaning light soils. It partakes of the nature of Finlayson's harrow and Biddell's scarifier.

*Clod-Crushers.*—Mr. Crosskill's implement remains undisturbed in the opinion of the Judges as the most efficient of its class yet introduced. They would not, however, withhold from Mr. Joseph Hall, of Cambridge, much commendation for the crusher produced by him; but, on trial against Mr. Crosskill's, in the clay of Rough Heanor, well and purposely prepared for testing the qualities of such tools, it appeared to them that the simple, serrated, independent series of wheels composing Mr. Crosskill's implement, effected more perfect pulverization than Mr. Hall's more complicated tool; also, that the latter is less well adapted for rolling young wheat, &c., to which Mr. Crosskill's crusher is so advantageously applied.

A spike-roller or clod-crusher, of excellent workmanship, was exhibited by Mr. Hornsby; but, from some misapprehension, it did not reach the field in time for trial. A rough roll, by the same maker, was tried, and much approved; but its application is limited, as compared with Mr. Crosskill's.

Messrs. R. Garrett and Son, of Saxmundham, brought out an improvement which more expressly

applies to the convenience of the farmer than to the improvement of the clod-crusher; viz., the furnishing it with wheels which are raised from the ground when at work, but remain attached to the implement. The wheels are thus at all times ready for travelling it, instead of their having to be sought for, probably at some distant part of the field, when the work is done.

*Rollers.*—The Judges did not see occasion to award any special prize in this class, though many well-contrived rolls, and of various dimensions and arrangements, were presented. The principal novelties were two implements of wrought iron in the collection of Mr. Hill, of Brierly Hill Iron-Works, near Dudley. The general advantages contemplated by the substitution of wrought for cast iron as the material of rolls, are the obtaining enlarged diameters without increase of weight, and the diminishing the chance of breakage. One of these rolls, formed of two separate cylinders, was furnished with sliding weights, so as to render it heavier or lighter, ranging between 15 and 40 cwt. in order to accommodate it to different purposes. In commending these wrought-iron rolls, which were well manufactured, the Judges are not prepared to pronounce, with any certainty, as to their durability being equal to those composed of cast iron; wrought iron being subject to more rapid decay from oxydation than cast metal, when exposed to the vicissitudes of the seasons. Some experience is desirable to determine this question.

*Couch-rakes.*—The attention of machine-makers was solicited by the Society to the construction of a rake for collecting couch, which had the effect of bringing forward four implements expressly designed for the purpose. The silver medal was awarded to Mr. Stratton, of Bristol, for a tool which appeared to possess the desired qualifications. The raking apparatus consists of two separate rows of long curved teeth fixed upon a shaft or axis, the points of one of which are upon the ground collecting whilst the other row stands vertical and empty. The row of teeth collecting is retained firmly in action by two catches; and when filled, the driver gives half a turn to a handle which liberates the catches, when the rakes instantly make half a revolution, the one set discharging its load whilst the other set comes into play. The machine is mounted on three wheels, is calculated to be worked by one horse, and the inventor estimates its capabilities at raking from twenty to thirty acres per day. The Judges were unable to experiment with this new implement on couch land, but are disposed to consider the principle sound, and likely to be efficient in the collection of hay, corn, and stubble, as well as couch. It is also proper to mention that it is designed, on a stronger construction, to collect cane trash in the plantations, for which it was originally contrived, and has been found, in the island of Antigua, to be well adapted.

*Drills.*—The existing system of drill-husbandry, practically considered, has an origin intrinsically English, though faint traces of its use are mentioned as of high antiquity. It will not be thought an undue tribute of praise to the English agricultural mechanics, to notice that the implements employed are also of purely English invention; neither the mechanic nor the agriculturist has been indebted to any other portion of the British empire, or to the foreigner, for any improvement in the art itself, or in the machinery by which it is accomplished. To the drilling of seed has been added, within the last

\* These implements were, with the consent of the makers, subsequently placed in the hands of Mr. Jaques, of Easby Hall, near Richmond, Yorkshire, who has undertaken the task of reporting to the Council his opinion of their respective properties.

few years, the drilling of manures, a process also purely English, and which can scarcely be ranked as secondary in importance even to that of the mechanical deposition of seed. If the annual collection of mechanism sent to the Society's country meetings afford any evidence of the demand for particular implements, or of the progress made in distinct branches of husbandry, then we may with confidence deduce that the drill system is advancing with rapid strides. More than sixty implements, expressly designed and employed for the deposition of seed and manure conjointly or separately, called for the examination of the Judges on the present occasion. If to these be added the horse-hoes and other tools auxiliary to the system, it results that one-third of the articles in the tillage and cultivating departments of the exhibition consisted of drilling machinery; and if the ploughs common both to the broadcast and drill systems be excepted from the summary, more than one-half of the remainder was specially subservient to the preparation of the soil for drilled crops, or to their after treatment. The contemplation of such a display cannot but have been gratifying to the members of the Society, including as it did an adaptation of the drill to almost every species of grain and seed crop, and justifying the encouragement extended by the Society to this pre-eminently important division of the agricultural art.

By referring to the analysis of the exhibition, it appears that, of the 61 implements denominated drills and pressers, two-thirds of them combined the deposition of manure with that of seed; thereby testifying to the fast increasing appreciation of the value of these united processes both by agriculturists and mechanics. The following concise history of the first introduction and progress of the manuring drill-system in Lincolnshire\* has been obtained from sources on which it is believed full reliance may be placed; and its relation may have the effect of exciting the farmers of more backward districts to emulate those of a county excelled by none in Britain, in respect of the quantity of its produce, though far inferior to many in the natural fertility of its soil and character of its climate.

"The introduction of manure drills into Lincolnshire is comparatively of recent date. Previously to 1814, small single-row drills, attached to the plough for depositing beans in every alternate furrow, and turnip-seed drills, were the only seed-sowing machines used in the county. In 1814, the firm of Seaman and Hornsby, of Grantham, made a drill for depositing bones with turnip seed. In 1816, Mr. Gregory, of Nottingham, brought a sample of crushed bones to Grantham market, in a mahogany box, to exhibit to the farmers the perfection he had attained in reducing them to a small size. In the same year several spirited farmers purchased drills for bones. In 1817 these drills became general. In 1819 portable bone-mills were first introduced: these flourished but a short period, giving place to the large fixed steam-mills. In 1828, we first began to drill ashes mixed with bones. In 1839 originated the first attempt to improve the delivery of manure by means of stirrers in the drill-box; and by these improved machines the drilling of compost was effected. At present, 1843, we pre-

sume to be able to deposit by the drill, fold and stable-yard muck with our seed. For the rapid adaptation of the drill to this latter purpose we feel to be much indebted to the stimulus given to our mechanics by the Society. Neither Jethro Tull, the honoured father of the drill system, nor the Rev. Mr. Cooke, the inventor of the Suffolk drill, dreamed of depositing manure of any kind with the seed; an addition which we consider to belong to the eastern counties' farmers, ambitious only at first to economise their then favourite manure, the bone."

The Society's prize of £30 was awarded to Messrs. R. Garrett and Son, of Saxmundham, for their drill for general purposes. A mode of steering was applied to this implement, which was thought to be calculated to render its use less difficult to novices, and to ensure straightness in the lines. Facility in the guidance and management of these implements is a property of unquestionable importance, as providing for the more complete and safe action of the horse-hoe. It may not, however, be out of place to observe that experienced drill men reject refined appliances of this kind as incumbrances. The late Earl of Leicester is said to have remarked that "he would not employ a labourer who could not lead a drill-horse straight from Holkham to St. Paul's."

To Mr. Richard Hornsby, of Spittlegate, Grantham, £10 were adjudged for a twelve-coulter corn and manure drill for general purposes, which bore ample evidence of the care and skill bestowed by him in the construction of this class of machines.

Both the above mentioned drills were provided with well contrived apparatus for dropping seed and manure at intervals, should the agriculturist prefer that method to their deposition in continuous trains.

The silver medal was awarded to Mr. Hornsby, for a thirty-coulter drill, effecting the deposition of clover and grass-seeds, either separately or mixed, in rows three inches apart. This excellent implement facilitates an extension of the drill system, and does much credit to the inventor.

A third implement by the same maker was considered to be equally, if not still more deserving of encouragement and approbation: viz., a cart with drills attached for both ridge and flat culture, adapted for sowing from two to four rows of turnip seed and bones, or other pulverized manure. This is another and important step made towards the perfection of the drill system, by accelerating the operation and diminishing labour in the field. The silver medal was given to Mr. Hornsby for this original combination of drills with the manure-cart.

To Mr. Thomas Hunter, of Ulceby, near Barrow-on-Humber, Lincolnshire, £5 were awarded for an excellent ridge turnip and manure drill, the invention of Mr. Cartwright. Without the aid of diagrams it would be next to useless to attempt to convey a distinct idea of the particular mechanism adopted by the different makers for discharging manure and ensuring uniformity in its deposition. A safe and perfect judgment of mechanical sufficiency, or of the superiority of one method over another, can, in fact, scarcely be arrived at without a patient trial. That a considerable advance had been made during the past year in the manuring faculty of the drill was manifest in most of the machines exhibited; and the Judges were disposed to estimate very highly the arrangements of Mr. Hunter's simple apparatus, which he represented to be quite effective for drilling putrescent manure; yet they did not

\* The Judges have set on foot inquiries relative to the origin of manure drills in the south-eastern counties, but have not yet succeeded in establishing the historical dates to their satisfaction.

feel so satisfied of its powers as to award to him the highest prize, which they might otherwise have done, though his drill was limited to turnip culture. They now think it their duty to report that, since the meeting, one of their number has carefully tried this drill, and found it perfectly capable of depositing well chopped fold-yard manure mixed with soil, without the aid of the riddle, and with as much regularity and precision as has been hitherto effected with dry bones, ashes, or compost. He is also of opinion that, with this drill, moisture not being an impediment, ashes are unnecessary as assisting in bringing compost to the drilling state; and further, that all that is required for the preparation of fold-yard or stable muck is, that it should have a certain degree of fineness so as to admit of its being covered by soil when deposited. He is satisfied that Mr. Hunter's drill is capable of uttering any required quantity of such manure, and of passing lumps, without obstruction, even of five inches diameter.

Mr. John Caborn, of Denton, Grantham—the whole of whose collection showed an acquaintance with sound mechanical principles as adapted to agriculture—produced a well-contrived convertible corn and turnip drill, more especially remarkable for its possessing a peculiarly simple and efficient manure stirrer. It was rewarded with the silver medal. The axis of this stirrer, instead of being straight, and having tines, forks, or otherwise formed limbs projecting from it, in order to agitate the manure and prevent its arching in the box, is fashioned of a continuous serpentine figure from end to end of the box. The simple change of figure adopted by Mr. Caborn is no inconsiderable improvement in the mechanism applied to effect manure delivery.

A premium of £5 was awarded to Mr. James Smyth, of Peasehall, near Yoxford, for the adaptation of a nine-coulter corn drill to sowing hilly land. The purpose of the inventor is simply and ingeniously managed, as will be understood in few words by stating that the seed-box and delivering-cups are always maintained in a horizontal position whilst crossing a hill; so that, whether in going or returning, the seed is prevented from shifting to one end of the box. This is accomplished by suspending the box on levers, and giving motion to the cup-axis by wheelwork at both ends; so that on raising either end of the box by the lever, in order to adjust it to a level line, one set of wheels is out of gear, whilst the other set gives rotation to the axis and effects the delivery of the seed. In other respects, too, the arrangements of this machine did much credit to Mr. Smyth.

Mr. Crosskill's grass land cultivator and manure depositor, rewarded at Bristol, was again considered, by reason of its utility and the subsequent improvements made in it, to merit a silver medal.

Mr. Huckvale's liquid manure drill, mentioned in the Bristol report, and rewarded at that meeting, was produced in a more finished and effective state. There can be no question as to this machine now possessing the requisite qualifications for applying any liquid dressing, and in any desired quantity, to plants in rows. The barrel of the one exhibited held 100 gallons, dimensions which may be increased. The inventor recommends it as a convenient mode of distributing soluble or miscible manures, as saltpetre and guano, which may be deposited below the seed; or as a surface-watering machine in a dry seed-time. The fluid is delivered by cups, or small scope-wheels, which revolve in a water-tight trough

supplied from the cask or cistern. The quantity of fluid taken in and delivered by these scope-wheels is regulated by a metallic shroud or band, which passes over their face, and is adjustable so as to increase or diminish the size of the apertures. For dressing grass land this machine has the advantage over common liquid manure carts of depositing it with perfect uniformity throughout the space passed over, as the discharging-wheels revolve a definite number of times in a given distance, at whatever pace the horse may be travelling. The silver medal was adjudged to Mr. Huckvale for his perseverance and ingenuity in adapting this novel idea to practical uses.

A seed hand-barrow was exhibited by Mr. James Smyth, jun., of Peasehall, for the more accurate sowing of small seeds by machinery than can be done by hand-scattering. The seed-box covers a considerable breadth at once; and precision of delivery is secured by cups, instead of brushes, which are the more usual but less exact mechanical means used for meting out small seeds by the drill. The revolution of the cup-axis is derived by toothed gearing from the barrow-wheel. The arrangement is highly creditable to Mr. Smyth; and, by reason of its lightness, cheapness and efficiency, this sowing-machine will prove useful to the small farmer.

*Drill-Pressers.*—Ten machines for forming drills by pressure were brought forward by various makers, the greater number of them bearing the stamp of improvement, particularly as adapted to the deposition of seed and manure. After a careful examination, the Society's prize of 10*l.* was awarded to Mr. John Caborn, of Denton, Grantham, for a two-row implement, having wheels 3 feet 8 inches in diameter, and comprising very effective arrangements for depositing the manure in the trenches. The price of this machine is also moderate.

*Dibblers.*—The collection of the Earl of Ducie contained the dibbling and sowing machine with five wheels, invented by James Wilmot, rewarded at Liverpool, and described in that report. No improvement was observed on the original specimen, but the machine was reported as gradually coming into use.

Mr. Stratton, of Bristol, exhibited the single-row dibbling wheel used by Mr. Miles, M.P., of Kingsweston, chiefly for forming the holes to receive the seed of mangold-wurzel. It is a tool of the simplest kind, gives mathematical precision to the spaces desired between the plants, and is represented by Mr. Miles as leaving the holes quite sufficiently true and clear for the purpose. It consists of a light wheel, furnished on the rim with dibbling points, set at equal distances from each other, and making holes 2 inches in depth. The wheel is comprised in a frame, and worked by a man.

Messrs. Cottam and Hallen, of London, produced a two-row dibbler, with wheels 3 feet in diameter, the principle of which is precisely similar to that last mentioned, but rendered adaptable to a greater number of purposes. The machine is entirely constructed of light iron. The dibble points are adjustable to any distance from each other; and the wheels can be set at any space asunder from 4 to 36 inches. A man can work it on light soils, and it has a pair of shafts for a pony on stiffer lands. A premium of 2*l.* was adjudged to Messrs. Cottam and Hallen for this well devised implement.

*Horse-Hoes.*—The well-known horse-hoe of Messrs. R. Garrett and Son, rewarded both at Liverpool and Bristol, was exhibited with improve-

ments, rendering it still more complete in its fittings and adaptation to follow the drill in the various forms of culture to which the latter implement is applied. The silver medal was awarded for these improvements.

A silver medal was also given to Mr. Joseph C. Grant, of Stamford, for his new patent steerage-lever horse-hoe, which appeared to possess the requisite properties for cleaning drilled crops. It is provided with a very manageable and efficient steerage, and a lever power for instantly and readily raising the hoes from the ground.

For hoeing and scuffling between rows of turnips, potatoes, &c., the show-yard abounded with implements, most of them well known, and constructed, with more or less skill, in most parts of the Kingdom. A premium of 3*l.* was given to Mr. Joseph Scurrell, of Crakehall, near Bedale, Yorkshire, for a turnip and potato horse-hoe, having a small but effective lever-rake attached to it, which collects the weeds as they are hoed down, and prevents them from growing again. The rake is in an instant freed of its collection by the action of the lever. It is a cheap and good implement.

Some remarkably well-made tools of the scuffling kind were also exhibited by Mr. William Wood, of Knutsford, Cheshire.

*Haymaking Machines.*—Mr. Wedlake, of Hornchurch, produced a spreading or tedding machine, for which the silver medal was adjudged, as being the most complete of its kind yet exhibited. It has two separate cylinders, with a ready means of reversing their motion, so as to scatter the grass in the usual way or leave it behind in rolls, on the plan of Mr. Lovell's machine, rewarded at Bristol. This faculty of reversing the motion is an advantage, as the wet heavy grass of the swath requires tossing and spreading evenly; whereas, as it approaches in dryness to the state of hay, the more quiet action of turning it is considered to be preferable, less seed being shaken out. The judges, however, have ascertained, from several farmers using and highly approving these machines, that there is still room for improvement in them. The journals are not yet sufficiently secured against clogging, and time is lost in freeing them from grass. An extensive and experienced hay-grower observes that, with one horse and changing the horse every three or four hours, Mr. Wedlake's machine will strew more than two acres of newly mown heavy grass per hour, in a manner far superior to the hand; and that he considers its performance fully equal to the work of twenty haymakers. There is no harvesting machine yet introduced which economises labour to such an extent, or tends to save a crop so surely, as the mechanical haymaker; and it is very desirable that the manufacturers should use every exertion to remedy such defects as may abridge the utility of so valuable an implement.

*Horse-Rakes.*—Several horse hay-rakes were exhibited, but the judges adhere to the opinion formerly expressed, that none of them excel the patent rake of Mr. Joseph C. Grant, of Stamford, rewarded at Liverpool and Bristol, which was again produced by him, with improvements tending to secure its more perfect action, durability, and convenient management.

*Horse-Engines.*—The horse-engine, or horse-work, as this machine is more commonly but incorrectly named, has become—where steam is not used—indispensable as a prime mover of barn-machinery, more particularly as applied to threshing-

machines and chaff-cutters. For these and other purposes it is extensively and economically used, whether fixed or as travelling from farm to farm on hire. The judges have to notice the production of two novelties in this class by Messrs. Ransome. The first was an arrangement of the travelling engine, which obviates the necessity of unloading it from the carriage or removing the wheels. By these means, too, the main shaft, which communicates the power to the object, is kept above the horses' backs, so that they pass under instead of having to step over the shaft, as on the common plan. The second had a more important purpose in view; viz., the establishing a kind of intermediate mechanism, planted between the engine and the objects to be set in motion, from which (without disturbing the engine or any machine applied to it) any other machine may be driven, and at any part of the barn which may be most convenient for its use. It would occupy too much space to attempt to describe this arrangement; nor could it be done justice to without drawings. Suffice it to say that the purpose was accomplished in a simple and satisfactory manner. This contrivance for diverging power in various directions will be found useful where it is desirable to put in motion several machines at the same time by the same horse-engine, provided no one of them requires a greater force than one horse: thus, the chaff-cutter, the turnip-cutter, and the domestic flour-mill, or a pump, &c., may be driven together or separately. There is certainly no part of the farmer's establishment which more commonly needs a thorough revision than that devoted to his barn operations. It is too often formed without plan; is too often devoid of systematic arrangement; and seems rather to resemble an incongruous mixture of things of no value, than of mechanism, in the disposition of which space and method should be considered as elements of the first consequence. As an appliance to palliate existing defects of this nature, and as the germ of a superior system of mechanical arrangement in barns, Messrs. Ransome's contrivance merits the highest commendation.

*Steam-Engines.*—The truth of the last remarks will receive the acknowledgment of all those agriculturists who have applied or desire to substitute fixed steam-engines for manual or horse-power, as the prime mover of their barn machinery. Then it is that the disadvantage of crippled space and previously bad arrangements becomes prominently apparent, from the difficulty of connecting the power with the machines, in such manner as to unite economy of outlay with convenience as respects the fold and stack yards. These are points especially deserving of study by persons erecting new farm buildings.

The show-yard contained six well-constructed steam-engines, three of which were of the travelling kind; and two of these were set to work at Mr. White's, of Rough Heanor. A premium of 10*l.* was awarded to each of the exhibitors—Mr. William Cambridge, of Market Lavington, Wilts; and Mr. Alexander Dean, of Birmingham. The judges cannot presume to pronounce an opinion as to the comparative merits of these engines, to determine which would require a longer and much more severe trial than they were able to submit them to. Both appeared to possess the qualifications necessary for good working and safety.

It will be in the recollection of the Society that the first portable steam-engine which appeared at

any of their meetings (and, it is believed, the first of the kind introduced to the notice of the agricultural world) was that exhibited at Liverpool, in 1841, by Messrs. Ransome; of the performance of which, during a short period, a separate report was made. This engine, on the disc-principle, was afterwards converted into a locomotive, and again tried at the Bristol meeting, in conjunction with a travelling engine by Mr. Cambridge, and both received premiums. The judges may now report that the manufacture and use of travelling steam-engines is become a systematised business. In Lincolnshire, steam-engines both fixed and portable are becoming general on large farms. They are also let on hire. The charge made for threshing is necessarily dependent on the quantity of grain capable of being threshed out in a given time, and whether the straw has been reaped or mown; also, in some degree, on the amount of work to be done. It will be useful to the members of the Society to be informed that the hire of engines for wheat and barley threshing varies between 1s. and 1s. 3d. per quarter, including the wages of the engineer and the feeder of the machine; the farmer usually finding coal and the assistant hands. The travelling steam-engine is also employed to give motion to draining and other apparatus, which may only require to be put into occasional activity. Incidentally to this subject it may be of consequence to observe that the judges have ascertained that the Yorkshire Fire Office will insure at 3 per cent. where these engines are used; their usual charge being 2 per cent. It is believed that other offices effect assurances at the same rate. It is the opinion of the judges, from the attention they have given to the furnace and boiler arrangements of these engines, that little or no danger is to be apprehended from their use; and that, by proper representation and inspection, all the fire-offices would speedily release the farmer from a tax which bears heavily upon him and the machine-maker. At the same time it behoves the employer to satisfy himself that the engineer adopts the best known precautions against the issue of sparks or flame. Coke is a better and safer fuel for these engines than coal; it is also cheaper wherever it can be procured at only one-fourth higher price than coal, weight for weight.

*Thrashing Machines.*—Two of these machines were elected for trial, and taken out to Mr. White's farm. One of them, constructed by Mr. Cambridge, was driven by his own travelling steam-engine, exerting probably at the time a power of about three horses. The performance of both threshing-machine and engine was satisfactory to the judges and creditable to their maker. It will not be expected that the judges can assign the cost of threshing by steam from such short experiments as they are able at any time to superintend. The yield is so dependent on the condition and quality of the straw and corn to be threshed, that no rule of produce can be safely quoted in terms of the power and time expended. The average rate of hire, which includes that of the threshing machine, has been already cited; to which will have to be added the cost of fuel, a variable but small item per quarter, and that of the assistant hands. On obtaining these facts from the makers, the farmer will be able to determine the economy of steam-threshing in his own locality, compared with the flail or the horse-engine.

A wheat threshing-machine, by Messrs. Ransome, was distinguished by some novelties which deserve notice. It was driven by the horse-engine previously

referred to as having the connecting shaft over head. Its chief characteristics consist in an arrangement of the beaters, so that they are fed with the straw and ears in a horizontal instead of a vertical direction, by which means the straw is delivered flat, straight, and unbroken. Thus, the straw, after being threshed, issues in a state ready for immediate tying up. The machine is also furnished with a contrivance for conveying and shaking the straw. The judges cannot but highly commend Messrs. Ransome's efforts and ingenuity in perfecting a species of threshing-machine more particularly coveted by farmers residing near large towns, to whom the production of clean unbroken straw is frequently an object of more importance than the threshing out the greatest possible quantity of grain in a given time.

*Corn Cleaners.*—The collection of these machines was larger than at any previous meeting, but the judges take occasion to remark that some of them bore rather the external appearance and polish of cabinet-work, or articles of household furniture, than of serviceable barn tools. Good workmanship is as important to the efficiency of the light winnowing machine as it is to the sturdy horse or steam engine; but there cannot be worse taste in mechanism than the overloading it with finery. The good sense of farmers is pretty sure to cause them to leave such things in their makers' hands rather than to transfer them to their barns. Many excellent implements of this nature were, however, exhibited; and, after trial, a premium of 5*l.* was awarded to Mr. Bryan Millington, of Asgarby, near Sleaford, for a machine which united simplicity of construction with usefulness. Its distinguishing advantage consisted in the first operation termed chaffing, which it effected with great celerity, producing a clean sample of corn.

A silver medal was given to Mr. John Newham, of Kegworth, Leicestershire, for his double-blast winnowing-machine with stamped riddles. Both these adaptations are mechanically good, and do credit to the constructor.

Mr. John Caborn, of Denton, Grantham, also exhibited a double-blast winnowing-machine, exceedingly well got up.

Mr. Joshua Cooch, of Harlestone, near Northampton, produced a superior barley-hummeller connected with a winnowing-machine, and supplying itself by an elevator. It is a matter of surprise that this well known and useful auxiliary, the elevator, is not more frequently applied to barn work. The power required by it is a mere bagatelle, scarcely indeed appreciable by the man, and it saves much severe labour. A premium of 3*l.* was awarded to Mr. Cooch for this useful combination.

*Crushing and Splitting Mills.*—Two prizes were adjudged in this class, after a minute examination of the numerous specimens exhibited, and the trial of many of them. A premium of 5*l.* was awarded to Mr. James Spencer, of Hopton, near Wirksworth, Derbyshire, for his oat and bean mill; and the silver medal to the Earl of Ducie, for a crusher invented by Mr. Richard Clyburn. The first was a remarkably well constructed and effective machine, on the horizontal fluted-roller principle. Mr. Clyburn's implement consists of two rollers of different diameters, having a series of vertical grooves turned in each of the form of a V, and working into each other. By reason of the difference in velocity given to these rollers, a bruising action takes place, and any species of grain is reduced to the desired state of fineness, which can be regulated by approaching or withdrawing the rollers from each other. It is an excellent machine.

*Cake Crushers.*—A premium of 5*l.* was awarded to Mr. Richard Hornshy, of Grantham, for his conical-pointed, case-hardened, toothed crusher, which had every appearance of being as durable as it proved to be effective on trial.

*Chaff-Cutters.*—This universally-used implement was produced of all dimensions and powers, whether suitable to the purposes of the smallest stable or the largest farm. A prize of 3*l.* was awarded to Mr. James Smith of Gloucester, for a chaff-cutter of medium size, power, and price; which possessed, in the opinion of the judges, very good provision against choking in the feed, as well as the means of regulating the length of cut to great nicety. The same maker also exhibited a combined corn-crusher and chaff-cutter, commendable to those who may prefer one machine to two separate ones.

The powerful chaff-cutters exhibited by the Earl of Ducie and Messrs. Ransome (both of which had undergone considerable improvements since the Bristol meeting) were selected for trial at Mr. White's farm. The former was driven by Mr. Dean's travelling steam-engine, presumed to be exerting a power of from two to three horses; under which circumstances the spiral knife-barrel made about 500 revolutions per minute, and cut at the rate of about 228 bushels of wheat-straw chaff per hour. Messrs. Ransome's machine was worked by their horse-engine with two horses, the knife-wheel making about 250 revolutions per minute, and cutting at the rate of about 112 bushels per hour. No very nice judgment can, however, be formed of the expenditure of power for the work done when two different agents are employed, as the horse and steam; but it was safe to conclude that Lord Ducie's implement required the least force for equal effect, and was capable of sustaining the velocity given to it without derangement or danger. The spiral knives are also very readily sharpened without removing them from the barrel, and require no fresh adjustments, which are no slight recommendations of the implement. For these reasons the Society's prize of 10*l.* was awarded to the Earl of Ducie.

Messrs. Ransome's machine, which had received valuable improvements (patented by Mr. Charles May, one of their firm), by which its durability is increased, the feeding improved, and the cut rendered cleaner and more effective, merits high commendation and confidence in its use as the best plain knife chaff-cutter yet exhibited.

*Corn and Meal Mills.*—A large assortment of domestic hand-mills was exhibited by Mr. Alexander Dean, of Birmingham, the grinding parts of which were composed of metallic, French-burr, and grey-stone materials. Mr. Dean's attention to this subject and his good workmanship deserve the encouragement of agriculturists. Several of his mills were applied to the force of small steam-engines as well as horse-power. The judges were unable to determine between the respective merits of Mr. Dean's metallic and French-burr mills, and of a metallic mill recently invented by Mr. Luke Herbert, of Dover, exhibited by Messrs. Ransome and other manufacturers. Mr. Graburn has undertaken, at the request of the Council, to submit a specimen of these mills to a lengthened trial in his household, and to report on their respective qualities and performance.

*Corn Weighers and Meters.*—The silver medal was adjudged to the Earl of Ducie for a self-registering corn-meter invented by Mr. Richard Clyburn. This is a well-contrived and useful instrument, and will be appreciated by feeders of stock,

&c., as conducing to exactness of measure, diminishing the chance of robbery, and obviating mistakes of count, as the quantity abstracted from the granary must pass through the machine and be registered on the dials; which are calculated to denote 80 bushels, in measures of a quarter of a peck each.

A simple corn-weighing machine was exhibited and invented by Mr. Colville, M.P., but as it was not furnished with a self-registering apparatus, its utility is bounded as compared with the foregoing. Nevertheless, when it is wished to give small determinate weights of grain to animals, in preference to measure, and without regard to a mechanical record of them, this little instrument will be found to answer the purpose.

*Turnip Cutters.*—A number of these implements appeared in the show-yard, the best of which seemed to partake more or less of the well-known principle introduced by Mr. Gardener. A prize of 2*l.* was awarded to Mr. Thomas Wedlake, of Hornchurch, for a machine provided with extremely simple means for cutting two sizes of slice for beasts and sheep, which is effected by reversing the motion of the cutting cylinder, and turning over a plate in the feed-box, which directs the roots to one or other side so as to subject them to the action of the different knives fixed on the cylinder.

*Root Graters.*—Two machines were exhibited for grating turnips and other bulbous roots to a pulp or very small particles, by Mr. E. Moody, of Maiden Bradley, Wilts, and Mr. John Green, jun., of Newtown, Worcester. It is urged by these gentlemen that there is considerable economy in so reducing mangold-wurzel, carrots, and turnips, as to mix them more intimately with hay, chaff and straw; they assert that cattle eat the mixture more greedily, and thrive better on it, than when the roots are given separately with the chaff. As the parties were not present, the Judges did not try these implements. They may observe that the practice of grating roots, rather than slicing them, is said to obtain very much in the United States.

*Cider Mill.*—The silver medal was awarded to Mr. Alexander Dean, of Birmingham, for a new cider-mill manufactured by him, and invented by Mr. James Ashwid, of Brefforton, Worcestershire. This implement is in fact a crusher or squeezer, being furnished with a piston worked horizontally in a substantial wooden box, from which the apples are discharged in the state of pulp. Mr. Ashwid describes its mode of use and effects as follows:—“I drive it by a one or two horse power used for chaff-cutting, &c., and place it as near the cellar as convenient. It requires two women—one to carry fruit from the heap and throw into the hopper, the other to regulate the feeding with her hands; two men to remove the pulp and press it through hair-cloths, the same as with the old mills; and one man to carry and tun the cider. The quantity of fruit it is capable of reducing varies, according to its ripeness, from 300 to 400 bushels per day, and produces from 800 to 1000 gallons of juice. Several of my neighbours have already bespoken the use of my mill for the present year, who have seen the efficiency of its work and the superior way in which the cider keeps from it. I also tried it last winter for pulping turnips and potatoes for pig-feeding, and found it most economical. The juice is not squeezed out by it, but the pulp is beaten up to about the consistence of paste, which I mix with barley or bean meal, and find the pigs feed much faster than when mixed with water.”

This new machine was very well got up by Mr. Dean, and accommodated to manual as well as animal or steam power. It has been represented to the Judges that the *grating* of apples is much preferred in America for cider-making to the old rolling mill; the saccharine matter being much better evolved by grating, and the pips in great measure reduced. This may be worth the attention of cider-mill manufacturers.

*Potato Washers.*—Mr. Crosskill produced a machine for washing and raising potatoes out of the water, which was deemed to be the best in the exhibition.

*Steaming Apparatus.*—The Society had called attention to improved steamers for roots. Five sets were exhibited: after examining which a premium of 5*l.* was awarded to Mr. James Richmond, of Salford, for a very complete apparatus, particularly in its fittings, as regards safety, the supply of water, &c. In respect of cost it is moderate.

*Feeding Apparatus.*—The silver medal was adjudged to Mr. Hill, of Brierley Hill Iron Works, for his very excellent iron cow-cribs and sheep-cribs on wheels. His collection also contained numerous other articles of a similar description, which deserve the highest commendation as regards moderate price, lightness, strength, and good workmanship.

A fodder-preserver, more particularly applicable to bark, was exhibited by Mr. James Moorcroft, of Bratley, near Burton-on-Trent, which deserves commendation on account of its neat arrangement, substantial structure, and cheapness.

*Weighing Machines.*—Mr. H. G. James, Great Tower Street, London, produced two weighing-machines invented by M. George, of Paris; which, on account of the correctness of their principle, were considered to merit the Society's encouragement, and a premium of 10*l.* was awarded for them. It would require more space than can be devoted to this subject to explain the causes of error incident to all weighing-machines hitherto made, and from which Mr. James's are free. The principle is mathematically correct, and mechanically carried out; as is proved by placing the object to be weighed on any part of the scale-board, when it will be found to be balanced by the same weight. Scale-boards of the largest dimension may be used: and it is hoped that by means of this invention agriculturists will be induced to ascertain the relative value of varieties of food in the fattening of cattle, by frequently placing them on the weighing-machine; which will indicate the weight of the largest ox, or loaded cart, with as much accuracy as the sack of corn, or still lighter objects.

*Fire and Garden Engines.*—A number of these eminently useful machines were exhibited. To one hand-engine in particular, invented by Mr. J. Read, Regent Circus, Piccadilly, London, the Judges desire to invite attention, as uniting convenience as respects the garden, with very considerable power in case of fire in dwelling, out-houses, &c. With four men it will discharge 20 gallons of water per minute, to a distance of 60 feet; a quantity which may often serve to arrest an incipient fire. The valves are solid and spherical, and may be pronounced as at all times in order for use, so little liable are such valves to get out of repair. It is very light, is moved on two good-sized wheels, and will pass through ordinary doorways. By an arrangement of the levers it is

readily reduced to the power of a single man and adapted to horticultural use.

A very powerful pump was applied to Mr. Dean's travelling steam-engine; a combination which may often be found extremely useful for emptying ponds, draining, irrigating, &c., as well as a fire-extinguisher.

*Ricks.*—The silver medal was given to Mr. John Gillett, of Brailes, near Shipston-on-Stour, for a valuable and cheap little tool termed a rick-ventilator. The very simple idea of boring a hole perpendicularly into an overheating hay-rick or barley-stack, has been ingeniously carried into practice by the inventor. The contrivance consists of a kind of auger, which opens its road with a screwed point, and withdraws a core of hay, &c., leaving a circular hole of seven inches in diameter. By repeating this operation a hole is quickly pierced to nearly the bottom, but not quite through the rick. The judges have been informed that the holes thus made remain firm and open, and that the anticipations indulged in the show-yard of the effectiveness of the invention have been fully verified in practice.

A silver medal was also awarded to Mr. George Parsons, of West Lambrook, Somerset, for a mode of raising and depressing a roof over a rick. The roof is constructed of light timber on the truss principle, and covered with some species of impermeable cloth. The rick is made around a post or pillar, having a coarse threaded screw of cast-iron fixed upon it. The centre of the roof is furnished with a nut, so that by turning the roof round it ascends or descends upon the pillar. Much constructive ingenuity was evinced by the author of this contrivance, which is superior in many respects to the common Dutch barn, though it may be found too costly as a fixture in stack-yards.

The Society's offered prize of 20*l.* for the best and cheapest stack-covering, was not adjudged.

*Field-sundries.*—Extensive assortments of iron-fencing, gates, seats, &c., were exhibited. The silver medal was well merited by Mr. Hill, of Brierley Hill Iron Works, near Dudley, for his wrought-iron farmer's field gates with cast-iron posts, manufactured and sold by him at the low price of 28*s.* These were selected as more especially deserving the notice of agriculturists (in addition to the cow and sheep cribs before mentioned) on account of their remarkable lightness and stiffness, which give assurance of durability. Many other field articles by the same maker, such as hurdles, deer and cattle fencing, &c., were constructed with equal attention to strength and moderate cost.

A silver medal was awarded to Mr. C. R. Colville, M.P., of Lullington, near Burton-on-Trent, for his invention of a useful wrought-iron wheelbarrow, arranged with a furnace and melting-pot, to transport gas-tar for paying over palings, &c.

Mr. Joseph Hall, of Cambridge, produced a new tool, called a weed and bush extractor, which is an ingenious combination of the lever with a gripper for drawing out tap-rooted weeds, or stocking up fences. The implement is handy in use, and adapted both in strength and price to the object for which it may be required. The silver medal was given to Mr. Hall for this invention.

*Waggons, Carts, &c.*—Four premiums were adjudged to exhibitors in this department, and though the show-yard contained specimens of vehicles which had partaken but little of modern improve-

ment, no previous exhibition approached the present either in the variety or excellence of many of the carriages adapted to the numerous uses of the agriculturist. Amongst the builders of these implements Mr. Richard Stratton, of Bristol, shines conspicuously.

To him the Society's prize of 20*l.* was awarded for his spring-waggon on the equisetal cross-lock principle, referred to in the Bristol report. On the present occasion it was improved in its details, mounted on springs, and furnished with Thatcher's breaks. It will be understood that the fore-wheels are of the same size as the hind ones, which must considerably diminish the draught. It had a pole, driving-seat, foot-board, and patent axles. Mr. Stratton estimates the saving in draught arising from springs as equal to 30 or 35 per cent., in which opinion he is borne out by well-known experiments. This waggon turns in a sufficiently small space; and the adapting such a carriage to the general purposes of road and field does the highest credit to Mr. Stratton as a builder and mechanic. In price it did not exceed that attached to several ancient clumsy waggons exhibited.

The same maker also produced a variety of other waggons, as well as single-horse carts on springs, applicable to general or more special uses; and the judges have to notice with high commendation a market and family cart on springs, the arrangements and finish of which were of the first style of workmanship. The observation, however, may be made, that some small deduction from the comforts of this vehicle may be advisedly spared in order to reduce it safely below the duty price.

The silver medal was adjudged to Mr. Stratton for a low manure tipping-cart, with a liquid manure cistern body to fit. This cart combines a number of excellent properties. The cranked axles so reduce the height of the cart-chest from the ground as greatly to diminish the labour of filling. The chest tips upon the line of the axles, which is the only true place for effecting that operation; and it is retained in place by a spring-catch, or adjusted to any angle for discharging, in the simplest and safest manner. The liquid manure body is five feet long, by three feet three inches wide, and 20 inches deep, containing about 160 gallons, or about 15 cwt.; which, with the weight of the body, pump, &c., brings the whole to about 23 cwt., and therefore within the power of a single horse. The removal of one body and affixing the other is performed with the greatest ease by one man. This adaptation of solid and liquid manure bodies to the same wheels, axles, and shafts, is strongly recommended to the attention of agriculturists.

Mr. Daniel Coombes, of Shipton, near Burford, Oxon, introduced a novelty, by rendering two single-horse carts convertible into a waggon, so that the purchaser of the former may have a waggon at his disposal, as his preference may dictate. The combination or separation of these carts is accomplished very quickly, and by simple means; and it was considered that the inventor well merited the encouragement of 5*l.* awarded to him. It requires some experience to ascertain whether the carts so joined have the requisite strength in the centre, when loaded as a waggon; and also whether the place of junction be sufficiently strong to resist the lateral strain thrown on that part when the fore-wheels turn, and the hind-wheels are fixed. Having, however, overcome so much, Mr. Coombes

may see his way in remedying any defects which time may render apparent.

A premium of 10*l.* was adjudged to Mr. A. White, of Old Sleaford, Lincolnshire, for his spring carriage, for the carrying of linsced-cake, delivering corn, and other uses. This vehicle was furnished with a pole and driving-seat; it had a well-closed cover removable at will; and side-rails for converting it into a harvest-waggon. Its usefulness would also be found for numerous other purposes in a farmer's establishment.

A gig-cart, exhibited by the Rev. Thomas Sewell, of Nether Broughton, near Melton-Mowbray, and built by Mr. Thomas Dutt, of Bungay, Suffolk, is entitled to high commendation as uniting peculiar comfort and accommodation, whether for family use or the transport of luggage, &c. It was designed and finished in a superior style, and its price under duty.

It is a pleasing task to have to record such rapid improvement in the construction of implements so indispensable to the agriculturist as those of which the horse will probably ever continue to be the prime mover. The economy of his force is so much diminished expense to his employer. It was noticed in the report of last year's exhibition that "the show-yard did not furnish a single specimen of a waggon or cart on springs." On this occasion no less than 15 out of 38 of the vehicles exhibited were furnished with them, proving that the Society has only to indicate a want, and that machine-makers are able and ready to supply it.

*Carriage Drags or Breaks.*—The silver medal was given to Mr. Charles Thatcher, of Midsomer Norton, near Bath, for his patent self-regulating self-acting breaks, applicable to carts, waggons, and vehicles of all descriptions. This invention was rewarded at the Bristol Meeting, and described in that report, since which time it has been materially improved by doubling the force of the horse's pressure on the wheel-nave, and therefore increasing his confidence in descending hills. The Judges took the opportunity of testing its powers, and the sagacity of the horse in trusting to them, by causing a cart furnished with these breaks, and heavily laden with implements, returning from Rough Heanor to Derby, to be turned up a steep bank adjoining the road. The horse was then encouraged to descend by the voice of his driver, having never before felt the breaks. After a slight hesitation, and a few experimental steps, the animal seemed to acknowledge his power of holding the load, and came down the bank as steadily as if he were drawing on a level. Coaches have also been fitted with this simple apparatus, and the Judges understand that the strangest horse unhesitatingly avails himself of it, and regulates his resisting force with remarkable delicacy, according to the greater or less degree of the declivity.

*Cart Wheels and Tires.*—Several manufacturers exhibited sets of wheels and axles, for one of which, by Mr. Crosskill, of Beverley, the silver medal was awarded, as combining good workmanship with cheapness.

The Judges have also to commend the 4½-inch ridged tires applied by Mr. George Coates, of Richmond, Yorkshire, to some well-made carts exhibited by him. These were rolled in a piece, and made an excellent job.

*Harness and Gearing.*—With respect to harness no improvement of moment was brought to the observation of the Judges.

Under the head of *gearing*, which includes the methods of connecting or coupling animals with the objects to be put in motion, Messrs. Ransome produced some new patent iron-trussed whippetrees, remarkable for their simplicity, strength, and durable properties. For this invention the silver medal was adjudged.

*Dairy Implements.*—Various churns were exhibited both of the upright and barrel construction, and having different motions. The society's prize of 5*l.* was given to Mr. William Wood, of Knutsford, Cheshire, for the adaptation of a rotative movement to work an upright churn. It was ingeniously and conveniently managed so as to accommodate a female in the sitting posture.

Six cheese-presses claimed attention, and two premiums of 3*l.* each were awarded; one of them to Mr. James Smith, of Gloucester, for a single press, and the other to Mr. Richard Stratton, of Bristol, for a double press, invented by Mr. W. James Gingell. The first of these was furnished with a convenient and excellent pressing power, combining the continuous action of the lever with that of a screw to elevate it as required, so that the weight has never to be released in order to raise the lever. Cleanliness is also ensured by furnishing the screw-handles with wooden hafts, in order to prevent the dairywoman's hands from touching iron, which is represented to be a matter of no slight importance. Mr. Gingell's double press is on the same lever principle as his single one rewarded at Bristol, but better constructed, and is a very neat, compact machine. The judges, however, are disposed to consider the compound screw and lever principle, as arranged by Mr. Smith, to possess advantages over any pressing power yet exhibited. This plan may possibly be made applicable to the double press through the medium of one screw, which would diminish the cost, and is a matter worth the consideration of the inventor.

*Dynamometer.*—A dynamometer on a new construction, invented by Mr. Cylburn, was exhibited by the Earl of Ducie. This instrument purported to possess new and valuable properties, and has been referred by the council, together with Messrs. Cottam and Hallen's instruments, to a future and more correct trial than either time or the condition of the land permitted at the meeting. The charge of comparing and reporting on their respective merits has been undertaken by the Duke of Richmond, Captain Spencer, and Mr. Jaques, who will use them in succession.

*Model Map.*—The silver medal was awarded to Mr. John Bailey Denton, of Southampton, for a highly ingenious and well-executed map in relief, showing the superficial variations, water-courses, levels, &c., of an estate or district. An ordinary paper map can only represent truly a flat superficies; and, however well it may be executed and shaded, such a map cannot convey to the mind any correct idea of undulations, depths of water-courses, relative levels, or the general configuration of the country. Neither are sections of much aid in enabling a landed proprietor to seize and retain in his memory a correct image of all those terrestrial phenomena by which many of his agricultural operations must be, and are in reality, governed. The multiplicity of sections requisite to denote such data at a glance would only tend to confuse. It has been Mr. Denton's object, in contriving the raised map submitted to the society, to place under the eye an exact miniature model of a farm, estate,

or district, so that it shall represent the minutest difference in level, and carry on its surface a pictorial fac simile of its character. He has succeeded in giving to the surface a coating which renders his model map impervious to water; and he represents it as proof against shrinking, cracking, or warping. In fact, it carries water when poured upon it, by means of which and of simple accompanying instruments, the discovery of every hydraulic fact, as touching outfalls, the proper courses for drains, the capability of distributing water collected by drainage, or of employing it as power for farm uses—as has been so skilfully accomplished by Lord Hatherton—will be greatly facilitated. The surface is coloured in oils, and therefore admits of its displaying a picture of the particular use or culture to which the various divisions of an estate or farm may, at any time, be appropriated; and a simple method is applied of recording the geological stratification as ascertained by boring. Mr. Denton states the price of completing these maps at from 2*s.* 6*d.* to 3*s.* 6*d.* per acre. In awarding the society's silver medal for this invention, the judges have looked at it not as a mere ornament or toy, but as a useful auxiliary to the agriculturist, by assisting him in the record, study, and full comprehension of the phenomena of that surface and subsoil upon which his art and capital are expended.

*Drainer's Level.*—An instrument for assisting workmen in giving a uniform fall to drains was exhibited by the inventor, Mr. A. Notman, of Painswick, Gloucestershire, and rewarded with the silver medal. It is simple, convenient, and possesses the requisite properties to ensure accuracy. The use of levels is chiefly required by workmen habituated to drainage where the fall is but slight, and the length of cut great. In such localities extreme exactness may be obtained by means of Mr. Notman's level, and it is used with the facility which the nature of the work demands.

*Domestic Articles.*—The principal object worthy of note, besides the hand-flour mills already mentioned, was a barrel thrawl, or stillion, of cast-iron, furnished with a very simple and effective lever apparatus for tilting casks without shaking their contents. It is the invention of Mr. William Hutchinson, of Derby, to whom a premium of 2*l.* was awarded for this commodious and durable piece of cellar furniture.

Messrs. Cottam and Hallen exhibited Mr. Carson's patent syringe for salting and curing meat, which merits trial in families, as it is said to afford a more speedy and efficacious method of impregnating the internal parts of flesh with the intended pickle than can be effected by steeping the mass in liquid, or covering it with salt. It is averred that meat thus treated may be cooked the same day, and will be found to be uniformly and perfectly prepared.

*Award of the Gold Medal.*—In concluding their notice of this immense and splendid show of agricultural machinery, the judges have to record the estimation in which they held the constructive skill and admirable workmanship displayed by Messrs. Ransome, of Ipswich. The society's gold medal was awarded to these mechanicians as an acknowledgment justly due to the merit of their varied collection.

JOSIAH PARKES.

R. S. GRABURN.

GEO. LEGARD.

## ON THE ECONOMY OF MANURES.

Were we to announce that we had discovered a chemical process, by which, for the mere trouble of collecting, we could supply every farmer with abundance of that inestimable manure—guano, doubtless our table would groan with the weight of applications for information as to the means to be used. We do announce that such discovery has been made; and without putting those under whose notice this may fall to the trouble of farther application, we tell them the secret consists in the proper management of the manures constantly accumulating, and, we regret to say, as constantly going to waste on most farms. Every particle of manure which lies for an hour exposed to the air, or to rain, is parting with its ammonia—the principle which renders guano so valuable; every pound of the fluid from the cattle-house, or even from the house-bucket or wash-tub, which is allowed to flow down the stream, or be absorbed by the yard or the air, is so much of the essence of manure thrown away, or, in other words, of food wasted. We have repeatedly endeavoured to bring the matter under the notice of farmers; it is a subject, however, of such importance that we must not omit any opportunity which may present itself of recommending it to their attention.

The following is from "Trimmer's Chemistry for Farmers:"—"The waste of the most valuable part of farm-yard manure is so great under the English system as to render it desirable that, without abandoning the use of it for that of liquid manure, till the superiority of the latter has been fully proved by experiment, the farmer should endeavour to introduce improvements in the present management of it, based upon a knowledge of the chemical properties of the substance with which he has to deal, by which a vast amount of manure may be saved, which is now lost. Not contented with promoting the escape of as much ammonia as possible in the volatile form during the process of heating, turning, and spreading the dung, and during the time which it is frequently allowed to lie on the land before it is ploughed in, we appear to endeavour to deprive it as much as possible of all soluble matter, by making the dunghill the channel through which all the water which is collected from the roofs of the buildings passes by the main drains of the farm-yard into the nearest stream. The annual waste of manuring matter which takes place on most farms, from this mode of management, is immense. In order to prevent it, the eaves of all the buildings should be supplied with spouts, which would lead the water away without allowing it to reach the dunghill, which should receive, except in very dry weather, only the water which falls on it directly from the atmosphere; and a drain should convey a surplus moisture from the dunghill to a covered tank, in which it should be preserved in a separate state. The brown or blackish fluid thus collected will consist partly of urine, partly of water, with many dissolved particles of the solid excrements. It must be putrefied before it can be used, in order to neutralize the caustic ammonia, with carbonic acid; but if putrefaction be allowed to proceed so far that the smell of ammonia is entirely gone, it will have lost the greater part of its manuring properties. It will be better, however, to convert the ammonia into sulphate of ammonia during the

process of putrefaction, by means either of sulphuric acid or gypsum. The liquid thus prepared may be applied, by means of the water-cart, to some of the most accessible of the growing crops, but not during wet weather; for, holding, as it does, so many salts in solution, it may convey too much nutriment to the plants, and injure instead of benefiting them, should the ground not contain moisture enough to dilute it properly. If it contain more than four or five pounds in the hundred of solid matter in solution, it will be too concentrated to be applied with safety to growing crops in dry soils. If derived from a manure-pit flooded by rain from the roofs of the buildings, it will scarcely contain two per cent. of solid matter, and will then be of little value. If the farmer dislike the use of the drainings of the dunghill in a liquid state to growing crops, they may be distributed upon uncropped land immediately before ploughing or harrowing it, or they may be used for the purpose of saturating heaps of compost; but to such compost, and indeed to any, containing, like all dungheaps, salts of ammonia, burnt lime should on no account be added, as it decomposes most of the salts of ammonia, and causes the escape of volatile ammonia.

"*Mode of fixing the Ammonia by Means of Sulphates.*"—The dungheap, thus freed from superfluous moisture, and the fluids which drain from it being preserved for use, instead of being got rid of as a nuisance, the next object is to provide that during the heating of the dung, and the subsequent management of it, as little ammonia shall escape in a gaseous form as possible. The best mode of fixing it appears to be by means of gypsum. Liebig recommends the strewing of the floors of stables and cow-sheds with it, for the twofold purpose of removing the offensive smell, which must always be more or less prejudicial to the health of the cattle, and of preventing the escape of the ammonia in the form of the volatile carbonate. Gypsum and carbonate of ammonia cannot be brought into contact at ordinary temperatures without mutual decomposition, and the production of the non-volatile sulphate of ammonia and of carbonate of lime. It is stated in a note by the editor of Liebig's work, that the practice thus recommended prevails in some parts of England. In Germany, according to Sprengel, it is usual to strew gypsum over land on which sheep are folded, in order to fix the ammonia of their dung and urine in the soil. The dungheap might also be strewed with gypsum for the same purpose. It is a very cheap substance, easily obtained in most parts of England. Considerable beds of it exist in Cheshire, Derbyshire, and near Watchet, on the Bristol Channel; and it might be raised in much greater quantities than at present, if there were a demand for it. Of the quantity that would be required upon a farm for those purposes, we may form a rough estimate, by supposing that for every horse or head of horned cattle kept, as much ammonia is lost in a volatile state, by our present mode of managing farm-yard manure, as Sprengel calculates is lost in Belgium by putrefying urine without diluting it with water, or saturating it with acids—viz., 162lbs., requiring for its saturation 373lbs. of sulphuric acid. This quantity of sulphuric acid might be obtained for somewhat more than five cwt. of gypsum. But as the cattle are not in the yard above six months in the year, this would be

reduced to  $2\frac{1}{2}$  cwt. per head, which should produce  $2\frac{3}{4}$  cwt. of sulphate of ammonia—a powerful manure, not to be bought for less than 25s. the cwt. Of course, however, if the dungheap is to be flooded with water, which will carry this soluble sulphate away from the farm, its formation by means of gypsum will only incur an unnecessary expense.

## HINTS TO THOSE CONTEMPORATING THE FORMATION OF FARMERS' CLUBS.

We take from the "Sherborne Journal," the following report of an eloquent speech delivered by the Rev. C. Woodcock, vicar of Chardstock, at the recent meeting of the East Devon and Dorset Agricultural Society.

He did not rise to address the meeting as a farmer, for the nature of a clergyman's important duties did not permit of his doing much as a practical farmer; but he had turned his attention of late somewhat to the subject, with a view to aid his parishioners in meeting some of the difficulties under which they laboured (*hear, hear*). No parish could be under greater difficulty than his was, from the fact of its having no resident landlord; and he firmly believed that we should never see agriculture prosper until landlords resided upon their own estates. In the case of Chardstock the non-residence arose from inability on the part of the late landlord (Lord Henley, we believe), who would gladly have come, had his health permitted, to cheer and reside among his tenantry. In the absence, then, of any resident influential landholder he (Mr. Woodcock) had dabbled a little in agriculture, but by no means to the benefit of his purse, for no novice could expect to succeed in a pursuit which required so much experience. He had circulated those excellent publications "The Farmers' Magazine," and "The Farmers' Almanac," by Johnson and Shaw, and they had been extensively read; the impression that farmers were unwilling to help themselves was, he believed, a false one; for when they saw any one willing to assist or instruct them, he had found them ready to carry forward all useful plans. Last Easter a Farmers' Club had been formed in his parish; he called a meeting, and the first question was—who is to support it? It could not be expected that he (Mr. Woodcock) should bear all the expense, and there seemed at first some difficulty, but it was less than might perhaps be imagined. They met, 18 in number; in a fortnight they were 36, and by paying 2s. 6d. a year each they got a very good change of books, and each an Almanac containing valuable information at the end of the year. They also were forming an agricultural library, and he hoped in a year or two he should see in the poor parish of Chardstock a good society (*cheers*). He would impress upon the farmers present that some little good was to be done by reading. It sounded very fine to say "an ounce of practice is worth a pound of theory or of reading," but that was a fallacy. If his professional friends around him did not read up to the present times, they would not retain their position; and if it were necessary for them to keep pace with the spirit of the age, surely the farmer could not expect to be exempt from the same obligation. There was agricultural chemistry to be studied, and those farmers who made this science their own, would leave others far behind. It was not possible, perhaps, for plain farmers to become experienced agricultural chemists, but they might make a beginning; and he would specially advise them to explode old Francis Moore, and read the *Farmer's Almanac*, containing information of yesterday and of the utmost value. He should like to see landlords turn

farmers, and then they would know some of the difficulties with which their tenants had to contend. When they had well burnt their fingers, they would say of draining, "Well, farmer, I see a shilling a rope is not enough; I will allow you eighteenpence." (*Hear, hear.*) He (Mr. Woodcock) would advise every farmer to run up and see Lord Ducie's model farm, where, after enormous outlay, his lordship was reaping now his 8 per cent. by draining. He would farther recommend every farmer to cultivate habits of intercourse with his landlord, if possible; he would say to him, "don't be afraid; don't go to any one else—to any go-between men—but straight to your landlord, face to face, with any grievance" (*Load cheers from the farmers, in which those from the professional gentlemen present were quite lost*). The farmer should give his landlord credit for Christian feeling, and should lay before him his disadvantages. This was the course recommended the other day by Sir R. Peel, and he never spoke more wisely than when he advised the landed gentlemen to meet their tenantry face to face. Farmers should not go upon the principle that what their grandfathers did must be right; but they should let science go hand in hand with practice and experience. Then as to schools—it was not enough that farmers' sons should be able to read a chapter in the Bible; they ought to be sent to those respectable middle-class schools which taught matters of utility in after life. He meant nothing unkind or personal in these observations—he wished the farmers present might ever be delivered from that greatest curse—a poor landlord—(*cheers*)—and he trusted that those under whom they rented would always be ready to come forward heart and hand to their assistance. (*Load cheers greeted the excellent vicar as he resumed his seat.*)

## ON DRAINING.

TO THE EDITOR OF THE FARMERS' MAGAZINE.

SIR,—The agriculturists throughout the kingdom, ought to be grateful for the very many and valuable articles on the important subject of draining, especially furnished by your very popular and invaluable publication. In the number for November last, I met with an article—or rather, some speeches at the Witham Agricultural Meeting—which particularly interested me; inasmuch as the plans there suggested for draining bog lands agreed so well with my own experience, and further, with the plans I have lately recommended to a gentleman in this neighbourhood, a great land proprietor, and who is at present occupied in draining similar land to that named, but who is pursuing quite a different course to the one I recommended to him, and which I have no hesitation in saying will be a failure. Since receiving your magazine for November, I shewed him the articles it contained on the subject, but all to no purpose; the old plan must be pursued that has been followed for years in this country, and yet with little or no permanent benefit. Indeed, it appears to me as if the farmers generally hereabouts look with discredit and suspicion on all new plans; I think, indeed, should a premium be offered for agricultural simpletons, and the farmers of the old school have the awarding of it, I don't know whether you or I would obtain the prize.

The plan pursued by the above-named gentleman, is by making parallel drains, about three feet deep and eighteen feet asunder. The plan I suggested, was to make a drain along the foot of the hill, on the three sides of the field, about six feet in depth, which alone will be found sufficient to reach

the root of the evil. If prejudice to old customs or plans be allowed to rule in this district as it has done for years past (with few exceptions), the land now in a fair state of cultivation will soon become sterile, and that in a bad state will get worse.

But I hope the time is near when your magazine—the farmer's best friend—will be found in the house of every farmer, and that its plans will be adopted and carried out by them; and if so, I shall feel no surprise at seeing the land in the Craven district yielding double, and, in some instances, treble to what it does at present, as well as paying good interest for the outlay.

Perhaps some of your numerous readers will give an opinion which of the two plans is most likely to be successful; by so doing, you will oblige,

Yours respectfully,  
A CRAVEN FARMER.

## STEWPONEY FARMERS' CLUB.

SUBJECTS FOR DISCUSSION FOR THE YEAR  
1844.

**JANUARY 1st.**—"On the most economical mode of keeping and using Cart Horses." This subject includes the consideration of the best food adapted for such horses; draught, or the number required to draw each waggon, cart, and plough; the manner of using them, whether single or abreast, and the number necessary to be advantageously employed for the size of each farm.

**FEBRUARY 5th.**—"On the relative advantages of different manures, both natural and artificial." This includes the consideration of the cost and value of the application of farm yard manure, heaps of compost and urine collected in tanks as applied to the land; as to its immediate or permanent effect, compared with the introduction of guano, gypsum, nitrate of soda, &c. and other manures purchased and brought from a distance; whether applied separately or mixed.

**MARCH 4th.**—"On the advantages of mixing and deepening Soils, by subsoil ploughing and trenching." Subjects to be considered are the proper depth to be tried; the relative expenses incurred by each method; and the profit to be derived from them, at the time required, when a return may be expected for the capital expended; the nature of the soil so treated; and the crops to be grown to produce a remuneration for the money expended.

**APRIL 1st.**—"On the cultivation of turnips." Subjects to be considered:—The time of sowing; the manner; whether ridged, drilled, or broadcast, the quantity and quality of manures applied; the mode of treating the young plants, whether by scuffling, hoeing and setting out; the proper distance apart; the number of hoeings; the time for cleaning the fallows, whether in Autumn or Spring; the probable difference of expense of each method of treatment, and the average weight of the crop to be grown per acre.

**MAY 6th.**—"On the management of Grass Land and the best rotation of Green Crops." Subjects to be considered: The time of putting up meadows intended for hay; the time of making hay, and its relative value, whether grown and made early or

late; the use of aftermarth; the time meadows ought to be left cleared; the artificial green food required to allow meadows to be so treated, such as turnips, vetches, Italian rye grass, clover, &c.

**JUNE 3rd.**—"On the management of Sheep." Subjects to be considered:—The sort best adapted for different soils; the average number to be kept per acre; the relative profits between a breeding and a fattening flock; the best mode or treatment, and the nature of food, with reference to the benefit to be derived from it, both by the animal and the land.

**JULY 1st.**—"On the best method of Harvesting Corn." Subjects to be considered:—The state of cutting, whether ripe, or not quite ripe; the manner of cutting, whether with scythe or sickle; the best waggon adapted for carriage; the best place for making ricks, whether in the field or rick-yard.

**AUGUST 5th.**—"On the best management of Hedges."—Subjects to be considered:—The relative expense between annual trimming and periodical plashing; the proper shape and form of trimming, and the quality of fence obtained by such methods.

**SEPTEMBER 2nd.**—"On the advantages of Draining." Subjects to be considered:—The cheapest and best mode of draining different qualities of soils; the capital required per acre, and the return to be expected therefrom.

**OCTOBER 7th.**—"On the best mode of keeping Farm Accounts." Subjects for consideration:—Number and division of entries to be made; division of live and dead stock; interest to be charged on capital sunk in making improvements and purchase of implements; number of years required to bring back capital.

**NOVEMBER 4th.**—"The best method of bettering the condition and increasing the comforts of the Agricultural Labourers, by such means as are in the power of the owners and occupiers of Land." Subjects to be considered:—keeping labourers in farm houses, whether hired as yearly servants or hired weekly; the sort of cottage requisite to their wants; the allotment system; benefit societies; premiums for good behaviour and length of service.

**DECEMBER 2nd.**—"On Leases." Subjects to be considered:—For what number of years granted; whether on a corn rent or not; certainty of possession; facility of borrowing capital; expectations of improvements to be effected by tenant; probability of remuneration; confidence in the custom of the country and character of landlord; as to annual takes; reduction of rent, in bad times, no rise if otherwise; repairs, &c. done by landlord, without charge; improvements, such as draining and irrigating, for which the tenant is charged a per centage.

It is intended to recommend the Stewponney Agricultural Society to offer a premium of twenty pounds, for the best essay to be selected from those sent, on all or any of the twelve foregoing subjects, to be founded on experience and observation alone, and limited to members of the Stewponney Farmers' Club, to be decided in January 1845, in which case the said members will be invited to transmit any essays they are willing to write for competition, on any of the above subjects, to the secretary of the Agricultural Society, before the 31st of December, 1844. Marked as agreed upon.

## AGRICULTURAL QUERIES.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—Having read of several experiments where 3 cwt. of guano has produced a heavier crop of potatoes than farm-yard manure, I feel anxious to make use of it; but, before doing so, shall feel obliged by any of your subscribers informing me whether it is requisite to apply any other manure for the following wheat crop. In this neighbourhood we manure heavily for potatoes with farm-yard dung, and the following wheat crop is generally good, without any additional manure. Will this be the case where only 3 cwt. of guano has been applied for the potatoes?

I am, sir, yours, &c.,  
A YORKSHIRE FARMER.

SIR,—What is the greatest quantity of rain-water known to fall in twenty-four hours; and, with this knowledge in view, what would be the proper size for tiles at 12, 15, 20, 25, &c. feet distant?

Are not cylindrical tiles or pipes, especially for close draining—say, under twenty feet apart—cheaper than the ordinary tile and slate sole, less liable to break, and more certainly kept clean when only a small run of water is passing, than a flat bottom with slate or tile sole? AMICUS.

SIR,—As the system of eating vetches off by sheep has become very prevalent, especially in the neighbourhood of Worcester, there appears to be but one objection, namely—as we generally lay down in the succeeding crop, we can rarely ever grow good seeds after; so that it is evident that the vetch crop is detrimental to, and robs the soil of a property that is congenial to the growth of seeds.

I should esteem it a favour if some of your correspondents would inform me, at their earliest convenience, what it is, and what we could apply to the soil to prevent the failure of the seeds.

I am, sir, your obedient servant,  
A WORCESTERSHIRE FARMER.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—I observed an advertisement in your journal of last week, which also appeared in the *Farmers' Almanac*, regarding Etheredge's Patent Machine for making Drain Tiles, Pipes, &c.

As tile-draining is now come to be almost universal, anything relating to it, more especially anything calculated to lessen the expence, is seized upon with avidity. I as one belonging to the agricultural class would respectfully solicit your insertion of the allowing queries, to which I have no doubt Mr. Etheredge will give satisfactory answers.

He says—"This machine is simply a common pug mill, which at once makes a number of tiles from its bottom—the clay being forced by the action of the knives through several dies." Q. 1st. Is the clay taken from its natural bed and put into the pug mill, or does it undergo any preparation previous to this? Q. 2nd. Is the hole where the clay is forced through quite round, or is it in the shape of a common drain tile? If round, what form are the tiles when severed?

"The cutting off is performed by a wire strained across the top of two upright bars, and is instantaneous in its operation." Q. Is the cutting performed as it progressively descends, or is a stop put to the machinery while doing so?

"The pipes cut off to the length required are removed on barrows to the hakes and placed on the top of each other." Q. Are the tiles placed upon one another immediately after coming from the mouth of the machine? If so, of what stiffness is the clay when put therein?

"They do not crack in the arch." Q. Does the clay require to be free from stones or lumps, and of one consistency?

"They are much stronger than any others made by hand or machinery." The machine "is usually worked by a horse." Q. Are the tiles made thicker, or is the pressure greater, that they are stronger than others?

"The tiles require no shelving." Of what form are the hakes, and are they under a roof?

"The whole manufacture of the tiles is performed at one operation by the pug mill." Q. Is a single horse the only moving power for all that is described?

"Plans of tile works on economical principles, with estimates of expence, are supplied at a small charge, which will be found far less expensive than those generally adopted." Q. Is it from practical experience alone that these plans and estimates are given?

I have every reason to believe that Mr. Etheredge will insert in your widely-circulated journal satisfactory answers to the above queries. Such answers will be of vast importance to landed proprietors and others who are about to embark in this all important improvement.

I am, yours respectfully,  
QUERIST.

Nov. 27.

SIR,—Will you allow me the favour to inquire if yourself or any of your valuable correspondents could furnish me with some information on the following subjects:—

Being somewhat interested in the breed of cattle denominated "short-horns," I am desirous of knowing which are considered the most essential points in an animal (a two-year-old short-horn bull for instance), and what relative proportion do the different points bear to each other? We must assume that there are few that possess all good points: supposing for argument's sake that there are twenty or even thirty points in the animal which are more particularly deserving of notice, such as the touch, the head, the eye, the nose, the coat, the colour, &c., &c., it would be necessary to balance the good with the bad points to judge of the animal.

I have very frequently seen two or three bulls of the same age standing by the side of each other so nearly equally good, that were I asked the question which was the best, I should, as far as my own judgment would go, have some difficulty in deciding. By inserting this in your next week's *Express*, you will much oblige your very obedient servant,

Nov. 26th, 1843. A SUBSCRIBER.

SIR,—Will any person inform me if there is a cheap tract or paper of any kind, instructing labourers how to manage their gardens to the best advantage? Also what are the best and simplest regulations to make, in letting land to the poor for allotments? I am, sir, your obedient servant,

Nov. 29. WARWICKSHIRE.

A correspondent inquires what is the best and easiest procured article for fixing the ammonia in liquid manure?

Sir,—It appears that our legislative agriculturists have come to the mature conclusion that it is absolutely necessary for the farmers of the present day to adopt the surest and cheapest mode of cultivation to obtain the largest amount of produce, which must be acknowledged a judicious precept in a country like this, where the annual produce is inadequate to the demand. Therefore, it becomes necessary to know which is the most speedy mode to arrive at this object; viz.—large occupations or small. An answer to this query by some of your practical correspondents, would much oblige a proprietor,  
*Herts, Dec. 7, 1843.*

A. J.

Sir,—I wish to rear as many calves as I can by keeping five cows for this purpose only, and not attempting to make butter or cheese. I should like to be informed by any of your correspondents what breed of cows they consider best for this purpose, and how many calves each cow can rear in the year, how many a good cow can support at one time, and for how long the calves should continue to have milk? Whether it will be better to allow the calves to suck the cows, or that the latter should be milked and the calves fed by the hand? Any other information as to what food should be given with the milk and after its discontinuance, will much oblige  
 Your obedient servant,  
*Dec. 7, 1843.*

INQUIRER.

Sir,—If any of your readers can inform me the best means of keeping rats out of the thatch of a new barn, I should feel very much obliged.  
 I am, sir, your obedient servant,  
 A WILTSHIRE FARMER.

Sir,—There is a small insect called “weevil” which is very injurious to and destructive of malt and other grain, and is generally to be found in granaries. If, through the medium of your valuable paper, any person can inform me of the most effectual mode of destroying this insect, it would confer a favour on, sir, your obedient servant  
*Nov. 8th.*

A SUBSCRIBER.

Sir,—If any of your readers should have tried any experiments with guano against any other manures, and would favour the writer with a short and accurate account of the results, it would greatly oblige,  
 AN OLD SUBSCRIBER.

Sir,—Will any one of your correspondents oblige me with an answer to the two following inquiries? Which is the cheapest, best, and most simple instrument to ascertain the degree of inclination of land, with a view to draining? and will land, occasionally overflowed by salt-water, receive benefit from the application of chalk?—I am, Sir, your obedient servant,  
*Chichester, Dec. 1, 1843.*

A SUBSCRIBER.

Sir,—Will any of your correspondents oblige me by answering the two following enquiries?—What is the best process to be adopted for sowing turnips on ridges? and what is the best food for fattening lambs?

I am, sir, respectfully yours,  
*Crandall, near Farnham, Surrey.*

R. S.

Sir,—In the *Express* of the 18th is a recipe given for destroying rats, by “A Hampshire Farmer.” If

he will take an early opportunity of giving, through the same medium, the lot of butter with which the two ounces of arsenic is to be incorporated, he will oblige, sir, your obedient servant,  
*Stroudwater, Dec. 21.*

A SUBSCRIBER.

## ANSWERS TO AGRICULTURAL QUERIES.

TO THE EDITOR OF THE MARK LANE EXPRESS.

Sir,—In reply to your correspondent, “Inquirer,” respecting the rearing of calves—

1st. The breed of cows most suitable must, of course, be matter of entire opinion; those producing most milk would be to him of most value, as with dairy cows. I should prefer Herefords.

2nd. A good cow would rear about seven calves in the year—say from April till October.

3rd. When in full milk, they would support three calves at one time, or nearly so.

4th. The calves should continue on milk about eight weeks, more or less, depending on the health and condition of the animal.

5th. I consider feeding by hand much better than allowing the calf to suck the cow—for this reason, that each calf has a regular and proper quantity, which is of the utmost importance. When a calf refuses milk in sucking, those rearing from the same cow get too much. This generally produces scouring, which is highly contagious, is always attended with ill effects, and frequently destroys the animal.

I should allow the calf to suck the cow six or eight days (not more, as there is often a difficulty in getting them to take the milk by hand, if permitted to suck too long); then give it five pints of milk, morn and night, for a fortnight; after that time, three quarts, twice per day for a few weeks; then gradually reduce the quantity, and give it only two quarts once in the day for the last week.

A supply of clean water and gurgeons or flour should be provided in the building they run in. Hay and Swedes, or mangel-wurzel sliced, in the winter months; and vetches or cut grass, natural or artificial, in the summer.

The large and small calves should be kept separate, and bran may be substituted for flour as they advance in age.

When turned out, as the summer months advance, they should be provided with shelter—the bran continued, with chaff.

*Overbury, Dec. 21.*

J. R.

“Warwickshire,” who wishes to instruct his “labourers how to manage their gardens to the best advantage,” will find “Paxton’s Cottagers’ Calendar” suit his purpose. It is cheap and well digested. They are sold at the rate of 5s. for 25 copies.

Sir,—One of your correspondents, wishing to be informed of a cure for the “weevil”—or, as Dr. Johnson calls it, “weevil”—I beg to tell him that a liberal application of strong lime-water, with a brush to the floors and walls of the granary, will effect its destruction; and a few days afterwards the floor must be scoured with soap and hot water, or the future corn placed upon it will be injured by the dust of lime.

I am, sir, your obedient servant,  
*Twickenham, Dec. 22.*

J. G.

SIR,—An "Inquirer," in your paper of Dec. 18, wishes to know the best way of weaning calves. I have had good luck, and will relate my plan; hoping many will state theirs, as I may perhaps find one better.

I never begin till April, and for the first fortnight give three quarts of new milk each per day, at three times (putting their mouths into the milk), never placing the finger into their mouths to make them suck—that is a bad plan, and they will be double the time taking to drink; then, if they go on well, begin to water it by degrees, and mixing it with linseed gruel and white peameal; one pint of linseed makes a pail of gruel. Thus, by degrees, they do without milk at all in about five weeks, the whole time being in a warm meadow with a shed in it. A great point is to feed them three times a day, giving them a quarter of a pail at each feed. A cow will thus wean a great number—two fresh ones every fortnight, at least—and from the middle of July till Christmas, if the weather is open, an acre of good rowen will keep one calf well; from then till May I like them to lay in a warm yard or meadow, with shed, and have as much good hay as they like.

If weaning good calves went pay, nothing will. I calve them at not less than two-and-a-half years old, and calculate I can rear them to that age at a cost of £9.

ALBUS.

SIR,—I beg, in answer to your Wiltshire correspondent's request respecting the rats in new thatch, to say, the best and, I venture to add, the only preventive is to destroy them. Perhaps your Wiltshire correspondent will say, and it is reasonable to suppose he may, how is this to be effected? I answer thus:—Take a slice or two of bread of about half an inch thick, mix two ounces of arsenic with a piece of butter, exactly in the same way that flour is with butter, suggesting it to be meant as a thickening for gravies, &c.; this done, spread it on the bread of a pretty good thickness; when thus prepared cut it in small squares, place these in different parts of your buildings, but principally that part to which the rats resort for food; and they will I am confident, without any previous allurements, partake bountifully of it, which if for a short time continued will destroy the whole number.

I am, sir, respectfully yours,

A HAMPSHIRE FARMER.

Bishop's Sutton, near Abresford,  
Dec. 6th, 1843.

SIR,—“A Subscriber” wishes to know what is the best food for fattening pigs. I have myself tried nearly every description of food, and have never found anything to produce so much weight or such fine meat in a given time as bean-meal. Some pigs fed with this food, mixed with a small portion of fine toppings, weighed at six months old twenty stones; and the pork was allowed to be extremely tender. I gave at that time 17s. for 2 cwt. I last year tried to fatten them upon grey peas alone, giving them liquid (milk if you have it, or water) to drink; these also were fat in an amazingly short time, but they did not weigh so heavily as those fed on bean-meal.

I have tried potatoes in every way, both boiled and raw, mixed with meal and alone, but have never found them answer. But let the food given be what it may, plenty of it must be given, so as to excite repose.

I am, sir, your obedient servant,

AN AGRICULTURAL EXPERIMENTALIST.

Herts. Dec. 2, 1843.

SIR,—In answer to a letter in the *Mark Lane Express* of the 18th instant, enquiring as to the best mode of fixing ammonia in the soil, I beg to draw your attention to Justus Liebig's work on organic chemistry of agriculture and physiology. In the 87th page of that work is a passage, of which the following is a copy:—

“The action of gypsum on chloride of calcium really consists in their giving a fixed condition to the nitrogen, or ammonia, which is brought into the soil, and which is indispensable for the nutrition of plants. In order to form a conception of the effect of gypsum, it may be sufficient to remark that 100 Hess. lbs. of burnt gypsum fixes as much ammonia in the soil as 6,230 lbs. of horses' urine would yield to it,” &c.

A careful perusal of the work above alluded to, edited by Lyon Playfair, Ph.D., should be recommended to agriculturists.

There were other letters in your last number upon which I might offer a few observations, but the fear of being thought obtrusive prevents me referring to any excepting the one on the subject of bearing-reins for horses. In the opinion that a tight bearing-rein causes uneasiness, pain, and often stumbling, every sensible man must coincide; but it is questionable whether it is not the cause of a still greater evil, viz., roaring.

For further information upon this subject, the writer in your journal may be referred to the 160th page of a book entitled “The Horse,” by W. Youatt, published under the superintendance of the Society for the Diffusion of Useful Knowledge.

By taking such notice of my remarks as may best answer the end for which your journal is intended, you will oblige

Dec. 20.

A SUBSCRIBER.

SIR,—In answer to an “Isle of Wight Farmer,” concerning sea-weed, in your paper of the 20th inst., I beg to say that the best way of rotting the weed is, to mix it with other manures in the yard. By experience I have found that putting it in a heap by itself it decays away almost to nothing. If he has got plenty of straw to mix with it and the other manures, it is astonishing how soon it converts them into excellent manure.

The crops that I have found it to suit best when so mixed were turnips and barley. I have known it applied in this way producing barley 2lbs. more per bushel than farm-yard dung. I have known it producing good crops of oats ploughed into the land fresh from the sea; but this way of using it encourages the growth of weeds, but by being fermented with other manures checks it.

Nov. 30th, 1843.

AN AGRICULTURIST.

SIR,—In reply to your correspondent, signed “Warwickshire,” I beg to say that Mr. Kimberley, one of the Council of the Royal Agricultural Society of England, has written two or three tracts upon the subject of cottage gardening and the management of allotments, which I consider worthy an extensive circulation; they are published by C. C. Wetton, Egham.

I much wish that some one of your intelligent correspondents may furnish your subscribers with a few simple regulations for letting allotments to the poor, feeling sure that many landowners would adopt the system if a good plan were suggested.

I am, your obedient servant, N. C.

Shirley, Southampton, 6th Dec., 1843.

STR.—I hope the following answers to the queries of "Querist," regarding Mr. Etheredge's patent machine for making drain-tiles, pipes, &c., will prove satisfactory to his mind, and remove any doubts that may be resting there as to the accuracy of the statements that have appeared in various journals regarding the subject.

To prevent mistakes I shall adopt the plan of "Querist" in conveying the information, by taking his questions as they come and giving the answer to each.

Question 1st. Is the clay taken from its natural bed and put into the pug-mill, or does it undergo any preparation previous to this?—The clay is taken from its natural bed during the winter or spring, and soaked; after which it is ready to be put into the pug-mill. If many stones are found in the clay, it should be washed previous to using.

2nd. Is the hole where the clay is forced through quite round, or is it in the shape of a common drain tile; if round, what form are the tiles when severed?—The holes in the bottom of the machine (eight generally) are commonly of an oval form, about 6 inches by 3 inches, from which two tiles are formed 3 inches wide by 3 deep. When the holes are round, pipes are formed without being severed. The latter part of this question I consider unnecessary to answer; to suppose any one capable of writing *even the letter of "Querist"* ignorant of the form of a semicircle, would be a complete insult to their understanding.

3rd. Is the cutting performed as it progressively descends; or is a stop put to the machine while doing so?—The cutting off is performed after the tile has descended, and no stop is put to the machinery while doing so.

4th. Are the tiles placed upon one another immediately after coming from the machine; if so, what stiffness is the clay when first put therein?—Drying ground or hakes are prepared according to the quantity contemplated to be made in a season, which, for the sake of illustration, we will suppose filled with one day's making (one line round); the maker may then begin on the top the second day, and go on with another course, until he has produced a sufficient number to fill up his hakes or begin burning.

5th. Does the clay require to be free from stones or lumps, and of one consistency?—As stated in answer 1st, if many stones occur in the clay, it ought to be washed. The machine reduces it to one consistency.

6th. Are the tiles made thicker, or is the pressure greater, that they are stronger than others?—The tiles are not thicker, but the pressure is greater, and also the manner of pressure is more favourable to the production of a strong tile than others.

7th. Of what form are the hakes, and are they under a roof?—The hakes are simply lines of turf raised three or four inches from the surface, and of a breadth suitable to the length of tile to be placed thereon. Two of these hakes, about six inches apart, are placed under one roof: which is called by the workmen a double-bladed hake.

8th. Is a single horse power the only moving power for all that is described?—A single horse is quite adequate to perform the labour, but any other equivalent power of steam or water may be applied.

9th. Is it from practical experience alone that plans and estimates are given of tile-works?—This is rather a curious sort of question, and not put in a very courteous way. If Mr. Etheredge gives suffi-

cient guarantee to perform his promises, I cannot for my life see what right "Querist" has to ask the way or manner by which he may have gained his knowledge. But as this is altogether a personal affair, I would strongly recommend "Querist" to apply by letter to Mr. Etheredge, who possibly may condescend to answer even this question. If I had felt satisfied that "Querist" had propounded the above questions from no other motive than merely to obtain information, I would have given my name and address, but in the mean time he must be content with the initials of O.P.Q.

P.S. Should this not prove satisfactory, let "Querist" throw off the mask, and give his real name and address, and I pledge myself publicly that ample information will be afforded even in the most minute particular.

STR.—I observe the letter of "Inquirer" respecting furze-hedges and thistles has been answered by a "Dorsetshire Farmer."

In regard to the former the time of sowing will do very well in March, but when grown, furze-hedges should only be clipped during the last half of June. With respect to thistles, the best mode of extirpating them is to trench plough fourteen inches deep, and have a careful man following the plough to lift up the long tough roots, of which many yards may often be taken up at once, with branches or joints about a foot asunder, from each of which a thistle of that particular kind springs. The roots will be found about the depth mentioned, precisely like the meshes of a net, twelve or fourteen inches square.

I am, sir, your obedient servant,

Nov. 24.

A SCOTTISH FARMER.

PLOUGHING MATCH OF THE LIFTON AGRICULTURAL SOCIETY.—This took place on Wednesday last, at Lifton, the weather being remarkably fine. Twenty-four ploughs (without drivers) started. The Judges were Mr. Peter Tanton, of Thrushelton, Mr. Pengilly, of Lamerion, and Mr. Lobb, of Lawhitou; and the prizes were awarded as follow:—Men of any age—Best, 1*l.* 10*s.*, to J. Holman, ploughman to Mr. Jackson, of Moonhouse, Lifton. Second best, 1*l.*, to J. Adams, ploughman to W. B. Gould, Esq., Lewtrenchard. Third, 10*s.*, to J. Stenlake, ploughman to Mr. W. Northey, Lake, Lifton. Fourth, 6*s.*, to Edmund Mison, son of Mr. Mason, of Stone Barton, Lifton, who performed the whole of his work without reins or any kind of assistance, except the word of command. Boys under 18 years of age—Best, 1*l.* 10*s.*, to C. Kellaway, Mr. Jackson's, Moonhouse. Second, R. Waller, Mr. Mason's, Stone, (this boy was under 16 years of age and very small; it was astonishing to behold the dexterity and neatness of his work at so early an age.) Third, to J. Rundle, Mr. Jeffery's, Bore Kell. Fourth, 6*s.*, to W. Heard, son of Mr. Heard, Sydnam Barton, Marystow. Best pair of horses—Mr. Bartlett, Lifton, 1*l.*; second best, 10*s.*, Mr. J. D. Palmer, Yeath, Lifton. Third, 5*s.*, to Mr. Facy, Downhouse, Lewtrenchard. Amongst the crowd we noticed W. A. H. Arundell, Esq., Recn-fred Arundell, Esq., J. D. Harris, Esq., G. Webber, Esq., J. Braddon, Esq., Rev. T. M. Martyn, &c., together with most of the influential agriculturists of the neighbourhood. They now proceeded to Lifton, where about 50 sat down to a good old English dinner, to which they did justice at the Arundell Arms Inn. The ploughmen were also provided with dinners at the Bell and London Inns.

## AGRICULTURAL REPORTS.

### GENERAL AGRICULTURAL REPORT FOR DECEMBER.

The weather of this month has been characterised by extreme mildness, its position in the calends considered; nevertheless, though a few sharp frosts would certainly have had a favourable influence upon vegetation in general, it has not been productive to any inconvenience, if we except the sloppy state of the roads, to the agricultural body. The process of sowing the seed wheat having been generally concluded under, for the most part, favourable auspices, and immense breadths of plant above the surface of the soil, we are now enabled to assert that the young wheats have the appearance of health, that very few grains have missed "chitting," and that everything looks promising for the next crop. Farm labours are generally quite as forward as are usually observed at this period of the year.

The progress which has been made in thrashing out the present year's wheat and other crops, now enables the growers, as well as ourselves, to form something like a correct idea of the actual yield. Although accounts have reached us from some quarters to the effect that it amounts to an average, we think we are justified in asserting that, taken in the aggregate, the produce is less than was that of last year. In speaking thus, it must be understood that we are referring to wheat and oats only; as it is very evident that the quantity of barley, as well as that of beans and peas, is fully adequate to meet the consumptive demand.

The long-continued heaviness in the corn trade, and the comparatively low rates at which all kinds of the soil's productions have been selling, are, unquestionably creating serious considerations in the minds of our agriculturists; and many are the inquiries made as to the period at which improvements will be observed. To us, it is very evident that the present state of demand, the heaviness in which is chiefly attributed to the principal markets of consumption having been well supplied, and to the fact of most of the dealers having purchased with extreme caution, cannot long continue; especially if we bear in mind that the stocks of grain in the hands of our farmers are by no means large for the season, and that the consumption is going on freely,

Depastured and home-stall stock have fared extremely well, from the large supply of good fodder obtainable; and it affords us unspeakable pleasure in being enabled to affirm—notwithstanding it must be admitted that losses to some extent have again been experienced—that the ravages of the epidemic appear to be gradually subsiding.

Our advices from Scotland are cheering. The produce of the flail and thrashing machine is represented as abundant; and some parties seem to be of opinion that a large surplus will be found for shipment to England. The weather, as with us, has been very mild and humid.

In Ireland nothing has occurred worthy of particular observation. The crops are stated to be abundant, and of good quality. Fine wheat has gone off freely, at full prices; while in other kinds of grain exceedingly little has been doing, with larger exports of wheat, flour, and oats to Liverpool.

The English provincial markets have been somewhat largely supplied with wheat in the course of the month. Fine qualities have supported their previous rates, but all other kinds have had a downward tendency. Good malting barley has been in brisk demand, at an advance of from 1s. to 2s. per qr.; while the value of other descriptions has been well sustained. Oats, beans, peas, and flour, have moved off slowly, at unaltered figures.

The following is our usual statement of the supplies and prices of fat stock exhibited and sold in Smithfield cattle market in the month just ended. The former have ruled as under, taking their extreme range:—

Per 8lbs., to sink the offals.

	s.	d.	s.	d.
Beef.....	2	6	to	4
Mutton.....	2	10	—	4
Veal.....	3	0	—	4
Pork.....	2	8	—	4

The supplies have amounted to the following numbers:—

Beasts.....	13,290
Sheep.....	110,362
Calves.....	980
Pigs.....	1,260

In comparing the above returns with those at many previous corresponding periods of the year, we find the value of stock to have exhibited this month a great falling off, but the supplies have consisted of a fair average.

Although we have had by no means an excess of supply—even on the great Christmas market—the demand has been in a very depressed state, at low prices. In support of what we have here advanced, we give the following table of supplies and prices for the "Great Day" during the last five years:—

	1839.	1840.	1841.	1842.	1843.
Beasts ..	5074	5523	4334	4490	4510
Sheep ..	23490	21550	20020	24800	26560

Price, per 8lbs. to sink the offals.

		BEEF.																	
		1839.		1840.		1841.		1842.		1843.									
s. d.																			
3	4	5	0	4	4	5	8	3	8	5	0	3	4	4	8	2	8	4	4

		MUTTON.																	
		1839.		1840.		1841.		1842.		1843.									
s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.									
4	0	5	4	4	4	5	6	4	4	5	4	3	6	5	0	2	8	4	4

From the above it will be observed that farming is reduced to a low ebb indeed. Last year some extremely prime Scots were sold as high as 5s., but this year nothing exceeded 4s. 6d., even for the prize animals. Some difference of opinion appears to have existed as to the actual quantity of the stock brought together at Smithfield on the 11th of December this year, but we are of opinion that it was quite equal to that of any season of the past five years, save that shown in 1835. The only reasonable fault that can be found with it is that the supply was not quite so even as previously advised; but we can safely venture to assert, there were shown some of the most extraordinary animals ever witnessed, and we cannot but express our regret that the return in the shape of price, should have been so unsatisfactory to the grazing community.

The principal portions of the bullock supplies have been derived from the northern, western, and mid-

land districts, with a much smaller number from Scotland than we have noticed for some years past.

Up to Newgate and Lendenhall nearly 57,000 carcasses of beasts, sheep, calves, and pigs, have been received from distant quarters, owing to which, and the large supplies of London-killed meat—in quality seldom surpassed—on offer, the trade has ruled very dull, on the following terms:—Beef, from 2s. 8d. to 4s. 6d.; mutton, 2s. 10d. to 4s. 6d.; veal, 3s. to 4s. 6d.; and pork, 2s. 4d. to 4s. 4d. per 8lbs. by the carcass.

No imports of foreign stock worthy of notice have taken place in the course of the month, either in London or at the outports; but some large shipments of beasts, sheep, and pigs, have been made to France and Belgium.

#### AGRICULTURAL REPORT, TO CHRISTMAS.

We never recollect a season so singular as that of the whole of December instant. During upwards of twenty-three successive days, the barometer has never once fallen to 30 inches, or, in more familiar terms, those by which persons would generally indicate a high state of the glass, the mercury has been at "fair." This is wonderful; and Scotland re-echoes the same tale! Our last letter tells us that the barometer was never known to stand so high. In Thanet we once noticed it at 30 in. 80 c.; but the situation is close to the sea, and therefore low; but here, in Berks, we have observed it once at 30 in. 50 c., and during several successive days at 30 in. 40 c.; and this elevation we never before observed during the last twelve years.

Whether frost may be predicted or not, neither the atmospheric pressure nor the aspects of the planets appear to decide. We read of it—are told to expect it—but our thermometers register nothing but spring-like temperature, with now and then a frosty rime, which on every occasion has either been followed by rain or clouds, with increased warmth.

Of rain there has been little since our last, and the ground has become capital for the plough. Fogs have been dense and extensive. Some of our fields were intended for late wheat, after turnips, but they turn up cloddy from lack of frost, and the sowing is deferred till February. Much wheat is up, and beautiful, though sown late. Complaints are made of slugs, which however, if they do not make a field bare in large patches, never seem to thin away the plants sufficiently. It should appear that, in drill sowings, nine seeds of ten are superfluous; for in examining a row, we find six, eight, or more young plants buddled within the length of three inches; whereas, to tiller well, a space of nine inches would not be excessive for each plant.

We have dibbled wheat at home, putting four seeds in a hole, nine inches asunder; and all, excepting in two spaces, seem complete: hence, if each hole can retain permanently one plant, it is evident that, even at these distances, three or four seeds are supernumerary. But in all land some considerable loss of seed will inevitably occur, but surely we throw much away; and therefore it behoves our machinists to contrive some handy dibbling machine for light lands; and this would obviate many objects, and economize seed and labour.

The growing wheat, the turnips, and some few other things—and particularly the abundant stores of animals on the farms—offer good promise. Much might be saved in every prudent family by baking at home, in a good brick oven, heated by small beech billets, a little furze, and small

brushwood; 28lbs. of good seconds flour absorb exactly six quarts of luke-warm water at this cold season; half a pint of white, washed yeast is ample, and the yield will be generally more than 39lbs. of perfect bread. We calculate our fire at about 3d.; it may vary from 2d. to 6d. in different localities.

#### CALENDAR OF HORTICULTURE FOR JANUARY.

At the commencement of the new year, we would so vary the order of our calendarial notice as to confer upon it something of a new or fresh character. In respect to general operations, the month of January is so uncertain in its meteorological aspects as to set at defiance any fixed rules. In proof of this, we might refer to the sudden mutation of 1838, when, after one of the warmest Decembers ever remembered—the thermometer at Christmas marking near 60°—the 2nd of January introduced at once that terrible frost which lasted nearly six weeks, and on two occasions reduced the mercury nearly to, or even below, zero.

The January of 1843 was, on the contrary, bland and open; so much so, that there was no period of three successive days wherein it would have been difficult to break up the surface of the soil.

The weather of the late December was singular. To the 25th (Christmas day) the barometer had attained an altitude, during the whole course of the month, which, we believe, has never been recorded in Britain. We had once seen the mercury at 30 in. 80 cents. in the Isle of Thanet, near Broadstairs—a low situation. But here, in a high one, on Christmas eve, we registered 30 in. 46 cents.; and during the last twenty-eight days it has never receded to 30 inches. It is a phenomenon of remarkable peculiarity, and may indicate a very severe January. The gardener, therefore, is premonished to have all his appliances for protection ready, his frames well glazed, his hot-beds and flues in good serviceable order; so that, if a sudden attack come on, nothing may be endangered from want of preparation.

It will be the object of all these monthly articles, throughout the series, to make it appear that horticulture is a science; that it is governed by laws certain as the light, but which have heretofore been scarcely suspected to exist. We have, indeed, approached only to the threshold of knowledge; our clearest theories amount to little more than speculations, and our practice is that of routine.

Under the impression of these truths, we offer this, our first, as a preliminary article, explanatory of the order of the series which it is proposed to adopt.

The phenomena of vegetation are governed by several great natural agents, over which man exercises a certain degree of control. Some or other of these we shall allude to as an introduction to the calendarial directions of each month.

As the operations of every month must, in a degree, be contingent, we shall notice the state of the weather existing at the latest period prior to each monthly article being transmitted to the printer.

The probable operations in the kitchen, fruit, and flower garden, will be considered in a sort of weekly progress, so as to avoid confusion of dates. The directions for *culture under glass* will always

he made to refer to the presumed *condition* of the solar light.

1. The great *natural agent* which claims immediate attention is light, the light diffused by the solar rays through the medium of refraction, the atmosphere. At the moment of writing these words the day has increased in length, though not quite to one minute. The sun, having passed the limits of depression on the 21st by entering the sign Capricornus, has begun to ascend, acquiring a slight degree of increased meridional altitude, which renders itself apparent chiefly by the lengthening of the evenings. This increase began on the 18th of December. With the turn of day the torpor of vegetation diminishes; and though, by the severity of a January frost, nature would appear more paralyzed than it now is under the high unnatural temperature of December (42° by night, 55° by day); yet when plants are protected by glass, they speedily exhibit the vivifying influence of solar light, and assume some degree of activity.

During the latter weeks of November, plants like the *Gloxinea*, of which we had several specimens, abounding with verdant leaves and blossoms, afford evidence that under a declining sun, however brilliant its power, no degree of artificial heat could induce any colour in the corollas which lay deep in the cups of the calyx.

It seems, then, that during the declining months a great portion of the finer rootlets, connected with the late formed leaves and flower-buds, perish or become inactive; but as light advances vital activity is resumed, new rootlets or absorbent feeders are protruded, and then the upper parts receive aliment, regain colour, and begin to grow.

In the open air, direct frost checks and may kill some succulent plants; but the roots of the more hardy tribes are not idle. This may be ascertained by examining cuttings of China roses, goose-berries and currants, inserted late in October or November, many of which will, at the end of January be found to have emitted a ring of callus between bark and wood, which will protrude roots during early spring.

Meadows under grass appear deplorable during a severe January; but the soil under the herbage remains comparatively open and warm, so that they assume verdure almost immediately after a thaw. But these remarks refer wholly to the rise of the year; for, prior to turn of days, decreasing light always produces torpor, especially in severe weather. It is thus that we can account for the accidents which occur in pits and greenhouses, particularly in November and February; both are damp months, and in the former too much water and heat are frequently given to maintain verdure, at a period when the weakest root-fibres are languishing, and thus vitality is destroyed by misapplied stimulants. In February, after a season of confirmed torpor, solar power, with want of sufficient air, excites the debilitated buds before a corresponding development of new roots can supply the required aliment; and then decay comes on suddenly, and the plant perishes.

2. The increase of light, day by day, points to the necessity of keeping all the departments of hardy and half-hardy plants and shrubs exposed to as much air as circumstances permit in dry weather, when there is no actual frost. It is a great improvement in greenhouses to have the glazed roof secured, so that the sashes cannot be moved by rough wind or even by hand, unless done expressly to clean or repair them, while the admission of air is provided

for by means of front sashes made to move on a central pivot, and by corresponding wooden shutters at the upper part of the back wall; rain need never be then admitted, though air is effectually secured. Water should be sparingly supplied whenever the soil becomes manifestly dry, always apportioning the quantity to the actual power of the sun. It is astonishing how rapidly evaporation proceeded, even during the heaviest fogs of last December, while the barometer was at nearly its maximum of elevation; proving that *heat and temperature—high or low*—have little comparative influence with the existing condition of the atmosphere.

3. *The early Vinery*, if not already at work, should be excited by the first of the month; and this can be done with the greatest effect in a house provided with the hot water apparatus formerly alluded to, and which may now be described in a few lines.

An ordinary six or eight-gallon copper is brazed with two copper pipes, a foot long (more or less, according to the situation), three inches in the bore, and about four inches apart, one above the other, the lower one being very little above the bottom of the copper. To these pipes are adapted a series of common red earthen tubes, now easily met with: these are bent or elbow pipes also made, by which the angles of the erection are turned; and thus the house, at ends and sides, is completely furnished.

The earthen pipes terminate in the lower brazed tube, and a fall of four inches distributed throughout is amply sufficient to secure a regular flow of the warm water. Another advantage attendant on these earthen pipes is their porosity, by which a quantity of moist vapour is disseminated throughout the atmosphere of the vinery. If their red colour be objected to, the pipes can be painted with black-lead, and thus made to resemble iron tubes; while the radiating power is thereby increased. The cost of fitting up a twenty-four feet house was about £2, the cost of each pipe of 18 inches being 7d. (it is not more than 6d. at the manufactory).

4. *The pine stove* of fruiting plants ought now to be kept at 70° by fire, and 80° with the sun. *The succession pits* are advantageously worked by the aforementioned earthen hot-water apparatus, by which, with dung linings, a steady growing heat of 70° can be insured night and day. *Growing pines* never suffer from shaded or diffused light; they are by nature suited to sombre, vaporous habitats, and therefore deep pits, well covered during frost and snow, are adapted to them.

5. *Cucumbers* are grown to full perfection in similar pits, and so are melons, both plants being trained on a trellis a few inches below the glass. It is much too early, however, to contemplate the culture of the latter, but fine cucumbers have been cut for several weeks.

6. *Mushrooms* used to be grown on beds in the open ground, but in improved horticulture they are now produced in dark sheds, at the back of the stoves or vineries, each consisting of various ranges of shelves and troughs, prepared first with rich, pure horse-droppings, covered with a firm stratum of yellow maiden loam, and duly spawned. Inspection of a good mushroom-house in any great garden will exhibit the method at once. In such a house, ably managed, and kept at about 50° or little more, an amazing supply is obtained.

#### WEEKLY OPERATIONS.

First week.—Peas, sow thickly a row or two of the early Charlton, May, Warwick, or frame, three

inches deep, on a rather firm bottom, and cover the row with sawdust or sifted wood-ashes. In the row, among the peas, chopped furze is a good preventive against mice. Early *long-pod beans* are treated in the same way.

First and second weeks.—Radish twice; the short top red is preferred.

Third week.—Sow any kind of hardy cos or cabbage lettuce.

Fourth week.—Repeat sowing of peas, beans, and radish.

*Plant* now, but not before, any deciduous trees or shrubs which were omitted in the autumn. The roots will soon be active at this season, if the ground be open; but prior to the end of the month mischief may result from very severe weather, frost-hardened ground, and chilling snow.

*Gooseberry* and *currant* bushes may be pruned, if the weather be mild, because they will sprout ere long. *Spur* the currants, but cut clean away more or less of the older wood of the gooseberry, leaving a regular supply of last year's young branches. Dust every mossy tree with powdered lime and a fourth of coal-soot; lay a few inches of rich dung over the site of the roots, and then reverse the surface of the intervening soil (of rows) two inches deep; but avoid digging unless, to remove suckers.

*Prune* no wall tree nor espalier at present; but if insects be suspected, syringe the trees freely with a wash made of soft soap, mixed with a fourth of sulphur, and warm soft water, sufficient to form suds.

*Dig or trench* every plot, which ought to have been exposed to frost long ago, had the drenching rains of October and November permitted the work.

*Any plot* intended to be early cropped should, in our opinion, be now covered with two inches or more of mellow dung, if the surface be frosted; because thereby the heat from beneath will tend speedily to make the ground pulverable. It is seen that land under turf rarely freezes to any depth, and an artificial covering of some meliorating substance will be useful.

*Early potatoes* are procured by setting the entire small tubers of the ash-leaved upon grass turves, inverted upon a warm bed of tree-leaves, prepared a month since in brick pits, covering the tubers with four or five inches of soft mellow loam. Abundance of air will be required; water now and then; and the distance from the glass should be not more than the stems will require.

Time also is gained by placing tubers in some warm house or pit till the eyes push, when they can be planted in a warm border.

The *Lancashire lenon* kidney is thus procured during May, in that county. Never cut an ash-leaved potato, if the tuber be small, either for forcing or out-of-door culture.

Remove weeds every where, and littery leaves from walks or lawns; but disturb no parterre or flower quarter till nature shall rouse the plants into incipient activity.

## REVIEW OF THE CORN TRADE DURING THE MONTH OF DECEMBER.

The year 1813 has now passed away, and during its course nothing has occurred in any manner calculated to dispel even the smallest portion of the gloom which has been suspended over the heads of the agricultural interest, and of the productive labourers generally throughout the United Kingdom, since the passing of the present corn law, and since that equally fatal measure to the internal prosperity of this great country, "the alteration in the rates of duty previously charged on the importation of various articles of foreign agricultural product," was carried into effect. During last month, the supplies of wheat of home growth, which have been forwarded to the different markets of consumption, have not been large; and yet no improvement in its value has been the consequence. The quality generally, however, has been soft and inferior, and in some instances it has been damaged in the fields. In our previous reports respecting the last harvest, we have described the wheat crop, on the whole, as being neither abundant nor of superior quality; and, in as far as the corn season has as yet progressed, we cannot see any reason to alter our previously-so-often-repeated opinions on this highly important subject. Our farmers, therefore, during the present season, have for the present very little prospect of being better paid for their wheats than they have heretofore been; and the average price has, since the last wheat crop appeared at market for sale, been somewhere about 8s. per quarter under the price at which the prime minister of

the crown so lately declared it could be profitably produced in this country. That the information received by Sir Robert Peel on this subject was correct, we have no reason to doubt; indeed, from our own observations in these matters, we know that 58s. per quarter is rather under the mark than otherwise. The farmers, therefore, must again sink a further portion of their capital embarked in their farms, during this season, and a further reduction of rent, on the part of the land-proprietor, must again be submitted to; although it is not easy to make rents, in England at all events, much lower than they are at the present time; nor would the remission of them entirely make good to the farmer the loss which he sustains in his agricultural operations, when he is compelled to sell his wheat at the average price of 50s. per quarter, after payment of the expenses attending on its transmission to market. Unless, therefore, by the investment of additional capital, the immense improvements which every acre of land in this country is capable of undergoing, cannot be prosecuted hereafter; and then—when it is too late—the iniquity of the demand now making, by a well-organized conspiracy, for the total repeal of the corn laws, or even for fixed duties on the importation of foreign grain into this country, will be but too fatally illustrated by the misery and starvation which it must create amongst our industrial classes of all denominations. To the proprietors of the soil, to their tenants, and to the reduced establishment of agricultural la-

bourers, which the employment of foreign land labourers in preference to our own must occasion, the total repeal of the corn laws cannot be of the same importance as it must be to the remainder of the population. The tillage of the fields hereafter will, at all events, supply those who may be employed in this manner with all the necessaries, and even with many of the comforts of life; but from the practical introduction into this country of the principles of free trade in corn with foreign nations, a million at least of working men must inevitably be thrown out of employment, and be reduced to public charities for their daily bread. The agricultural labourers have no cause to complain of their present lot in life. They are satisfied with their condition generally; but even were this not the case, the division of their labour, and consequently of their wages, with foreign agricultural labourers, is not a very intelligible mode for curing their evils, if they actually be subjected to any. To the serfs of Poland, and to the slaves of Muscovy, the illustration in this country of the doctrines of the Anti-Corn-Law Leaguers must be of as much benefit, as it must be detrimental to every class of industry within her Majesty's dominions. To the national credit, and to the property which three hundred thousand families, and upwards, hold in our national debt, a free corn trade with foreign nations must naturally be ruinous; for fifty millions sterling of taxes could not afterwards be annually raised in this country. But the cotton-lords regard little the happiness of the vast mass of the British people, and the protection of their property. The increase of their own wealth is the sole object which they have in view. No doubt they profess a sufficient quantity of philanthropy—they desire to relieve their own workmen from distress—although this profession be attended by their own condemnation; for, within a dozen of years, many of these masters have accumulated more than princely fortunes; and, had they acted with only common honesty towards their own workmen, by whose toil they have acquired their wealth; had they paid, and did they now pay, to them wages commensurate to their own profits, distress could not, and never can, exist amongst the manufacturing labourers. The league, however, must be reminded of the declarations made by its orators at its first formation. The object then was to retain the present profits of the masters, and at the same time to undersell foreign manufacturers in all the foreign markets of consumption. These advantages, however, could not be obtained without reducing the wages of manufacturing labourers; and these wages had been previously so low that, without an assault on the property of the agricultural interest, their further reduction was not possible. Hence arose the demand, on the part of the Anti-Corn-Law League, for an unrestricted trade in agricultural produce with foreign nations; for this was the only channel open to them for increasing the immense riches of many of them, at the expense of the agricultural interest in the United Kingdom. But even should our legislators gratify the ambition of the members of this combination against the property of all classes in the British Empire, their professed principles can never be illustrated by such means. Foreign nations refuse, and very properly too, to admit into their consumption British manufactured goods, unless duties be previously paid on them, which may give ample protection to their manufactures at home and to

their internal industry. Indeed, the United States of America, and the Germans generally, have in this respect overstept the road of prudence; for their import duties are much too high to be protective, and accordingly our manufacturers at present enjoy a much more advantageous trade with Europe and America, than they can by any possibility do were the corn laws actually repealed and the commercial laws of reciprocity perfectly established; because our manufactures are now chiefly smuggled into consumption there, without being charged with any import duty whatever. We have within the United Kingdom the means, in the greatest abundance, of raising food perfectly sufficient for our population, were the number doubled. We have plenty of money, and plenty of industry and farming knowledge, for the development of our great agricultural resources; and security, therefore, is only necessary to call into activity the internal riches of the United Kingdom. No extended foreign commerce is necessary to the productive employment of our own population; although it is far, indeed, from our intention to undervalue the great and generally admitted importance of foreign commerce to the British empire. To give protection to the property of those who direct their attention to the improved cultivation of our fields is, however, immeasurably more important to the real wealth of the British empire than foreign commerce can ever be, however much it may be extended. By agricultural improvements we must eventually become entirely independent of foreign nations for any of the necessities of life; whilst, by increasing our commercial relations with them by reciprocity in trade, we forge chains for rendering our dependence on them more lasting and more galling. In the mean time, however, although our farmers are generally losing confidence in many members whom they placed in the legislature for the vindication of their interests and principles, still, from necessity, they are compelled to prosecute their agricultural pursuits, as offering to them the only remaining chance for saving a part of their capital invested in their farms; and, consequently, the winter operations are progressing as usual. The winter seed wheat has been committed to the ground generally in good order, although, in some of the western districts, complaints are making of too moist weather, and of the young plants consequently not being very healthy in their appearance. This circumstance is, however, not now of much consequence; for spring-sown wheat sometimes produces as large crops as the winter wheats do; but the season must be extremely favourable for the production of this effect, the plants not being so hardy as those are which have been subjected to a winter climate. After several deficient wheat crops, we may naturally look for the next one being abundant; but even this prospect is little cheering to the farmer, for an opinion is gradually gaining ground, that it is the intention of the ministers to yield to the clamour of the anti-corn-law conspiracy against agricultural property, and, on the meeting of Parliament, either totally to repeal the corn laws, or to place low fixed duties on the importation of foreign grain of all descriptions. In the same act of Parliament, they may as well declare the necessity also of Americanizing our national debt, and of repudiating the future payment of the half-yearly dividends; for this must be the certain consequence of the admission into this country of foreign agricultural produce, free of duty. The repeal of the corn law will

be the last will and testament of the British empire, and the abrogation of the national debt will be a fit codicil to such a suicidal document. The minister has only to propose an act of this description to Parliament, and most certainly he will carry it. He will be supported by the theorists in both Houses, and the opposition of the farmers' and of the labourers' friends there will be entirely unavailing.

The mail from Halifax has arrived in due course of post; and the information received by this conveyance, although not of immediate, is still of considerable ultimate importance to the agricultural interest in the United Kingdom. The elements have brought to a conclusion the navigation of the St. Lawrence, and a limit has consequently, for a time, been placed to farther shipments of flour, wheat, and cured provisions, from that part of our American possessions. The quantity of flour received, under the Canadian Corn Bill, has already far exceeded the most sanguine calculation made of its magnitude; but this quantity will be small indeed, when compared with the importations which we must receive when the rivers are again opened to the pursuits of commerce. Throughout our possessions in North America, and in all the western states of the United States, possessed as they are of continuous navigable lakes, rivers, and canals, from Lake Michigan to Quebec, and from that city to Great Britain, without even being subjected to the expenses of trans-shipment, very large crops of grain of all descriptions were produced last year; and, under our liberal system of nominal import duties, our information will indeed be most incorrect, if the shipments to be made to this country in the course of the next summer and autumnal months, be not immense; so much so indeed, that they will materially interfere with the wheat crop here, now in the fields, when it arrives at maturity. The anti-corn-law orators urge, as an argument in favour of an entire repeal of the present corn laws, that the importations of foreign grain will be afterwards regulated by our actual demand for it; and that they will not then be, as is the case at present, thrown into our markets for consumption during the harvest months. Now, in as far as this doctrine applies to Canada, next year will prove its fallacy; for the corn duties with that country are already most effectually repealed, and yet no mandate, even if issued by friend Bright himself, can alter the laws of nature, nor force the importation of Canadian flour and wheat at any other period than at that critical one when our own crops are first brought into the market for sale. It matters not what our prices may then be, for here, and here alone, can a market be found for the consumption of the surplus agricultural produce of this most prolific portion of the American continent, and by this circumstance alone must thousands more of our agricultural labourers be thrown entirely out of employment. Throughout our American possessions, and throughout the United States generally, large preparations are also in progress for the future supply of our markets with many other descriptions of agricultural produce. The cheese already received, and weekly arriving, from the United States, is seriously interfering with the property of our dairy farmers, and the quantity is now daily on the increase. This is one of the consequences of the changes made of late in our custom house duties; and for whose benefit they have been effected, it is difficult indeed to conceive, unless they be for the encouragement of foreign agriculture at the expense of our own. Cured provisions, also, we

shall receive in the greatest abundance from all quarters in the course of the ensuing year; for the benefit, no doubt, of the cattle breeders and feeders in Ireland; for, according to the Anti-Corn-Law League doctrines, the greater the competition with foreigners in these articles may be, the greater must be the prosperity of our dairy farmers and of our breeders and feeders of cattle and of swine. But it is not with Europe and with North America alone that our graziers will, in future, have to compete. At Buenos Ayres, at the Cape of Good Hope, in Australia, Van Dieman's Land, and even in the ports of the Pacific Sea, and in those of New Zealand, the public attention has been directed to this new channel for commercial operations; and our future prosperity will indeed, within a very short period, be boundless, if it be regulated by, and dependent on, according to the new philosophy of the Anti-Corn-Law spouters, annually increasing supplies of all descriptions of foreign agricultural produce arriving in this country, superseding our own produce in all our markets of consumption, as they most assuredly must do eventually, and causing the cultivation of our own fields to be for a time neglected, because unprofitable. It is useless for the friends of agriculture in Parliament to recommend now to their constituents increased exertions for the improvement of their agricultural products; for the American cheese already in our markets, is not inferior to the best qualities made in any county in England; and the same remark will soon be equally applicable to cured American provisions, when compared with those of Ireland. Our landed gentlemen, however, are yielding without any resistance or even complaint, to this iniquitous conspiracy entered into against their property; and the farmers, consequently, must submit to circumstances, and may lose their money with grace, at all events; but it will be over the heads of hundreds of thousands of agricultural labourers that the evil consequences of this most abominable combination must eventually burst, for it will reduce them either to the workhouse or drive them into the grave. Their sacred property is in productive employment, and a part of this property is about to be fraudulently taken from them, and to be transferred to foreign labourers, for no intelligible purpose whatever; for where is the wisdom or necessity of admitting American cheese into this country on the payment of a nominal duty of somewhere about 1d. per lb.? At New York they act differently, for the dairy farmers are protected there against competition with those of the United Kingdom by the imposition of 7d. duty on each pound weight of cheese imported into the American Union from this country. The grain growers there are likewise protected by the imposition of heavy duties on the importation of foreign grain, the duty on wheat being little short of 15s. per qr.; and thus is internal industry encouraged by beneficent laws, and the prosperity of the Union perfectly secured. If Sir Robert Peel would call on the British Legislature to emulate the conduct of these republicans, and to prefer the productive employment of our labourers to those of foreign nations, prosperity would speedily crown the labours of our workmen, and the Minister himself would enrol his name high in the list of the great benefactors of the British Empire. His system of expediency, however, and consequently of frequent changes in our commercial laws for the regulation of our foreign imports, we greatly fear, prevents him from acting that part in his character of Prime Minister which is so absolutely necessary to the public good.

From the ports in the north of Europe, within and without the Baltic sea, the news received in the course of last month, is not interesting to the British agriculturist. The corn trade is interrupted always at this season of the year, and the prices generally in all the large markets of exportation were, at the latest dates, entirely nominal. The letters, however, are filled with speculations on the future prospects of Polish and of German landed proprietors; anticipating, as the writers do, an annually improving trade in the exportation of all descriptions of agricultural produce. We shall, therefore, during the next summer and autumnal months, be again inundated with wheats of the finest qualities, whether our next crop be abundant or the contrary, whether we want foreign assistance or not; and, according to the opinions of many of these merchants, our export trade in manufactures, and in hard ware goods to the north of Europe, cannot be increased, even by the total repeal of our existing corn laws, or by any commercial treaties which we may conclude with any of those states, wherein these agricultural articles are produced. The Polish serf, the Russian slave, and the German boor, will dress themselves in British woollen and cotton goods, at the same time that the London dustman is clothed in Italian silk velvets, but certainly not one hour earlier, and this is but a dreary prospect even for the cotton lords themselves. To them the existing state of our corn trade with the north of Europe can do no good, but to our landed interest and to all our productive labours, it must be attended by very unfavourable consequences. With all descriptions of cured provisions also, we shall be plentifully supplied during the coming spring months from the German Ports and rivers without the Baltic sea; a circumstance which must be injurious to our graziers, and to the labourers employed by them. In a short month also, our markets will be plentifully supplied from Holland, with salmon and fish of all descriptions, which, according to the new philosophy, must be highly agreeable to our fishermen; and, when the season permits, we may expect abundance of cordage, chains, and cables from the upper ports in the Baltic, by which our rope-makers and blacksmiths will be again enabled to enjoy another year of idleness, and to feed themselves and their families on the expectations of reaping in some future period of their lives, the promised harvest of a free trade in grain, provisions, and fish with foreign nations. Hatmakers, shoemakers, and, indeed, all our other productive makers, may expect to be again gratified with similar advantages, originating in general reciprocity in trade; and thankful ought our working classes to be to the strenuous exertions of the Anti-Corn-Law Leaguers, so disinterestedly made in their favour.

Since our last publication, the supplies of barley in the principal markets of consumption have not been very large, but still they have been, on the whole, equal to the demand. The distillers requiring at this time of the year, large quantities of secondary descriptions of barley; the average price is a shade higher than we quoted it in our last magazine, but for malting qualities the demand has been unusually dull for the season of the year, and no improvement whatever can be noted in their prices. Annually now is the quantity of barley consumed by the malting trade falling away, not because the quantity of beer in use is becoming less, but because the half of it is spurious, and extracted,

not solely from malt and hops, but from various descriptions of deleterious ingredients, which are mixed with the pure beer after its delivery from the public breweries. Malt and hops are the cheapest articles which can be used in brewing, but it would really appear that our rulers' object is to prevent the consumption of beer in its wholesome and perfect state. By the act of 1815, the mean value of barley was declared to be about 45s. per qr., and so long as this act was in perfect operation, the barley growers were paid remunerating prices for their crops, and the beer generally was of excellent quality. The currency bill of 1819, which became most effective in 1825, put an immediate end to this favourable state of the barley and of the brewing trades. The alteration in the currency advanced the value of money little short of forty per cent, but it did not proportionably reduce the public expenditure. It reduced the value of barley, in many instances, from forty to fifty per cent, and it increased the pressure of the malt and spirit duties in an equal degree. The fall in the value of all descriptions of property was naturally attended by a most ruinous decline in the rates of wages paid to the industrial classes of all denominations; and thus the distress became universal, excepting amongst the tax-eating portion of the community. Had the malt duty been then reduced to moderation; had it been made 1s. per bushel, then the adulteration of beer to its present alarming extent would not have been, as it now is, a work of absolute necessity; nor would the farmers now be in want of consumers for the finer qualities of their barley crops. They would have continued to increase the cultivation of barley in proportion to the increase of the population and of wealth; and no small portion of the distress now existing in the agricultural interest would, in every probability, have been avoided. But our legislators have, it would appear, not considered the barley growers and the beer consumers sufficiently punished even by the gold currency bill, for they have lately removed a great portion of the protection which the act of 1827 guaranteed to them against the competition of foreign agriculturists in our markets of consumption. Barley at present pays into the public treasury upwards of twelve millions annually, and this amount would be materially increased by the malt and English spirit duties being reduced to moderation. One-half of the beer now consumed, however, is brewed neither from hops nor malt, and consequently it pays nothing towards the public revenue. A rumour certainly has found its way into circulation within the last two or three weeks, that our finance minister intends to propose to Parliament, during the next session, the transfer of one-half of the sum now collected on manufactured barley to other articles on which no direct taxation has as yet been imposed. We much fear, however, that the wish is father to the thought on this occasion; but if the minister be really serious in his desire to relieve agriculture from a part of the taxes under which barley has so long suffered, the barley growers, maltsters, distillers, and the great mass of beer consumers, will consider the transfer of one-half of their public burdens to any other quarter as a very great advantage; and as the cotton manufacturers assert that the malt and spirit duties do not injure the barley grower, because they are eventually paid by the consumers, so the imposition of six millions sterling annually on manufactured goods, could do no injury whatever to the manufacturers, because, according to their doctrines, the consumers eventually pay the taxes. But we repeat that the

revenue would not be rendered less by the reduction of the barley taxes; on the contrary, a charge of 1s. per quarter on malt, and of 5s. per gallon on English spirits, would much increase the revenue; for although it certainly would very materially diminish the consumption of ardent spirits now used in this country, still this reduction of consumption would be taken from smuggled spirits alone, which contribute nothing to the national revenue, the quantity of wholesome British spirits now in use would be doubled, and the illicit foreign spirit trade would be speedily destroyed. If the public good be the object of the Anti-Corn-Law Association, the members of it cannot better illustrate their benevolence towards the industrial classes, than by calling the attention of the legislature to the manner in which barley is at present taxed in this country. It pays nearly one quarter of the annual public expenditure, and the working classes are the chief contributors. The beer which is now used is adulterated by the manufacturing arts, and is most prejudicial to the health of its consumers. No ingredients for the brewing of beer, we repeat, can be cheaper than malt and hops, were the public charges on them only moderate. The favourite beverage of the people would then be pure and wholesome, and certainly considerably cheaper than is the spurious trash which, under existing circumstances, they are compelled to use. But these are not the only advantages which the reduction of these highly obnoxious duties would confer on the labouring classes generally; for their property in labour would be vastly increased by the productive employment, which many thousands of them would, from necessity, receive, in the cultivation of upwards of two millions of acres of land, at present in a perfect state of unproductiveness, which the additional consumption of barley would render requisite. The cultivation of this quantity of waste land would increase the landlord's rents and the value of his lands; and the profits of the tenantry and of the farming labourers thereon, would be perfectly equal to the payment of the increased expenditure which the increased consumption of beer would occasion. But this is the very reason why the Anti-Corn-Law Leaguers remain profoundly silent on this subject, for their object is the reduction of wages, and not their increase. The cultivation of our waste lands would render labour more valuable than it now is, and consequently the wages of all our labourers would be raised. This would but badly assort with the present views of the members of that combination, and hence their silence on the subject. But still the cultivation of waste lands throughout the United Kingdom is a matter infinitely more important to the real interests of her Majesty's subjects than any addition to our foreign commerce ever can be. By extended commerce with foreign communities, only a very few individuals can reap advantages; but by improved agriculture the vast mass of the people must be rendered happy and independent in their circumstances of foreign aid, all their wants being most plentifully supplied by our agricultural producers at home. In Ireland this is particularly the case at the present moment. The cultivation of her waste lands would be perfectly sufficient to maintain, in great comfort, double her present population; but confidence in the security of money so invested, and protection to the produce of these undertakings are absolutely necessary to its immediate prosecution. The oat markets throughout Great Britain have been, during the last month, chiefly supplied with oats of Irish growth; the

season, for a time, preventing the arrival of any great quantity from the north of Europe. Still, however, even the prospect of farther large supplies from abroad when the winter months have passed away, has at the present moment a very prejudicial influence on the value of oats, which are now lower than the expenses of their production. To the agricultural interest in Ireland this state of the oat trade is little less than ruinous. The agricultural labourers are in a state bordering on starvation. The farmers can pay neither poor's rates nor taxes, unless they draw them from the capital embarked in their farms; and the land proprietors have reduced their rents on an average very little short of thirty per cent. Even should the public credit be applied in future to the cultivation of the waste lands in Ireland, Irish agricultural grievances could receive no very effectual relief, unless the produce of the soil and the wages of the labourers hereafter be protected amply against the interference of foreign agricultural property in our markets of consumption. It is not possible to fancy that this state of things can continue for any length of time, without washing away the land proprietors' rents altogether, and putting England on a level with Poland, Russia, the greatest part of Germany, and the whole of North America; where tenants are unknown, or at least heard of only in a very small degree. The lowest estimated value of landed property is three thousand millions throughout the United Kingdom, and upwards of two millions of male labourers are employed in the tillage of our fields. Add to this immense national interest that of the national debt, funded and unfunded, being nearly another thousand millions sterling, and on which, three hundred thousand persons, chiefly orphans and widows, are subsisting at the present time; and then the dangerous tendency of the principles of the anti-corn law leaguers must become perfectly obvious to every unprejudiced mind. In commercial pursuits much less than three hundred millions sterling are embarked, and the cotton manufacturers in England give productive employment to less than half a million of human beings, of whom two-thirds are either women, or children much under age; and yet this interest is held forth by the cotton lords as by far the most important one within the British Empire. Steam is their workman. This is the mighty engine from which they draw their immense fortunes. The productive employment of as few labourers as possible, is their practical philosophy; and in the cultivation of their fields they recommend to the farmers, in as far as possible, to be economical of human labour, as being the best means for the production of cheap food; little reflecting, that by the means to pay, must the consumption be regulated, and that to adopt their liberal tenets must deprive the great body of the people of wages sufficient for the payment of even starvation allowances of food. Unless, therefore, speedy attention be given by the legislature to the actions of the anti-corn law leaguers, before long all will have reason to mourn over their reduced circumstances and their fallen independence.

#### CURRENCY PER IMP. MEASURE.

WHEAT, Essex and Kent, new, red	48	54	White	48	53	58	60
Irish	48	50	Do.	50	52	52	52
Old, red	51	59	Do.	58	60	63	63
RYE, old	30	36	New	36	—	—	—
BARLEY, Grinding 30 32 Malt	34	35	Chevalier	35	36	—	—
Irish	26	28	Bere	24	26	—	—
MALT, Suffolk and Norfolk	60	62	Brown	56	58	—	—
Kingston and Ware	60	63	Chevalier	60	63	—	—

OATS, Yorksh. & Lincolnsh., feed	21	22	Potato..	22	25
Youghall and Cork black	--	19	Cork, white	19	20
Dublin	18	19	Westport	19	20
Waterford, white	18	19	Black ..	--	19
Newry	20	21			
Galway	17	18			
Scotch feed	20	22	Potato..	23	25
Clonmel	18	20	Limerick	19	20
Londonderry	18	19	Sligo ..	18	19
BEANS, Tick, new	25	34	Old, small	34	38
PEAS, Grey	32	33	Maple..	31	33
White	33	36	Boilers ..	34	38
FLOUR, Town-made	48	50	Suffolk	40	pr sk. of 280 lbs.
			Stockton and Norfolk,	38	40
			Irish	42	--
FOREIGN GRAIN AND FLOUR IN BOND.					
WHEAT, Dantzic	42	45			
Hamburg	40	--			
Rostock	42	44			
BARLEY	20	--			
OATS, Brew	12	16	Feed ..	11	15
BEANS	15	19			
PEAS	23	25			
FLOUR, American, per brl.	21	23	Baltic ..	21	23

IMPERIAL AVERAGES.

Week ending	Wheat.	Barley.	Oats.	Rye.	Beans.	Peas.
Nov. 11th.....	53 1	32 5	18 9	29 3	32 2	34 0
18th.....	51 7	32 4	18 11	30 5	32 4	34 0
25th.....	51 0	32 1	19 0	30 8	32 4	33 7
Dec. 2nd.....	51 1	31 8	19 0	30 7	31 10	33 6
9th.....	51 0	31 8	18 8	30 1	32 0	33 0
16th.....	50 9	32 0	18 6	30 0	31 6	32 4
Aggregate average of the six weeks which regulates the duty .....	51 3	32 0	18 10	30 2	32 0	33 5
Duties payable in London till Wednesday next inclusive, and at the Outports till the arrival of the mail of that day from London ..	19 0	6 0	8 0	10 6	10 6	9 6
Do. on grain from British possessions out of Europe.....	5 0	0 6	2 0	2 6	2 0	6 1

COMPARATIVE PRICES OF GRAIN.

WEEKLY AVERAGES by the Imp. Quarter, from the Gazette, of Friday last, Dec. 22nd, 1843.	AVERAGES from the corresponding Gazette in the last year, Friday, Dec. 24th, 1842.		
s. d.	s. d.		
WHEAT.....	50 9	WHEAT.....	47 2
BARLEY.....	32 0	BARLEY.....	26 5
OATS.....	18 6	OATS.....	17 4
RYE.....	30 0	RYE.....	28 5
BEANS.....	31 6	BEANS.....	28 11
PEAS.....	32 4	PEAS.....	31 2

Account shewing the Quantities of Corn, Grain, Meal, and Flour, imported into the United Kingdom, in the monthended the 5th Dec., 1843; the Quantities upon which Duties have been paid for Home Consumption during the same month, and the Quantities remaining in Warehouse at the close thereof.

Foreign Grain and Flour.	Quantity imported.	Quantity entered for consumption.	Quantity remaining in warehouse.
	qrs. bush.	qrs. bush.	qrs. bush.
Wheat, from British Possessions .....	4900 2	4900 2	426 6
Barley .....	0 1	0 1	--
Peas, from do.....	1199 1	841 6	746 0
Indian Corn, do.....	--	24 6	19 1
Wheat, foreign .....	56501 0	840 1	160786 4
Barley, do.....	11460 3	12509 2	11599 3
Oats, do.....	18985 2	1172 3	61067 1
Rye, do.....	2212 3	1 0	2225 6
Peas, do.....	9899 6	4864 5	25293 4
Beans, do.....	317 1	8131 7	9528 1
Indian Corn, do.....	--	--	2531 4
Buck Wheat, do .....	0 3	0 3	--
	cwts. qrs.lbs.	cwts. qrs.lbs.	cwts. qrs.lbs.
Flour and Meal from British Possessions	80841 2 23	80513 2 13	2125 1 16
Flour & Meal, foreign	25877 0 22	208 2 5	77369 3 22

PRICES OF SEEDS.

Carraway .....	--	--	new	37	62
Clover English, red .....	46	65	white	none.	per cwt
Flemish, pale .....	44	52	do..	60	90
New Hamburgh .....	63	68	do..	60	92
Old do.....	42	54	do..	50	90
French .....	50	70	do..	none.	
Linseed, English, sowing	50	60			
Baltic .....	--	--	crushing	35	37 per qr.
Mediter. & Odessa	36	38			
Coriander .....	15	20	per cwt.		
Mustard, brown, new ..	12	18	white..	10	12 p. bush
Trefoil.....	--	--	old..	14	22 new 70 32s
Rapeseed, English new..	254.	261.	per last.		
Linseed Cakes, English..	92.	10s. to 104.	per 1000		
Do. Foreign..	51.	to 61.	10s. per ton.		
Large, foreign.....	--	--			
Rapeseed Cakes .....	51.	5s. to 51.	10s.		
Hempseed.....	35	38	per qr.		
Rye Grass, English.....	--	--	Scotch	--	-- nominal.
Tares, winter .....	4s. 0d.	to 4s. 6d.			
Canary, new.....	58	--	fine	60	-- per qr.

PRICES OF HOPS.

BOROUGH, MONDAY, DEC. 25.

This being Christmas day, we have of course nothing to report beyond the transactions of last week, when a good business was done at former prices. Hops generally are scarce, and a bargain is noted in Mid. Kent bags, at 135s. to 170s. per cwt., the consumers meeting with such a scarcity of pockets. Our last week's quotations may stand up for the bargains effected since, whether in Sussex, Wealds, East Kent, or Farnham.

ROCKETS, 1843.

Sussex .....	116s. to 118s.	Mid Kents .....	140s. to 180s.
Wealds .....	118s. to 122s.	East Kents .....	140s. to 210s.
Do. Choice .....	126s. to 130s.	Farnhams .....	185s. to 210s.

POTATO MARKET.

SOUTHWARK, WATERSIDE, DEC. 25.

The weather during the past week has been similar to that of several of the preceding; the supply continues to be moderate; the demand for the best samples from all countries is great, and especially for the reds, which have gone off freely at last quotations. There is a slight advance in those from Scotland and Devonshire, the supply from those districts being limited. There appears a general firmness in the market, at the annexed prices:—

PRESENT PRICES AS ANNEXED:—

per ton.	per ton.
York Reds .....	60s. to 80s.
Perth do.....	60s. 65s.
Fishhire do.....	s. s. Wisbeach do.....
Early Devons .....	s. 65s. Do. Blues .....
Late do.....	s. s. Do. Whites .....
Coriwall .....	s. 65s. Gurnsey Blues.....
Jersey Blues .....	s. 50s. Do. Whites .....
Do. Whites .....	s. s. Prince Regents .....

PRICES OF MANURES.

Subjoined are the present prices of several sorts of manure:—

Hunt's Bone dust,	16s. per qr.
Hunt's Half-inch Bone,	14s. per qr.
Hunt's Artificial Guano,	8l. per ton
Rape Dust,	6l. to 6l. 10s. per ton
Rape Cake,	6l. per ton.
Rags,	4l. to 4l. 10s. per ton.
Graves,	6l. 10s. per ton.
Gypsum, at the waterside,	32s. 6d. per ton; landed and housed, 38s. to 42s. per ton, according to quantity.
Agricultural Salt,	34s. per ton.
Lance's Carbon,	12s. per qr.
Ditto Humus,	14s. per qr.
Soap Ashes,	10s. per ton.
Poittevin's Patent Disinfected Manure,	13s. 6d. per qr.
Poittevin's Highly Concentrated Manure,	30s. per qr.



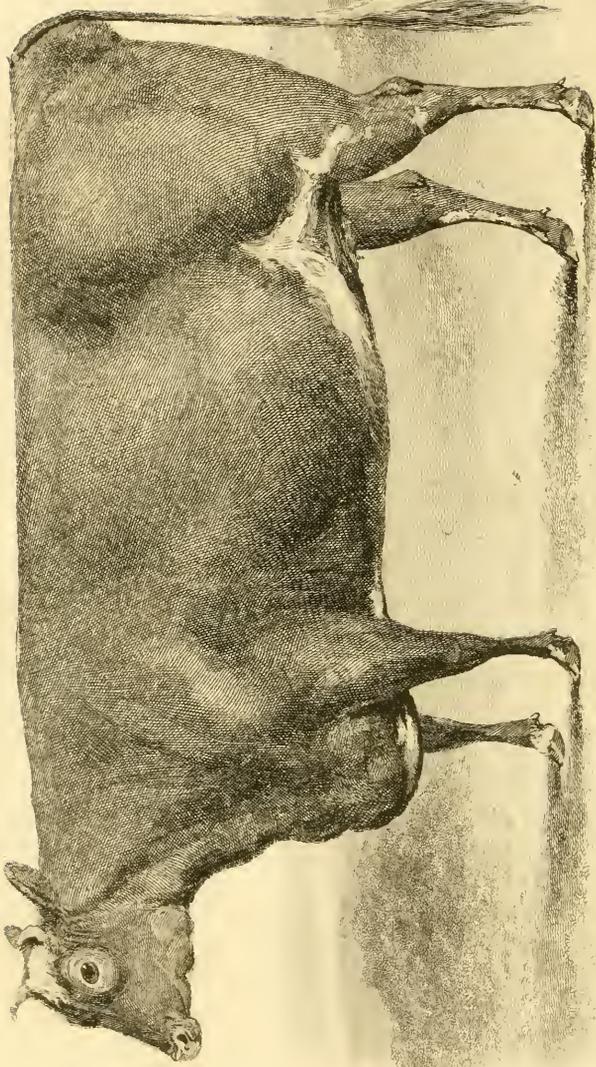


*James M. Smith*

*1810*

*Engraved by J. H. Smith*





# THE FARMER'S MAGAZINE.

FEBRUARY, 1844.

No. 2.—VOL. IX.]

[SECOND SERIES.

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## PLATE I.

CHARLES COLLING.

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## PLATE II.

BUTTERCUP.

Red and white Heifer, calved on the 11th of April, 1841. She was bred by, and is the property of, Mr. Henry Watson, of Walkeringham, near Bawtry. She was got by Garrick (3863), dam by son of Blyth Comet (5250), of Young Eryholme (1981), gr. dam by Belzoni (1709), gr. g. dam by Comus (1861), gr. g. g. dam by Denton (198), a son of Comet (155).

She was the winner of the first Prize at the Meeting of the Great Yorkshire Society at York, in 1842, as the best yearling Heifer. "Princess Royal" from the same cow, obtained the first Prize also at the Hull Meeting the previous year. Last August at Doncaster, Mr. Watson also obtained the first Prize, with his celebrated Heifer, "Myrtle," winner of the Yearling Prize at Derby; having thus in three successive years, viz., 1841, 42, and 43, obtained Prizes at the Great Yorkshire Society.

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## MEMOIR OF CHARLES COLLING.

By CUTHBERT W. JOHNSON, Esq., F.R.S.

The improvement of the noble breed of English cattle, to which the life of the distinguished subject of this memoir was so long devoted, is an effort to which the general reader will hardly perhaps assign the importance it so richly deserves. And yet we need only trace the progress of improvement, in the breed of cattle by the few imperfect, historical notices, in our possession to feel convinced of the importance of the undertaking. It is, indeed, needless to go back for any instruction in the art of breeding to the descriptions given by the old agricultural writers of the breeds of native cattle, since it is very evident, that the breeders of those days were entirely unacquainted with the desirable points to be obtained in the animals they produced, large bones and wide spreading horns being on more than one occasion dwelt upon with much commendation in their descriptions of the cattle of those ages. Cattle have always been a prominent production of this country. They were mentioned by Cæsar, Strabo, and other ancient writers. They have ever since continued, more or less, particularly to engage the attention of the farmer, not only for the dairy and the plough, but also as a source of food. The breeding of cattle, however, had been so much neglected in the time of Edward VI. for the more

profitable pasturage of sheep, that in 1555, an act of parliament was passed to remedy the evil. The preamble states that "Forasmuch as of late years a great number of persons in this realm have laid their lands, farms, and pastures to feeding of sheep, oxen, runts, scrubs, steers, and heifers, &c., having no regard or care to breed up young beasts and cattle, whereby is grown great scarcity of cattle and victual;" and therefore it is enacted that a cow shall be kept wherever are sixty sheep, and a calf reared where there are one hundred and twenty, &c. (*2 and 3 Phil. and Mary, c. 3.*) Many other enactments occur in the legislative records; but reason and interest are much better promoters of improvement than acts of parliament. A due attention to the breeding of cattle was first aroused by Mr. Bakewell. He let bulls for one hundred and fifty guineas during four months, and five guineas per cow was no uncommon charge. Pedigrees of different animals have since been preserved with as much care as those of race horses. The attention and care that have thus been paid to their breeding, have met with an appropriate recompense. In no other country is there now to be found such breeds of cattle; and that none are so highly esteemed, is proved by the prices that have been given for particular animals. (*Marshall's Midland Counties, i. 334. Parkinson on Live Stock, ii. 469.*)

To what an extent the cattle of England have steadily

increased, may be in some measure estimated from the number annually sold in Smithfield Market. In 1730, they amounted to 76,210; in 1762, they had increased to 102,831; in 1792, to 107,318; in 1822, to 112,043; and in 1832, to 166,224. And there is no doubt that while the numbers have been enlarging, the average weight of these has progressed with nearly equal rapidity. According, says Mr. Maculloch, to an estimate of Dr. Davenant, in 1710, the average weight of the *nett* carcass of black cattle was then only 370lbs., and of calves 50lbs., but now there is every reason to believe that the *nett* weight of black cattle will average about 550lbs., and that of calves 105lbs.—(*Maculloch Dict.*)

Of the private life of Charles Colling (an excellent likeness of whom, engraved by Mr. Cook, is prefixed to this memoir) we have but few particulars; and, as we have elsewhere observed, it is only in his great public efforts as certainly the most celebrated breeder of his day that the reader will feel interested. It is said that soon after the commencement of his career as a breeder of cattle, he spent three weeks with Mr. Bakewell, at Dishley, and a man of his powers of observation would not allow such an opportunity to go unimproved. It is probable that this visit had considerable influence in inducing him to turn his attention to the improvement of the cattle of his native county. He long resided at Ketton, near Darlington, on a farm which will ever be an object of historical interest to the grazier and the farmer, and which his father gave up to him upon his marriage; it was here that he not only accumulated an ample fortune, but secured to himself the gratitude not only of the English farmers of his day, but of all countries, and after ages.

The character of Charles Colling was evidently cool, calm, sagacious, and energetic. His neighbours and rival breeders, who watched his progress with all the anxiety that his unexampled success so naturally excited, could never divine the objects he had in view, or the principles on which he acted. These traits in his character have been incidentally noticed by Professor Youatt, in his excellent work on cattle, when tracing the history of the Teeswater Short Horns; and what he has so well described we will not attempt to give in other language. "Whatever," says Mr. Youatt, "had been the previous merits of the Teeswater cattle, it is certain that Mr. Colling greatly improved them, and although it has been often asserted that his success was the result of chance, arising from the possession of an animal with the merits of which, it is supposed, he was at one period unacquainted, yet the writer of this article is of opinion that Mr. Colling's success resulted from a deliberate and well considered plan. Colling found the Teeswater, like all other extravagantly large cattle, very frequently of loose make and disproportion. He was sensible, also, of the difficulty of breeding with anything like certainty *large good* animals; and though he had on all occasions declined to throw any light on his views and proceedings, still the writer thinks he can detect, in the very outset, and through the progress of his practice, a resolution to reduce the size of this breed, and at the same time, by that means, to improve its form. This he is supposed to have effected in the first instance through the medium of a bull called "Hubback," an animal respecting which there has been much controversy, principally touching the purity of his blood, a question now of little importance, because it is admitted on all hands that Mr. Colling adopted another cross which prevails in a majority of superior short-horns of the present day. It may, notwithstanding, be a matter of interest to state a few particulars respecting this bull.

Without entering on an enquiry as to the circumstances by which "Hubback's" title to be considered of pure blood is supported or weakened, it may suffice to observe, that it appears probable that he possessed on one side the improved blood. The possessor of his dam was a person in indigent circumstances, and grazed his cow on the highways; when afterwards she was removed to good land, near Darlington, she became so fat that she did not again breed, and her son having the same propensity in a high degree, was useful as a bull but during a very short period. The quality of his flesh, hide, and hair, are supposed to have been seldom equalled; and as he was much smaller than the Teeswater cattle, he was eminently calculated to forward Mr. Colling's views.

It has been remarked that we have at present no superior horses on the turf, which does not boast the blood of the Godolphin Arabian; so it may be asserted that we have no superior short-horns which do not claim descent nearly, or remotely, from Hubback.\*

This account of "Hubback" differs in some particulars from one that has reached us from another quarter. According to the latter, the animal narrowly escaped being cut off while a calf, being actually on its

\*This is true, because Hubback was the sire of the dam of Mr. Charles Colling's bull, Foljambe, who was the grandsire of Favourite; and there can be no doubt that there has not been for many years any superior short-horn who was not descended from Favourite. Mr. Charles Colling is said to have considered that the bull, Foljambe, was the one that did his stock the greatest good; and this is not improbable, as Foljambe was the sire both of the sire and dam of Favourite. Hubback, however, must have been a remarkably good animal, and, considering the short time during which he was used as a bull, proved himself a first-rate stock-getter.

The following account of "Hubback" we had from Mr. Waistell, of Ailey Hill, who, although his name does not appear conspicuously in the "Short-Horned Herd Book," deserves much credit for his discrimination here. He used to admire this calf, as he rode almost daily by the meadow in which it grazed; and at length he attempted to purchase it from the owner. The price asked, 8*l.*, seemed much for a calf not a year old; and the reputation of the short-horns not being yet established, the bargain was not struck. Still he longed for the young beast; and happening to meet Mr. Robert Colling near the place, he asked his opinion of the animal. Mr. Colling acknowledged that there were some good points about him; but there was something in his manner of acknowledging this which induced Mr. Waistell to suspect that Mr. Colling thought somewhat more highly of the calf than his language expressed, and therefore he hastened the next morning, concluded the bargain, and paid the money. He had scarcely done so before Mr. R. Colling arrived for the same purpose, and as the two farmers rode home together they agreed that it should be a joint speculation.

Some months passed by, and either Mr. Waistell's admiration of the calf a little cooled, or his partner did not express himself very warmly about the excellences of the animal, and Messrs. Waistell and R. Colling transferred young Hubback to Mr. C. Colling; who, with the quick eye of an experienced breeder, saw the value of the little beast. Mr. Waistell expressed to us (October, 1832) his regret (natural enough) at having been induced to part with the sire of the short-horns, and his extreme disappointment that when Hubback began to cover, Mr. Charles Colling confined him to his own stock, and would not let him serve even one of Mr. Waistell's cows.—*Professor Youatt.*

way, in a cart, to the butcher, when it was observed by a blacksmith residing at a place called Harrowgate, on the high road to Darlington. Being struck by its appearance he bought it for his son-in-law, by whom it was reared, until purchased by Mr. R. Colling and Mr. Waistell, as already mentioned. Previously to buying it Mr. R. Colling asked his brother, Mr. C. Colling, to look at the animal, and upon the latter giving a most favourable report of its merits, the bargain was effected. As before stated, the animal was shortly afterwards transferred to Mr. C. Colling for its original price of 8*l.*, who was highly delighted at his acquisition; and on its arrival at Ketton he asked his wife to go out and look at the handsomest little bull she ever saw in her life.

After obtaining this bull, Mr. Charles Colling proceeded with singular success to produce, from time to time, superior animals; and the number of bulls he disposed of by letting was highly encouraging. But the circumstance which brought the improved short-horns into most extensive notice was the production of the "Durham Ox," an animal which speaks volumes in favour of even a single cross of this blood; for the ox was the produce of a common cow, which had been put to "*Favourite*." At five years old, the Durham ox was sold to Mr. Bulmer, of Hamby, near Bedale, for public exhibition, at the price of 140*l.*: this was in February, 1801. He was at that time computed to weigh 168 stones, of 14*lb.*, his live weight being 216 stones; and this extraordinary weight did not arise from his superior size, but from the excessive ripeness of his points. Mr. Bulmer having obtained a carriage for his conveyance, travelled with him five weeks, and then sold him and the carriage, at Rotherham, to Mr. John Day, on the 14th May 1801, for 250*l.*

On the 14th of May, Mr. Day could have	£.	s.	d.
sold him for		525	0 0
On the 13th of June for		1000	0 0
On the 8th of July, for		2000	0 0

Mr. Day travelled with him nearly six years, through the principal parts of England and Scotland, till at Oxford, on the 19th February, 1807, the ox dislocated his hip-bone, and continued in that state till the 15th April, when he was obliged to be slaughtered, and, notwithstanding he must have lost considerably in weight during these eight weeks of illness, his carcass weighed—

	Imp.-stones.	lbs.
Four quarters	165	12
Tallow	11	2
Hide	10	2

This was his weight at eleven years old, under all the disadvantages of travelling in a jolting carriage, and eight weeks of painful illness. Had he been kept quietly at Ketton, and fed till seven years old, there is little doubt but he would have weighed more than he did at ten years old, at which age Mr. Day stated his live weight to have been nearly thirty-four hundred weight, or two hundred and seventy stones, from which, if fifty be taken for offal, it leaves the weight of the carcass two hundred and twenty stones.

It is a well-ascertained fact, that, during his career as a breeder, Mr. Colling tried several experiments in crossing, and resorted to breeds which were, on these occasions, very considerably smaller than the short horns, a circumstance which tends to corroborate the writer's opinion that he considered it desirable to reduce their size. The cross with the *Kyloe* led to no results worthy enumeration, but that with the *polled Galloway* must not be passed over without comment.

Before stating the circumstances attending this experiment, it may be proper to observe that no breed of cattle promised so successful a cross with the short-horns as the *Galloway*. They were calculated, by their deep massive frames and short legs, to bring the short-horns nearer the ground, and to dispose of their weight in a more compact manner: their hardy habits would be essentially useful, and the quality of their flesh and hair was such as to render the experiment still more safe. Add to this, that they could be obtained of a red colour, and we are prepared to admit, even without the sanction of a successful experiment, that they were admirably adapted to cross with the short-horn, standing frequently too high from the ground, not very well ribbed home, and not seldom of loose, disjointed frame.

To this breed Mr. Colling resolved to resort; and though at the time when he did so, the attempt was regarded with some degree of ridicule by the pure-blood advocates, and comments were made which would have deterred ordinary men from the exercise of their judgment, Mr. Colling persisted.

He was much favoured by circumstances in promoting his object, which was to take one cross, and then breed back to the short-horn,—the only course, by the way, in which crossing can be successfully adopted. To breed from the produce of a cross *directly among themselves* will lead to results which have induced many persons, without due consideration, to believe conclusive against crossing; but to take one a single cross, and then return and adhere to one breed, will, in the course of a few generations, be found to stamp a variety with sufficient certainty.

Mr. Colling's short-horned bull *Bolingbroke* was put to a beautiful red polled *Galloway* cow, and the produce, being a bull-calf, was, in due time, put to *Johanna*, a pure short-horn,—she also producing a bull-calf. This grandson of *Bolingbroke* was the sire of the cow, *Lady*, by another pure short-horned dam, and from *Lady* has sprung the highly valuable family of improved short-horns, termed in reproach, the *alloy*. How far the alloy deteriorated the breed, let *facts* testify.\*

It will probably be admitted that the prejudice against this cross was at its height at the time of Mr. Charles Colling's sale. The blood had then been little, if at all, introduced into other stocks, and it was manifestly the interest, whatever might be the inclination, of the many breeders who had it not, to assume high ground for the pure blood, and to depreciate the alloy. Under these untoward circumstances, what said public opinion, unequivocally certified by the stroke of the auctioneer's hammer? *Lady*, before mentioned, at fourteen years old, sold for two hundred and six guineas. *Countess*, her daughter, nine years old, for four hundred guineas. *Laura*, another daughter, four years old, for two hundred and ten guineas. *Major* and *George*, two of her sons, the former three years old, the latter a calf, for two hundred guineas, and one hundred and thirty; besides a number of others, more remotely descended from *Lady*, which all sold at high prices; in fact, in a sale of forty-eight lots, realizing 7,115*l.* 17*s.* *Lady* and

\*The dam of *Lady* was also the dam of the bull *Favourite*; and as the grandson of *Bolingbroke* is not known to have been the sire of any other remarkably good animal, it is most probable that the unquestionable merit of *Lady* and her descendants is to be attributed more to her dam than to her sire.—*Professor Youatt*.

her descendants sold for a larger sum than any other family obtained.\*

It is gratifying to be able to add, that by such successful, and such richly rewarded efforts, Charles Colling

secured an ample fortune. Retiring, after spending many years of his life (he was only sixty when he retired) in the most noble efforts to improve the breed of cattle, he removed from Ketton, the scene of his

\* The whole particulars of this first grand sale of short-horn stock ought to be preserved. We extract it from Mr. Bailey's Survey of Durham:—

*A Catalogue of Mr. C. Colling's Sale of improved Short-Horned Cattle, October 11th, 1810.*

COWS.

Names.	Out of	Got by	Cows' Age.	Bull'd by	Sold for. Gs.	Bought by
Cherry....	Old Cherry....	Favourite.....	11	Comet ..	83	{ J. D. Nesham, Esq., Houghton-le-Spring, Durham.
Kate.....	.....	Comet.....	4	Mayduke	35	{ Mr. Hunt, Morton, Durham.
Peeress....	Cherry.....	Favourite.....	5	Comet ..	170	{ Major Rudd, Marton, Yorkshire.
Countess..	Lady.....	Cupid.....	9	Do. ....	400	{ Do.
Celina....	Countess.....	Favourite.....	5	Petrarch.	200	{ Sir H. Ibbitson, Bart., Denton Park, Yorkshire.
Johanna...	Johanna.....	Do. ....		Do. ....	130	{ H. Witham, Esq., Cliff Hall, Yorkshire.
Lady.....	Old Phoenix ..	{ A grandson of Lord Bolingbroke ... }	14	Comet ..	206	{ C. Wright, Esq., Cleasby, Yorkshire.
Cathelene .	{ A daughter of the dam of Phoenix }	Washington.....	8	Do. ....	150	{ G. Parker, Esq., near Malton, Yorkshire.
Laura....	Lady.....	Favourite.....	4	Do. ....	210	{ Mr. Grant, Wyham.
Lily.....	Daisy.....	Comet.....	3	Mayduke	410	{ Major Rudd, Lincolnshire.
Daisy....	Old Daisy....	{ A grandson of Favourite..... }	6	Comet ..	140	{ Major Bower, Welham, Yorkshire.
Cora.....	Countess.....	Favourite.....	4	Petrarch.	70	{ G. Johnson, Esq., near Scarborough.
Beauty....	Miss Washington	Marsh.....	4	Comet ..	120	{ C. Wright, Esq.
Red Rose..	Eliza.....	Comet.....	4	Mayduke	45	{ W. C. Fenton, Esq., near Doncaster.
Flora....	.....	Do. ....	3	Do. ....	70	{ Earl of Lonsdale.
Miss Peggy	.....	A son of Favourite	3	Comet ..	60	{ O. Gascoigne, Esq., Parington, Yorkshire.
Magdalene.	{ A heifer by Washington .. }	Comet.....	3	Do. ....	170	{ ——— Champion, Esq., Blyth, Notts.

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BULLS.

Names.	Age.	Out of	Got by	Price. Gs.	Bought by
Comet.....	6	Phoenix.....	Favourite..	1000	{ Messrs. Wetherill, Trotter, Wright and Charge, near Darlington.
Yarborough...	9	.....	Do. ....	55	{ A. Gregson, Esq., Lowlinn, Northumberland.
Major.....	3	Lady.....	Comet ..	200	{ Mr. Grant, Wyham.
Mayduke....	3	Cherry.....	Do. ....	145	{ ——— Smithson, Esq.
Petrarch....	2	Old Venus.....	Do. ....	365	{ Major Rudd.
Northumberland	2	.....	Favourite..	80	{ Mr. Buston, Coatham, Durham.
Alfred.....	1	Venus.....	Comet ..	110	{ Mr. Robinson, Acklam, Yorkshire.
Duke.....	1	Duchess.....	Do. ....	105	{ A. Compton, Esq., Carham, Northumberland.
Alexander....	1	Cora.....	Do. ....	63	{ Mr. Fenton.
Ossian.....	1	Magdalene.....	Favourite..	76	{ Earl of Lonsdale.
Harold.....	1	Red Rose.....	Windsor ..	50	{ Sir C. Loraine, Northumberland.

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BULL-CALVES, UNDER ONE YEAR OLD.

Names.	Out of	Got by	Price. Gs.	Bought by
Ketton.....	Cherry.....	Comet.....	50	{ Major Bower.
Young Favourite...	Countess.....	Do. ....	140	{ ——— Skipworth, Esq., Lincolnshire.
Geerse.....	Lady.....	Do. ....	130	{ ——— Walker Esq., Rotherham.
Sir Dimple....	Daisy.....	Do. ....	90	{ T. Lax, Esq., Ravensworth.
Narcissus....	Flora.....	Do. ....	15	{ Mr. Wright.
Albion.....	Beauty.....	Do. ....	60	{ T. Booth, Esq., Catterick.
Cecil.....	Peeress.....	Do. ....	170	{ H. Strickland, Esq., Boynton, Yorkshire.

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triumphs, to Monkend, near Croft, in the North Riding of Yorkshire, where he died, January 16, 1836, in the eighty-fifth year of his age. The memory of such a man as this must ever live in the gratitude and the grateful recollection of the accomplished modern farmer; for the efforts of Charles Colling were devoted, not merely to the improved appearance of his favourite shorthorns, but also and mainly to those

points which add so much to the profit of the breeders. And if ever a column shall be erected to those who in former days have so nobly and so successfully struggled for the improvement of agriculture, Charles Colling will certainly be found among the list of names with which such a monument will be adorned.—(*Farmers' Encyclopaedia—Youatt on Cattle—Parkinson on Live Stock.*)

HEIFERS.

Names.	Age.	Out of	Got by	Price. Gs.	Bought by
Phœbe.....	3	Dam by Favourite....	Comet....	105	Sir H. Ibbetson.
Young Duchess...	2	Do.....	Do.....	183	T. Bates, Esq., Halton Castle, Northum- [berland.
Young Laura....	2	Laura.....	Do.....	101	Earl of Lonsdale.
Young Countess..	2	Countess.....	Do.....	206	Sir H. Ibbetson.
Lucy.....	2	Dam by Washington..	Do.....	132	Mr. Wright.
Charlotte.....	1	Cathelene.....	Do.....	136	Mr. R. Colling.
Johanna.....	1	Johanna.....	Do.....	35	G. Johnson Esq.

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HEIFER-CALVES, UNDER ONE YEAR OLD.

Names.	Out of	Got by	Price. Gs.	Bought by
Lucilla.....	Laura.....	Comet.....	106	Mr. Grant.
Calista.....	Cora.....	Do.....	50	Sir H. V. Tempest, Bart., Winyard, Durham.
White Rose.....	Lily.....	Yarbro'.....	75	Mr. Strickland.
Ruby.....	Red Rose.....	Do.....	50	Major Bower.
Cowslip.....	.....	Comet.....	25	Earl of Lonsdale.

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From this account it appears that—

17 Cows sold for.....	£2802	9s.
11 Bulls.....	2361	9s.
7 Bull-calves.....	687	15s.

7 Heifers.....	942	18s.
5 Heifer-calves.....	321	6s.

In all, 47 were sold for..... £7115 17s.

ON THE RESOURCES WHICH FARMERS POSSESS TO MEET THE REDUCED PRICES OF THEIR PRODUCE.

BY HEWITT DAVIS, Esq.

[Communicated by C. W. Johnson, Esq., F.R.S.]

(Concluded.)

Having thus briefly shown that the advancement of agriculture has largely been owing to the economy produced by the better implements introduced of late years, I trust I have done so sufficiently to attract to this branch of practical farming more attention than is generally paid to it. In like manner I might proceed with the live stock, which the farmer rears and fattens, but so self-evident, on reflection, must appear the importance of attention in breeding to select the best stock, that it appears to me I should be unnecessarily wasting argument to demonstrate a self-evident fact; and yet the frequent absence of the proper consideration of how much profit is affected by the producing of indifferent in place of better animals, calls for some notice. The desirable qualities in the animals which the farmer breeds or rears for the butcher, and to which his attention should be directed, are—hardness of constitution, both as to feeding and health; rapidity of increase in production, and early maturity; and lastly, superiority of quality. In these respects animals of the same breed widely differ; and although those which in these respects are most

perfect must pay the breeder most profit, yet sufficient attention is far from being given to these points by the generality of breeders. The cattle shows of England have done much to improve the breeds, and large fortunes have been realized by many farmers who have paid attention to the perfecting of their live stock; and they have shown that the animal that is most perfect in form is that which thrives quickest, and yields the greatest return in least time. Still a large portion of stock-breeders by their inattention will remain losers, until reflection teaches them, that whilst the keep of a well-bred animal is seldom more expensive than that of an ill-formed one, and frequently less, the difference in value may be a fifth, or much more.

In like general terms I shall but allude to the too frequent inattention shown in the choice of horses for employment on the farm; and would alike caution the farmer against the use of the heavy, cumbersome, slow cart-gelding, or against the other extreme; that is, the employment of stale hackneys, or broken-down nag horses. In the one instance, comparative high keep is necessary, which is ill repaid by

their slow motion; and with the other sort, much loss arises by their imperfect tillage, and the necessity for frequently putting three horses to do what should be the work of two. For many years I have used none but the Cleveland coach-horse; and, by their great strength, quick step, and endurance, I have effected a considerable economy in my horse labour; and, as I would grudge the payment of full wages to worn-out, feeble workmen, so do I refuse to keep horses incapable of full employment. A slow workman is a loss in himself, and there the mischief ends; but, with a slow or weak horse, his own work is below what it should be, and on the same low scale must be the work of the horse his companion, of the carter, of the dung-filler, and all that attend him; and by him all the operations on the farm are retarded. The necessity to combine strength with quickness of step and hardness of constitution, for the due economy of labour, is, in farming, of more consequence than in any other pursuit; for in horse labour is the principal expense, and on the full return obtained for this expenditure will the farmer's profits largely depend.

As I am passing in review the various ways in which better economy may be introduced, I must not omit a few words on the insufficient attention that is paid to the preservation of manure, and the keeping of its most valuable qualities; but, as I am hereafter going to allude to the want of better conveniences, I will here simply refer to the waste from evaporation and drainage which the farmers frequently incur by putting their dung into heaps, without receptacles of mould or other material in order to absorb the moisture, or coverings to preserve it from evaporation. Yard manure, from its moisture and tendency to fermentation, on exposure to air, rapidly decays and throws off its finer particles; and the loss in a few weeks amounts to 20 or 40 per cent. Strange to say, although farmers are fully alive to the value of manure, as they prove by the price they will pay, and the distance they will travel to obtain stable manure, they are most improvident in their care of it; and frequently—perhaps I might say generally—a third of the manures are lost, by the drainage and fermentation which it undergoes prior to application to the land.

I have now gone through those matters which may be said to be the province solely of the farmers to look into; their attention to them will be well repaid by greater economy in his expenses: and, whilst I trust that science will lead to further improvement, I am quite sure investigation and comparison of what has already been done may still produce large savings. By enquiry and examination into the practice of others, we may always find something to learn, some excellence to adopt, and the work of improvement is never at a stand.

I am now about to direct attention to the means which during late years have been made known to us for enlarging the returns of the farmer, by increasing the fertility of the soil. These are of still more consequence than greater economy, for they make large returns to the cultivator, and give to the nation an increase of the necessaries of life;—adding at once to the farmers profits and the country's wealth. These appear to me to fall more particularly to the province of the landlord to have done; 1st, because the advantages thus made are permanent; and 2ndly, that the skillful planning, direction, and execution of them will be

better performed by the employment of professional men than when left to the tenant, whose short interest and want of experience leads frequently to very imperfect execution; but, besides the certainty of getting them well done, the advantage of having them done at once, so as to enable the tenant to immediately reap the full advantages, will in these times make it politic in the landlord to take the doing of them on himself, even if he has to stipulate in consequence for an increase of rent.

The principal buildings and conveniences necessary for carrying on the cultivation of a farm, every cultivator is aware, are barns, stables, out-houses, cattle-sheds, tanks, ponds, and rick-stands with yards, and cottages for the labourers; and a landlord's first care should be to see that a due provision of these has been made, and that the most economical and profitable arrangement has been adopted. The want of any necessary building is to the tenant productive of increased expense, or deprives him of the means of adding to his returns by keeping of stock, both in the profit to be made from them, and by the greater fertility their manure would give to the land. The absence of a proper arrangement of the homesteads, and the ill formation of the yards, in the south of England, is remarkable: the buildings appear dropped in any vacant spot, and the yards are frequently so formed that the most soluble portions of the manure are constantly washed away; and the stock, if any be kept, lie unsheltered or exposed to the stormy and coldest quarters.

This is the place for me to allude to the almost entire waste of the urine and liquid manures of the farms in England, from the want of tanks to catch these most valuable fertilizers. I believe that the farmers in Flanders are indebted, for the high fertility of their farms and the large rents they are in consequence enabled to pay, to the deeper tillage of their land, and the economy of those manures of which in England no use is made; whilst the loss to the English farmer—the consequence of this neglect of his manures, and bad arrangement of his homestead—is so great, that it is difficult to estimate where it terminates.

In a well-arranged homestead, the following details will have been attended to:—

1st. The situation will be central, that access may most readily be obtained to all parts of the farm.

2nd. The farmer's residence will be so placed, that he from it may see what is doing at the homestead, and have a ready eye to the live stock and other property on the premises.

3rd. The yards will be so protected by the stables, cattle-houses, and barns, that the stock may be sheltered from the east, north, and west, and open only to the south; and also that the manure may collect with the least possible drainage, exposure to evaporation or loss of its soluble matter.

4th. The barns will extend east and west, that the noon-day sun may fall on the barn-floor.

5th. The open cattle-sheds and pig-sties will face the south, that the sun may at noon shine into them, while the stock will lie dry and sheltered from the colder winds.

6th. The rick-yard will be so situated as to have a quick and convenient connection with the barns, and be provided with stands best adapted for the ventilation and protection from the vermin of the corn.

7th. Tanks will have been made for the collec-

tion and preservation of the drainage from the stables, cattle-sheds, and yards.

8th. A supply of water will have been provided, in convenient situations, for the ready and constant supply of all the animals; and

9th. Cottages will be built, that the labourers may be accommodated, with little loss of time, in going to or coming from their labours; and the situations for them will have been selected to assist in the preservation of the property on the farm.

These are details that farming agricultural surveyors are alone competent to regulate; and the necessity for skill and practical knowledge in planning them is very much wanted. I have placed these improvements as one of the means for increasing the farmer's returns; and, I may add, no quantity of arable land can be made the most of where proper provision for winter keeping of stock is not provided, and the points here alluded to have not all been attended to.

The next step to making the most of the arable land—and it is one I would strongly impress on landowners as a cheap and very efficient mode for improving their farms, and enabling their tenants to meet the times—will be by the removal of all superfluous hedges and injurious trees; for the unnecessary divisions of arable land are hurtful, by the loss of time which they occasion in the cultivation, and by the destruction of the crops from the harbour they afford to birds, and by the injury from their shade, and by the imperfect tillage they occasion over a large portion of every field, as well as the encouragement they give to idleness to the labourers. Compare the economy in cultivation, and increase of produce, and superiority of the corn, of forty acres lying together with forty acres subdivided; and the difference in favour of large fields will be seen to be very great. Indeed, so great is the loss by small enclosures and hedge-rows timber, that I do not hesitate to say I know of much land in the Weald of Sussex and elsewhere that, simply by loss in this way, is reduced more than half in value; whilst the benefit to such a clay soil, by throwing it more open to the sun and wind, would do much to assist in drying it and bringing it into lighter cultivation. I think six or seven divisions of the arable land of a farm all that is necessary, and beyond this they are injurious. I know of no good argument for maintaining more; for even the climate of a country is improved by being open; and, for effect to the eye, six hedges on a farm will be abundant—or, if not thought so, a few trees, left park-like over the land, will have a much better effect.

Of the improvement of all poor soils by sub-soil ploughing and trenching, I am prepared to speak most positively. In this way I have more than doubled the produce of thin chalky and gravelly soils; and the benefit remains for ever: for no bad farming can do away with the increase of mould thus formed. These are operations which I have carried out the last 12 years extensively, and on various soils and in different situations, with most satisfactory results. By their effect all land is improved; thin soils are permanently deepened and benefited in proportion to the increase of mould thus given to them; and the advantage is greatest to those soils where improvement is most needed. This is not the place for me to enter into arguments to support a practice which, although only of late years prominently presented as advantageous, has been always pursued by gardeners,

and was recommended so far back as the time of Columella whose precept, that good farming was "first by good ploughing," and "second, by good ploughing," should be interpreted as meaning deep ploughing; or still further, to the days of Æsop, who inculcates it by his fable of a dying father bequeathing to his sons a pretended treasure hidden in his fields, thereby inducing them to dig and trench it over, that it afterwards produced so luxuriantly as to well repay them for their labour, and thus turned out the prize their father wished them to find; and the agriculturist too, will also discover that by deeper ploughing, he can likewise obtain the riches, as is plainly illustrated by the practice of the gardener and the cottager, after enclosing a piece of fresh ground. The latter may frequently be seen to have broken up the most barren spots—on the sides of commons or the brows of hills; and in a few years the place where heath or waste alone existed, will be seen luxuriant with beans, cabbages, and other garden produce—crops which the farmer very well knows will only flourish on good and deep soil. How has this important change been brought about but by the sweat of the labourer's brow in the use of his pickaxe and spade?

Next to trenching, I must notice the improvement of soils, by the addition of some constituent that is wanting; which is a simple, ancient, and very efficacious means of increasing their fertility, readily accessible in most situations. In this way may increased texture be given to the too porous sands and gravels, or the tenacity of clay soils be lessened by bringing on of sand, gravel, or chalk; and the means of doing this are generally at hand; and frequently may be found underneath, by sinking a pit a few feet, that soil which is most wanted on the surface; and this work is best and cheapest effected in frost, and at the season of the year when the farmer has little else for his cattle and men to do. I have seen land that has been dressed with chalk show the benefit after many years have elapsed since the application; and the old cultivated chalk soils abound with pits that have been sunk for the purpose of top dressing: indeed, these pits are remarkable as showing the extent of the practice formerly, and also that this dressing was frequently applied to the soil immediately on the chalk.

The change that takes place by the effectual drainage of wet land, may frequently be said at once to convert the worst into the best of land; for that fenny soil which, undrained, produces only rushes or the most worthless of herbage, requires but the removal of the stagnant water to become a rich vegetable mould, alike useful for the growth of corn and grasses and for turnip husbandry; and thus have thousands of acres of land, which are now yielding the largest returns, been reclaimed from waste. But there still remains a very large portion of the arable land of this kingdom sadly neglected in this respect; and which, although in cultivation, has its produce annually diminished, its tillage impeded, and its usefulness made imperfect by the accumulation of water in the soil. I have already alluded to the necessity for agricultural building surveyors, and I would now also call attention to the want of employment of professional engineers or drainers in laying out drains. The usual practice is imperfect, and but a very temporary and partial cure of an inherent evil, arising from leaving the execution of this very important amendment of land to the bailiff or tenant, whose want

of practice and scientific knowledge and eagerness to save expense, lead him to adopt the readiest means and at the least cost to get rid of only so much of the evil as is made evident to his eye by his crops lying sodden in the winter season: to cure this, and under the impression that it is only from the surface-water not sinking that he suffers, he cuts a trench 24 or 30 inches deep for the receipt of some bushes, and in this way he supposes that he has done all that is possible to effect a cure, without examining into the source and cause of the wetness, or even a desire to do more than to stop for his time the mischief.

The wetness of land must arise either from the water received on the surface not running off; or from springs from underneath rising in the winter and overflowing; or from water draining into hollows faster than it can sink into the earth; or from a top porous stratum lying above an impervious one, and so receiving the rain without letting it get away, and basining it as it accumulates. In order to effect a cure of wetness of land, it must be evident that the cause and origin of the water found at the surface should be first ascertained, and the drainage made in situation and in direction and depth accordingly as the source of the water be from top accumulation or under springs, or be there collected from sources on high grounds. The usual idea (and hence the practice of shallow drains) that land becomes wet by the rains not soaking away, is generally an error; were this the case, the farmer by throwing his ploughings into round balks or lands with deep furrows, would readily clear off the rain water, whilst under-drains at any depth would be useless.

Wherever land is wet from water collecting, or from springs, or from water thrown to the surface by an impervious under stratum—and in these cases alone can drainage be useful—the drains should be as deep as the fall will admit; and four, five, or six feet, or more, will generally be found not only most effectual, but very often the most economical, from the greater radius from which such drains cut off the source of wetness; and their situation and direction should be carefully chosen with reference to the course the water soaks, and the spot from whence the wetness can be traced. The fact that it is the rise of water from beneath to the surface which is the origin of the injury that commonly passes as the effect of the surface lodgment of the rain, is far too little known; that it is so may be seen by the different depths at which water at different seasons is found. A spring causing in winter a large extent of boggy ground, in summer will be found many feet from the surface, and as the winter progresses, it gradually attains the surface and spreads; but it will not be until it reaches this point that injury is perceptible, and the skill of the drainer lies in cutting off the water at its rise. Of late years a very considerable reduction in the price of drain-tiles has been effected by means of the Tweeddale patent; these laid with a slight covering of heath or brush-wood, make the best and most durable drains.

I must not close my account of the means for the improvement of agriculture, without calling attention to the advantages of good roads, both on the farm and those on which the produce passes, and by which communication is held with the neighbouring towns. The greater speed and ease with which the cartage of the farm may be done by sound roads, and the encouragement they afford for fetching manures and effecting improvements, should make them a serious

consideration. There are few situations but where, with a knowledge of road-making, sound roads may be obtained at moderate cost. The neighbourhood where I live is an instance of their advantage. My land and the surrounding ground were not many years since barren, but the former spirited owner of this and the adjoining estates commenced his improvements of large tracts of unclosed heath land by the formation of sound roads, and thus rapidly made valuable a poor desolate district. He not only made them on his own land, but by taking the office of surveyor of the roads of the adjoining parishes, he improved the highways and facilitated communication with the neighbouring towns, and thus increased the value of all the surrounding property, and induced general cultivation and the erection of new buildings and improvements which have never since ceased progressing.

Having now gone through the principal heads under which greater economy or increased returns may be sought, there only remains for me to strongly urge that, advice, on the farmers and landlords which I feel will be most sensibly to their interests to attend to. On the farmers I wish to impress the certain loss that must accrue by a perseverance in old practices and habits; and it has been my endeavour to point out to them the means they should look to, to lessen their expenses and to increase their returns, and I have began, in order to gain their confidence, by showing them that they are already indebted to modern innovations for their late position. And on the landlords I would still more strongly impress the means they possess to aid their tenants, not by a reduction of rent—from this very little good can be done—but by affording them that assistance which, whilst it will lessen their expenses and increase their returns, will also permanently add to the fertility of the land, and thus for ever enhance the value of the property. The land-owners should bear in mind that the reduction in their expenditure which is produced by the lessened cost of all the necessaries of life, makes it their interest, and enables them, even at some outlay but without actual loss, thus to come forward to sustain the farmers in their efforts to produce at lower prices. In this way they have in their power ample means to give the relief which the times render necessary; whilst to rely for the adoption of great improvements from the growth of better intelligence, or the unaided exertions of their tenants, will be to expect sudden enlightenment of a class whose education and habits naturally make them not rapid in progressive knowledge, but cautious in effecting changes from previous practice; whilst their late loss of capital, if it does not deprive them of the means, will certainly increase their reluctance to travel out of their usual track, or to make any outlay that is not immediately called for by their accustomed practice.

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#### EXPERIMENTS OF VARIOUS TOP DRESSINGS FOR BARLEY.

The following experiments were tried upon a mixture of brick-clay and sand; the clay being dug twenty feet below the surface, and clean white sand intimately mixed and put into small beds upon a surface of strong white clay, each partition being carefully divided and the mixed earth being, as near as possible, in equal portions to the depth of 10 in. by 1 ft.

square. The barley being sown on the 5th of March, the top dressings were applied on the 15th of April, as per label to each partition. The intention of sowing these small beds was for the purpose of fixing my attention to the same kinds of manures sown in the field in square rods and chains in the same proportions, as well as to ascertain whether certain salts were mere stimulants or manures, the mixed earth, in the bed being free from animal or vegetable sub-

stances. If any benefit resulted from the application of the top dressing, we have a right to infer that it must be a manure; but a perusal of the following will give a better idea of their relative effects, promising that the soil in the field is a dry brown clay (not sufficiently dry for feeding off turnips upon), with a surface staple of 1 ft. 6 in. in depth, the divisions of each dressing being separated by small paths.

PRODUCE OF THE BED OF PURE EARTH AND SAND WITH THE VARIOUS TOP DRESSINGS.

	Oz.	Dwts.	Grns.	Proportion sown to the sq. rod.	Sample work in the market per quarter.
Nitrate of Soda .....	2	2	16	1 lb.	25s. very inferior.
Saltpetre .....	1	2		1 lb.	34s.
Carbonate of Ammonia .....		12		1 lb.	34s.
Muriate of Ammonia .....	1	10		1 lb.	36s.
Guano .....	1	7		at the rate of 3cwt. per acre	34s.
Charcoal .....		12		at the rate of 20 bush. per acre	
Soot .....		5	20	40 do. do.	34s.
Red burnt Earth .....		3		80 cubic yards per acre.	
Ditto black Ditto .....		12	7	80 do. do.	
Kiln Dust .....		6	6	40 bush. per acre	
Pale Malt Dust .....	1	6	20	40 do. do.	36s.
High-dried Ditto .....		9	23	40 do. do.	34s.
Wood Ashes from Kiln .....		3		40 do. do.	
The undressed Earth .....		3			34s.
Gypsum .....		3			
Sulphur .....		3			

THE PRODUCE OF THE SQUARE RODS SOWN IN THE FIELD.

	Quantity sown per rod.	Prod. per square rod		Estimated produce per acre.	Estimated produce of off corn per acre.	Value of the sample per quarter in the market.	
		Pecks	Qtrs.	Qtrs. Bush.	Qtrs. Bush.		
Nitrate of Soda .....	1 lb.	1	4	7	4	2 6	27s.
Saltpetre .....	1 lb.	1	4	7	4	3	36s.
Muriate of Ammonia .....	1 lb.	1	2	6	2	3	34s.
Carbonate of Ammonia .....	1 lb.	1	1	5	5	3 to 4	34s.
Without Dressing .....		1		5			
Gypsum .....	½ peck.	1		5			
Gas Dust .....		1		5		"	"
Sulphuric Acid in Gypsum ..		1					
Guano, in proportion to 3 Cwt. per Acre .....		1	2	6	2		
Pale Malt Dust .....	40 bush. per acre.	1	3	6	7	2 to 3	36s.
High-dried .....	40 do. do.	1	1	5	5	3 to 4	34s.
Kiln Dust .....	40 do. do.	1	1½	5	7½	3 to 4	34s.

The above manures were likewise sown upon wheat and rye grass, and Swedish turnips, though with not ascertained results, but they were apparently similar, excepting the Swedes, which were rather injured than not by the application of the saline manures, in consequence of their attracting the frost, which happened early in December, thereby injuring the plants more by frost than the dressing did good.

It will be seen, upon a perusal of the above, that the results were similar both in the bed and in the field: the sample produce of the saltpetre in the field was superior to any, and with less proportion of off-corn; the produce of the nitrate of soda was very inferior in sample, with an enormous proportion of off-corn: this proves, so far as we can judge from so small an experiment, that it is unfit for barley or heavy soils. The superior produce from the pale malt

dust in both cases, in comparison with the high-dried, justifies the idea that a large portion of its manuring qualities are carried off by heat; the produce of the charcoal was inferior, but its effect was not observable until the latter end of May, when it had apparently undergone a process of decomposition (in consequence of heavy warm rains), when it suddenly assumed a vigorous habit, but it was too late to acquire maturity, consequently it was a thin sample. The superiority of the produce of the black burnt earth over the red is, undoubtedly, upon the principle of preserving its charcoal: this is consistent with experience of its effect upon land; the ashes arising from paring the surface only, are in all cases superior to the red or mere burnt earth, which is destitute of charcoal. If means could be adopted of burning the pared earth in a brick fur-

nace covered with sheet iron, in the same manner that it is burnt here (in making pot mould by merely scorching the earth, from which a rich compost is prepared for strong feeding plants), it would open a new field for the employment of our labouring poor. It is unquestionable, that it is indispensable, in the common manner of burning, to have too much heat in the fires, to preserve the charcoal, alkalis, &c., of the plants burned. The effect of nitrate of soda is decidedly pernicious upon clay soils in increasing its adhesiveness: but saltpetre is less so than nitrate, as is the muriate of ammonia even less so than saltpetre, and it appears to produce a kinder growth than any of the saline manures I hitherto employed. It is certainly worthy of farther trial upon a larger scale. It may be purchased, I am informed, at the same price as saltpetre. There is, certainly, an imitation of nature in the application of saline manures, or, we may enquire, how is it that various fertile alluviates, reclaimed in distant ages from the sea, are so much more fertile than the same kind of soil in the interior of the country, at a distance from the sea; or that sea-weed is a universal and powerful manure, where it can be procured; or, that animals fatten so much quicker upon salt marshes; or, that that they pine and die in the interior of America if they have not salt given them often? But this is a field for the investigations of chemistry. It is not a solitary experiment, either upon a large or small scale, but a multiplicity instituted upon various soils, and in various seasons; and where the climate, in respect to distance from the sea, altitude, &c. is taken into the account, ere we can arrive at the truth in these matters so as to apply them in agriculture to advantage. I am, Sir, your's, &c.,

Saebriqworth, Herts.

J. RIVERS.

## ESSAY ON THE MANAGEMENT OF FOLD-YARD MANURE.

READ BY MR. WEST, OF COLLINGHAM, AT THE LATE MEETING OF THE MARTON AGRICULTURAL SOCIETY.

(Continued.)

But I must now introduce to your notice, Sir Charles and gentlemen, another agent in this business; and that is a *tank* or cistern to receive what the Scotch farmers, with their usual shrewdness, call the "essence." And, gentlemen, they are perfectly right; it is the "essence;" and I have, from my earliest years, been astonished that farmers in this country should have been so careless and indifferent, so blind and mistaken, upon this subject. *Every farm-yard ought most undoubtedly to have a tank*, which should be proportioned in size to the quantity of stock kept during the winter. This tank *should have communication with every fold-yard on the premises*, including that for the sheep; and should be emptied as often as it fills, by means of a pump and a water-cart, constructed with a box behind, which should be perforated with holes, to distribute the "essence" over the land, when it is applied for that purpose, which the greater part of it should be, in my opinion, if there is extent enough of grass-land or seeds to receive it. As to the *mode* of applying it, I would remark, that a good deal will depend upon the state of the weather. In a showery season, it may be pumped out of the tank, and at once carried to the land; but after a long continuance of dry

weather, it will be necessary to supply some water to dilute it, as it is quite possible to put it on too strong. I have myself done this more than once. To meet this requirement, there must be a connection, by means of a sough, between the common spring-water pump and the tank or cistern. The period for applying the liquid may comprise all the winter months, avoiding wet weather when it can be done. During the spring and summer months, it should be constantly thrown upon the heap of compost, which ought, for that purpose, to be placed as near the tank as possible. If this compost consist, as it ought to do, of all the refuse substances which I have before mentioned, by moistening it well as often as there is any liquid to throw over it, and by repeatedly turning it over, so as to expose every part to the action of the air, the seeds which may be in it will all or most of them vegetate, and instead of filling a farm full of rubbish, as they too often do when the chaff is blown into the fold-yard, they will decompose and serve the purpose of producing, not "seed after their kind," as in the other case, but something *better* than themselves. A good deal of care will obviously be required to bring all such seeds within the action of the sun and air; but there is no difficulty in the matter which close attention to these directions will not overcome.

Where a farm is of sufficient size, a tank should be built of brick, and either lined with cement, or the mortar which is used should be made of such lime as has a tendency to set hard. Into this tank [there should be put a pump, having its spout at such an elevation that a water-cart may conveniently go underneath it, by which means the process of emptying it will be reduced to the capabilities of a boy of twelve or fourteen years of age.

The building of this tank properly belongs to the landlord, and there cannot be a doubt but it is the interest of all landlords to provide tanks for their tenants; but where the latter may fail in an application to their landlords for this purpose, I would strongly advise the tenants to build for themselves, as the cost is really as nothing to the benefit. Should they continue their occupations, they will very soon be re-imbursed; and if they quit they may safely leave the question of compensation to their referees. But where expense is an object, and when the subsoil is an impervious clay, it will be sufficient to dig a reservoir; and by fastening the sides and ends with piles so as to keep them from falling in, this will, for a time at least, answer all the purposes of the other. In any case, much care should be bestowed in the selection of the place or situation for the tank. In the cases last supposed the principal point will be, to fix it where, by means of a scoop, the "essence" may be at once thrown upon the compost heap, inasmuch as, where it may not be thought worth while to build a tank, it will not be deemed advisable to set up a water-cart. On sand land there is nothing for it but to build the tank as I have recommended, else all the essence would escape through the open strata below.

I will not conclude this part of my subject without a more particular reference to the value of the tank. It would be impossible for me, in this address, without completely exhausting your patience, to detail to you a hundredth part of the advantages which you would derive from duly economizing that invaluable liquid which, in more than fifteen cases out of every twenty, is now *absolutely lost to you*. Almost every fold-yard is

now so constructed as to purposely afford as ready means of exit as possible for that which forms one of the very staple constituents of good fold-yard manure! In general, all the rain that falls within the area of the yards, and all that which descends upon the buildings, together with a large proportion of the urine of the animals which are kept within them, are industriously hurried off, carrying away also the finer particles of the manure, into the nearest ditch, to be seen or heard of no more. And all this waste goes on, in order that the yards may be sufficiently dry and comfortable for the stock! It is not possible for one to help *blushing* for the ignorance which perpetuates this *cardinal error!* this grievous mistake! And who is there who does not see that the *tank* supplies a remedy for this mighty mischief? Permit me then, gentlemen, respectfully to entreat that you will, all and each of you, immediately set about building one for each of your farm—steals, and thus wipe away at once the disgrace which attaches to the carrying on of the ruinous practice which at present obtains. I could tell you of the extensive benefit which has followed the practice which I recommend, upon farms which have come under my own eye, upon the estate of a gentleman in a neighbouring county, whose agent I was; but time will not permit. I shall, therefore, only say generally, that as far as my observation has extended, all who have properly carried out the plan have come forward to advocate it; and those whose observation has been most accurate, and whose experiments have been most numerous, have been its warmest advocates. My own individual opinion is, *that, so far from any farm being without a tank, not even a cottage ought to be without one;* but some simple contrivance, which ingenuity will be at no loss to devise, ought to be resorted to, by means of which every drop of liquid which possesses a particle of the manuring quality should be collected, and put on the farm or the garden. This will appear the more important and desirable, in proportion as the value of liquid manure becomes better known.

It is calculated by Liebig that every pint of urine would produce a pound of wheat; and that every pound of ammonia which evaporates from an overheated manure heap, or runs off in the form of a liquid from below, is equivalent to a loss of 60lbs. of corn. I have myself, for many years, applied liquid manure to grass, both pasture and meadow; and have seen it on good land increase the produce very much, and on inferior land it has done more—it has greatly improved the character of the herbage—and in both cases it has quickened the growth so much as to make it considerably earlier in the spring. I have seen it applied to a crop of seeds which it very much benefited, even on good land, on which its effects to a yard were most manifest in the crop which was produced two years after, viz., a crop of beans. I have no doubt but it would be equally beneficial to any other crop were it tried, but I leave that point to time and further experiments.

The quantity of liquid sufficient for an acre may be put at 1,500 gallons, or thereabouts; and if grass land be treated with this quantity two or three times in a season, it will well pay for it. The size of a tank for a farm of 200 acres would not be far wrong if it were made 7 ft. long, 4½ ft. wide, and 5 ft. deep. I believe this would hold about 2,700 gallons, and would therefore be nearly sufficient for two acres. The cost of such a tank as I have described, with a pump and a water cart, would be from 12*l.* to 15*l.*;

but it must be well understood that, to do this, all the materials must be procured at the lowest rate possible. I am quite aware that the water cart alone would cost the money, if due regard to economy were not paid in the construction of it; but that it may be done I thus show: viz. the bricks and brickwork and the lime or cement of the tank, £3. 10*s.*; the covering for it, 15*s.*; the pump and fixing, £5.; the barrel, a pair of old wheels and shafts, and the workmanship for the water cart, £4. 10*s.*: in all, £13. 15*s.* At a trifling outlay like this, part of which ought to be borne by the landlord, a considerable extent of ground, if grass, may be permanently improved every year; and, if arable, the crops may be greatly increased, and that from a source and by means which at present are wantonly neglected and wasted. As I shall have occasion again to refer to points closely connected with the value of the liquid, I shall only add in this place a recommendation to those who may have tanks, frequently to throw into them a portion of common salt, which will have an important effect in retaining the volatile salts which will be generated during the process of fermentation.

Gentlemen, I trust that you will bear with me in what I am about to say—that you will attribute any warmth of expression which you may hear, to my anxious advocacy of the rights and claims of the hitherto neglected and unjustly treated dunghill. I must then, in commencing this the second part of my subject—viz., *as to the best way of managing your manure when it is made*—at once, and without the least hesitation, pronounce the present practice of most farmers to be *extensively mischievous, and inexpressibly absurd.* These are strong assertions, gentlemen, but I will not stop without proving them to be true. Is it not right, I ask you, thus to characterize a practice which allows the essence, the most valuable portion of your fold-yard manure, to escape from the heaps which are thrown up, into the nearest ditch, and from thence into the brooks and rivers, where it is for ever lost, and does nobody any good? That it does so escape in numberless instances, no one present will deny; that it never ought to do, I hope to prove, by showing that it forms a most essential attribute in the composition of a good manure heap. Is it not right, I again ask, thus to speak of a practice which does all that can be done to facilitate the escape of the volatile portions of the manure heap, instead of trying every means that scientific skill could devise in order to keep them?

It might have been thought sufficient that every practical farmer must have had before his eyes almost daily, during the whole term of his farming life, the most palpable proof of the great value to vegetation of the *essence* of which I am speaking; for there are few farmsteads without some sort of drainage to them: and there are not many cases where the essence does not overflow a grip, or in some way or other, without the assistance or even the leave of man, give the most convincing evidence that it is all-powerful in quickening the growth of plants. Not only, however, has this evidence been resisted or overlooked, but other facts have spoken as strongly and have not been heard, or, if heard, have not been regarded. In fact, whatever the evidence may have been, it has, in a large majority of instances, been almost if not altogether slighted, even up to the present time. I offer further proof of the total want of thought and consideration, which applies to the conduct of most farmers upon this subject.

Manure heaps have been carried, are now every

day being carried, and still will be carried, in spite of all that can be said about it, into fields were they are likely to be wanted; and it is more than probable that a place will be found for them in a corner, having a convenient slope towards a ditch, into which, as I said before, all the essence must run; and these heaps, when lead out again, will frequently be found to have lost nearly half their weight, and more than half their bulk. But mark well, gentlemen, this effect, disastrous as it is, has not been brought about without some trouble and expense. Oh no, the farmer has been obliged to give the manure a turning or two, in order to accelerate and increase the mischief. Let me pause here and ask you gentlemen, what has become of the difference? If you know no more about it than that it really has gone off; nay, more, if you do not know from actual experiment—which I am quite sure you do not—that what remains is so much better from being divested of something it contained before, which would have been pernicious to vegetation, you must admit that I have proved the absurdity of your present plan, as far as I have correctly described it, and that it is high time you began to make some inquiry into the matter; and if you should ever be convinced, by any process of reasoning, or by the evidence of facts which you can no longer resist, that you have, by the way in which you have managed your manure, actually lost the better half of it, you cannot fail to condemn yourselves because you did not long ago adopt a different practice.

But, gentlemen, it is not only by allowing the essence to escape that you suffer loss: a very serious injury arises to the manure heap, when unprotected, from evaporation. You will all have seen hundreds of times, the smoke rising from a manure heap which has recently been either first carried out or turned over. And what is this steam that thus flies off, and so powerfully salutes your sense of smelling, even sometimes at a distance of half a mile from the spot where the ruinous process is going on? What is it that thus impregnates the air with a strong effluvia? Why, gentlemen, it is proved, beyond the possibility of dispute, that this also is the very best part of the manure. Observe, I do not mean to say that no one will dispute it; oh no, for it is true in these cases, as it is in many others,

“Convince a man against his will,  
And he'll remain a doubter still.”

That will not alter the fact, however—and a fact it is, though all men deny it; a fact as clearly and satisfactorily established as that two and two make four.

Let me endeavour, as strongly as I can, to show this. Hitherto I have purposely avoided perplexing either you or myself by the employment of high sounding technical words and phrases. I have endeavoured to confine myself to a plain and familiar style of address, which I have thought would be more agreeable to you than the use of scientific language. I shall still do so, always choosing such terms as are best understood by us all, when they will express my meaning as well as any other; but upon this part of my subject I shall necessarily have to employ some of those terms which belong to the science of agricultural chemistry, without which it would be impossible fully to enter into the matter. Before proceeding any further, however, I must most unequivocally declare to you that I am not myself a practical chemist; nay, more, that I am unable myself either to conduct or very clearly to explain those important processes by which scientific men are enabled

to draw direct and positive and unerring conclusions, affecting your interests most closely. All I pretend to is, that I have read extensively on the subject, and have narrowly watched what has been going on; and although I am not, as I have just said, at all competent to prove, as some would do, by experiments exhibited before you, the truth of the principles and views which I advocate, I no more hold myself at liberty to doubt their truth than I do to oppose my own feeble conjectures on the subject of astronomy, to the sublime theory which has been laid down by the immortal Newton. I say again, then, that the smoke which is seen to escape from a manure heap in a state of fermentation, consists of certain gaseous matter, which is evolved or set at liberty during that process; and which is well known, by those who are versed in this highly interesting and, to every farmer, most important science, to constitute the vital principle of the manure heap; in fact, the gases which are thus dispersed in the air are clearly proved to enter into the structure of all plants, and to be absolutely necessary to their existence. Why, then, should they be allowed to escape?

In some cases fermentation is carried on to such an extent, and is rendered so complete by turning the manure, and by long exposure to atmospheric influences, that the whole, or nearly the whole, of the elementary principles useful to vegetation of which the heap was originally composed, are set at liberty, and either fly off by evaporation, or run off below; and about one-fourth at most, it has been calculated, of the original essential material is left to be spread on the field. There may, and probably will, in appearance be much more, but it is of comparatively little value; the real manure is gone, and what remains is little better than a mass of unputrefied rubbish; what little value it does possess consists of the alkaline matter which it contains. But let it not be supposed, from what has here been said, that I am opposed to any degree of fermentation; nothing of the kind: what I am opposed to is, the total absence of calculation and forethought which may be said to apply to the present practice of most farmers. It is quite clear to the man of science, and particularly to the scientific farmer, that in no branch of farming economy is a greater need of reform than in this. It is asserted by one of the greatest chemists of modern times, that the dead loss, as I have before endeavoured to show, from the present modes of managing fold-yard manure, is not less than from two-thirds to one-half of the value of the whole; and as the annual value of the manure consumed in Great Britain and Ireland is laid at the gross sum of thirty millions sterling, we may form some idea of the saving that might be effected were the whole process conducted on sound and scientific principles.

Great numbers of experiments have been made of the comparative effect of fold-yard manure when highly fermented, and when unfermented or but slightly so, and the most satisfactory proof can be adduced of the superiority of the latter. We have the testimony of Sir Humphrey Davy, among scientific men, given in language as strong as could be employed, that, by throwing the dung of the fold-yard together in one general mass, the fermentation which, as a natural consequence, is kept up, has the effect of exhausting and dispersing in the atmosphere the gases of which it is composed; and which, he says, are the only valuable properties of the manure. Having, then, such evidence as this, and having also infallible proofs, from chemical analysis, both of the constituents of manures and of plants—condemning

the present practice as to the management and application of manure—I do hope that I shall be excused by the gentlemen who hear me, even for reiterating as I have done, over and over again, the same truths in their ears; and I further hope that, if any of you stand convicted in your own eyes, of having in time past, proceeded exactly in the old way, without bestowing one single thought on the question, whether or not there is a better to be found, you will now set about the inquiry in good earnest.

At present, no rule that can be safely relied on, as of universal application, can be laid down to fix the degree of fermentation which may be allowed; but without attempting to settle the point, it will not be too much to assert that it should in most cases be decided with reference to three things: viz., first, the texture of the soil—that is, whether it be clay land, a loamy soil, or of light sandy quality; secondly, the nature of the plants to be grown; and thirdly, the time of its application. As clay soils, for instance, are more tenacious of moisture, or unfriable than others, they are greatly benefited by being rendered more incohesive and porous; and, consequently, manure may be applied to them which is much less decomposed than for light land, and that simply because the undecomposed fibre of the straw will naturally separate the closely-adhering particles of the soil. On the other hand, rotten dung has a tendency to make sand land firmer and more solid; an advantage not to be overlooked by the occupier of land of this description. Again—some plants seem to thrive better with fresh dung than others do. This is the case as to potatoes; but all the small seeds, such as clover, &c., &c., which are extremely tender in the early stage of their growth, require to be pushed forward into luxuriant vegetation by very short dung, the organic matter of which will be at the time of applying it, easily rendered soluble, and therefore fit for food for the young plant.

#### MISCELLANEOUS MATTER.—EXPERIMENTS.—ANSWERS AND QUERIES.

SIR,—As a subscriber, and also attentive reader of your instructive Magazine, may I venture to hope, through your means and that of some of your correspondents, for information upon some particular points: and, being somewhat of an experimentalist myself, I shall at all times be willing to communicate the results, if likely to be of service, though upon this head I would venture to remark, that in all such cases the informant cannot be too explicit in stating, not merely the result of his experiment, whatever it be, but also all concomitant circumstances, such as the soil itself, its situation, condition, and nature; for I fear that there is a constant misapplication of theory, and total or partial failure in practice, from want of a due understanding or analysis of the soil itself: for we all know that what will answer for one sort of soil may be a failure on another. And this is confirmed by what I have read in the No. for this month of January, page 28. And in the seventh line of page 29, will be found the best answer to a "Worcestershire Farmer's" enquiry, page 86; who, if he can procure gypsum near home, had perhaps better top-dress his seed land with it, and if not sufficient, sow it by hand again upon them the beginning of April. Now that agriculturalists are becoming more alive to the importance and value of applying the princi-

ples of chemistry in their systems of management, particularly in making experiments for themselves, I believe much disappointment and waste of time and money might be saved by getting some trustworthy practitioner or professor to analyse the soil of some part or parts of the farm in the first instance, if intending to adopt some different system of culture. In my farm, for instance, I have nothing but fair good land, yet varying from sandy loam to the stiffest clay; and looking at the carefully drawn tables of the constituents as well as products of soils, does it not stand to reason that different modes of tillage should be consulted, and one's judgment aided by analysis of the soil: in fact, the detail of experiments, from the commencement to the result, cannot be too particular; nevertheless, if all wellwishers and contributors have not time to be thus communicative, it would be a great boon to the improved and improving science of agriculture, and in the fullest sense, *pro bono publico*, if such a man as Mr. Morton of the Whitfield farm, or other talented or even painstaking agriculturalist, would devote an hour or two some winter's evening to communicate their good or bad opinion on the different points of practice, particularly in the results of experiments with manures, both foreign and home-made; for instance, I am not at all satisfied, nor do others write with any confidence as to the ulterior benefits from the application of guano—I mean in the *next* crop—or whether it be not merely forcing like nitrate of soda for the first or present growing crop; whereas, we know that good composts and good yard manure have virtues which will shew themselves in a second and third year. Last spring, after testing the goodness of some guano with a little lime, I dressed a portion of a field with it for turnips after the rate of only 1½ cwt. to the acre, being all I had for it, sown by hand, then harrowed previously to sowing the turnips, though my farming man had very little faith in it compared with a good ripe compost of bones and ashes from couch and rubbish allowed him for the remainder of the field; and yet he admits that the guano turnips always kept the lead in the top; and being now compared, after being topped and tailed, shew equal quantities for equal lengths of row gathered separately. The land was of good loaming quality, rather high ground, upon a substratum of coarse, rough, stony, dry earth, rather gravelly in its nature but close. I should have stated that besides the drilling in of the compost the other part of the field had had a moderate quantity of fold manure worked in. What may be the condition of the next corn crop upon each part of this field, I should be glad if possible to anticipate from the experience of some obliging correspondent. I had tried some guano upon meadow land, but I think there had not been a sufficient quantity applied. Of finely powdered gypsum, sown by hand on a calm damp morning the beginning of April, upon dry old meadow land, after the rate of six bushels per acre, the result was certainly more bloom and luxuriance of the clover (mostly red clover) and some little increase of the meadow, but none perceptible in the after-math. A portion of the same field being dressed with nitrate of soda, after the rate of 140 lbs. to the acre, it soon made that spot clearly distinguishable both in colour and quantity of crop, with a little improvement in the after-math also; but I do *not* anticipate permanent benefit visible next summer, as I do from another part of the same field dressed with good lime and soil compost. As to the operation of lime there

has been, and I think still is, much contrariety of opinion, some even contending that it hardens vegetable fibre; whereas, the generally received opinion, and certainly mine from actual experiment, is, that it does act beneficially in composts, decomposes vegetable matter, and in due time mellow a heap, and fits it for the application to, and nutriment of, another crop: for instance, I had (thanks to my predecessor) to collect from one field a large heap of couch or twitch and various weeds, which laying many weeks were turned and seemed as far from decay *as ever*, and being things very tenacious of life, soon presented a fine verdant cover; I then had them turned and well mixed with newly slaked lime about harvest time, life has appeared quite extinct, and the heap has become quite mellow and tender; and, instead of that heap being reduced by fire to a *single* load of ashes, I have a good large heap of excellent lime compost, almost fit now for any crop that would benefit by it.

In answer to a question of Mr. Franken of the Swansea Farmers' Club, there is no better or easier test of the goodness of guano than in any little deep vessel to put a very little, and nearly as much of good fresh slaked lime, a little water to them and shake them well, and if good guano, the fumes of ammonia rising would save any delicate lady the trouble (if in the country) of sending for a more expensive bottle of smelling salts.

Another much mooted point, and which is of great importance in the judicious management or making of manure, is the fixing of the ammonia, whether by occasional sprinkling of salt or other means. Of course, upon strictly correct chemical principles, gypsum will be the best application, if easily to be procured; but after the able article before alluded to, in pages 28 and 29 of the No. for January, I need say nothing, except that any clear instruction and information, particularly any definite result made known through a valuable and widely circulated publication like this Magazine, may be more accessible, and more eagerly studied by a great portion of practical men than the more formidable scientific books of a Davy or a Liebig. From some experience of my own, I am satisfied of the good effect of applying soil or even road scrapings, and I not only cover over a good midden with soil from hedge sides or road sides, or even scrapings, whereby the escape of ammonia is prevented, but I even mix some portions of it in the formation of the heap, whereby a too violent fermentation is prevented and the decay more effectual. Occasionally a thin coat of such soil is given in my fold yard over the accumulating litter, though with the spoutings of the roofs (any yard always having enough of moisture from above it) I have still a drainage from the *purpose* of the shape of the yard to a reservoir outside the wall, where the liquor is ladled upon a heap of compost or collection of odds and ends, to which fresh matter is constantly being added, sometimes a little manure also, and which heap, last October, was in as fine a condition for drilling with wheat as I should ever wish to possess. The chaff and waste from the barn, after being picked thoroughly over by pigs and fowls, and led away carefully for a detached heap, the manure heap in the fold yard may be greatly and beneficially increased by starting the first covering of the *empty* yard with a good coat either of dead grass, rubbish from hedge sides, or any other dry vegetable matter whatsoever, and soon afterwards a covering of soil or scrapings which will absorb some of the future supply of urine, and there may, with great advantage, be

occasionally brought in and spread a cover of manure from the horse stable. And on the improvement by proper and liberal feeding of the stock, see page 18 of the January No. If a cover of soil be given *before* the yard is once littered over, it is apt to set or bind too solid to the bottom and interfere with the slope for the drainage. Dung-hills away from the yard should be placed, if possible, upon some *level* and shady place; and if, besides being level, there should be a substratum of clay which would prevent the waste of any drainage—all the better. But to return to the ammonia and the preservation of it. *If* salt (as argued by some) be sufficiently effective, it is tolerably easy to be procured, and worth the expense. It is unfortunate when doctors differ; the patient will lose confidence. It is lamentable after good muck is made, to see the great waste by laying it on grass lands in heaps, or spread, and leaving it to dry in the wind, cold, and heat, and waste its sweetness on the desert air, when many a pound's worth of benefit might be saved to the farmer and added to his crop by refraining from laying it on in cold blowing weather, long *before* nature prompts the herb to shoot into active life, and absorb (if I may so say) this accession of nutriment; whereas, by laying it on later in the spring (if spring), and when the falling of the barometer perhaps indicates the approach of rain, and getting a little additional force to spread it all at once, and brush it in the very *same day* or hour (all the better if the rain catches the people in the act), the benefit would be incalculably increased. It may be said that many farmers could not afford the extra expense of this extra force, but let them ask themselves whether they ought to grudge say one pound for extra labour, when by the loss on the manure as above, double that amount may be lost in the crop itself. Of course, with ripe compost of lime and soil, the reasoning does not hold, but I would recommend that the lime in such heaps never be laid in layers in the first instance, nor so covered up in the lumps as brought from the kiln, for a great part of them will either *not fall*, for want of either actual moisture or contact with the atmosphere, or if they do fall (as the expression is) the heap, when turned, will discover layers or cakes of carbonate of lime, which forming moist if *not hard* lumps, do not get so intimately mixed with the soil as lime should be, and which, I am satisfied, will pay or compensate for an additional pair of hands in the very first formation of the heap to mix the whole more thoroughly. If pond or ditch mud be very moist and rich, I should recommend its being mixed with even poor soil or road scrapings at the same time that fresh slaked lime is added and thoroughly mixed in, and then, after laying say six weeks or more, it will turn over again with shovel in fine condition.

This present No. for January contains an answer to an enquiry last month, as to the potatoes for feeding pigs. The enquirer will no doubt see the passage near the commencement of page 18 of the January No. I do not think the public generally will agree with our amusing horticultural as well as political writer, Cobbett, in his abuse of potatoes, concluding with merely calling them *tolerable* food for pigs. I lately met with an article treating of the Guernsey practice of feeding pigs on parsnips, that it was the most fattening food possible, by no means to be boiled nor steamed, but given to the animals raw and earthy. Parsnips are raised like carrots, and will bear intense frost and even improve thereby, unpulled up. Moreover, variety must be pleasing to a pig as well as a christian,

though good meal makes a pig despise some other things before relished. Perhaps some experienced correspondent can say whether it is more fattening for pigs to have their food actually fermented, as I have known recommended, and whether the vinous or acetous fermentation, and yet where the feeding of stock is on a large scale the cooking is always in progress and therefore fresh; and, what is of great importance, can be given warm. Probably the sort of potato signifies very little, provided it be well grown and in good condition; and by all means give them to pigs and *all* other cattle not raw, but steamed, there being an extract from or near the rind, which an experienced chemist will tell you, makes the liquor in which potatoes are boiled decidedly pernicious, and in some degree poisonous; and steaming is a very easy and simple process. I, last winter, found my working horses very fond of steamed potatoes mixed with some crushed corn, and it kept them in capital working condition. It is otherwise as to steaming *some* watery roots, such as turnips in particular. With regard to the growing of potatoes, though there is a useful article on the subject in this January No. of this magazine, I will shortly state the result of some experiments upon good loamy soil, about an acre and a half in a field of four. The Irish Reds (a large coarse potato); were the most productive with fold-yard manure) Cheshire Whites (a good table potato) the next; but two rows done with a compost of soot and soil mixed a full week, though of excellent odoriferous quality, disappointed me in the produce; and the adjoining rows, with gypsum placed upon every set, still more so; however, the latter mentioned rows, with soot and gypsum, were perhaps somewhat shaded by the hedge adjoining on the south, and deserve a better trial; good soot, if possible unadulterated, being, as we all know, a very powerful manure, from the ammoniacal salts it contains. With reference to the subject of feeding stock, perhaps some one of the numerous readers of this magazine will be able to speak from experience; whether it is true, as supposed by some, that hay which has been salted in the stack tends to make milch cows go dry, and how does this act; for though hay possesses, we are informed, a larger proportion of saline matter than other dried fodder, yet it surely (even in hay salted in the stack) cannot prevail to the excess that is considered by some to have injured live stock having free access to salt left out for them.

By reason of this publication being a monthly one, and the next expected No. bringing us fast on towards spring sowings of various sorts, I would, before concluding, like to ask information from some one (if possible one who has tried the crop) as to the easiest and best mode of sowing carrots, the land a sandy loam now in due preparation, and intended to be ridged for sowing? And whether any instrument or machine work is preferable to hand sowing; the seed, in any case, by reason of its roughness, being well rubbed in dry sand?

No doubt some of the above remarks are familiar to, and in actual practice by some who may possibly cast their eye over them, but there are hundreds who greatly neglect points worthy of attention, of which they think lightly or care for very little, but which attention might greatly benefit their courses of husbandry and the produce; such, for instance, as the oft-mentioned management of manures, which can never be too much impressed upon all agriculturalists, for it must be obvious to every thinking man, that the greater the quantity of manure made on a farm, the better and

more productive will be the condition of it, and the greater the produce the more live stock can the farmer keep *if* he chooses, and the more he does keep, if with good convenience of folding and housing, the greater will be the accumulation of manure again. The modern manures, natural and artificial, are not to be despised as helps and additions, where manure may not be in sufficient abundance; but, when we all know that *good* farm-yard manure cannot be excelled, nor, I may say, even equalled, by reason of its containing *all* the essentials for the culture of every species of farm produce, it must obviously (notwithstanding that chemistry, geology, and botany are good councillors) be the farmer's best friend, and his friendly "always at home," worthy of esteem and cultivation.

Yorkshire, January 16th, 1844.

## FARMERS' CLUB HOUSE,

NEW BRIDGE STREET, LONDON.

At the monthly meeting of the Committee held here, on Monday, the 8th inst., present—W. Shaw, in the chair; W. Purser, Thomas Knight, and Henry Price; the following additional members were elected:

Lord Viscount Torrington, Yoles-court; Sir R. B. Vaughan, Dolgelly; W. P. Wood, Chelmsford; Thos. Abbott, Aylesford; J. Ylew, Catterick, York; Wm. Bushell, Wingham, Kent; Wm. Verrall, Lewes; Wm. Rogers, Bedford; J. Turnley, Bedford; J. Plowman, Oxford; E. Hopkins, Alresford; F. H. Brockman, Hythe; Thos. Mount, Hythe; T. Elman, Bedingham; Wm. Shaw, jun., Northampton; R. Brice, Bridge, near Canterbury; Jabez Hare, 10, Nelson-square; Chas. Murton, Sittingbourne; E. W. Moore, Coleshill; Richard Garrett, Saxmundham; J. Grant, Stamford; Fras. Rotch, New York; Henry Mugeridge, Blackfriars; Henry Gray, Blackfriars; T. H. Burrell, Chelmsford; T. W. Crook, Chelmsford; J. Emery, Petersfield; A. A. W. Gale, Shepton Mallet; G. Burt, Durweston; T. Lovell, Winwick Warren; Henry Paget, Birstal; Edward Mugeridge, Blackfriars; Jas. Vallance, Hurst-per-Point; Robert Crosse, Stamford-street; R. Brearey, Derby; W. Hazeltine, Broadstreet; T. Staff, Stamford-street; Thos. Paris, Greenwood; J. Harris, Springfield, near Bedford; Francis Vigers, 3, Frederick-place; J. Skilbeck, Hull; J. Wood, York; J. S. Whitten, Coventry; Wm. Lyall, Esq., Cotton's Wharf.

The following newspapers and periodical publications will be found in the reading room:—

LONDON DAILY PAPERS:—The Times, The Morning Chronicle, The Standard, The Globe.

LONDON WEEKLY PAPERS:—Mark-Lane Express, Bell's Weekly Messenger, Farmer's Journal.

COUNTRY NEWSPAPERS:—Essex Standard, Leicester Journal, Northampton Herald, Herts Reformer and Advertiser, Cambridge Chronicle, Cambridge Independent Press, Exeter Flying Post, Gloucestershire Chronicle, Wiltshire Independent, Lincolnshire Chronicle, Essex Herald, Maidstone Gazette, Cambridge Advertiser, Hampshire Advertiser, Oxford Chronicle, Berkshire Chronicle, Midland Counties Herald, Worcestershire Chronicle, Maidstone Journal, Northampton Mercury, Worcestershire Journal, Bristol Mirror, Bristol Mercury, Worcestershire Guardian.

PERIODICAL PUBLICATIONS.—The Journal of the Royal Agricultural Society of England, The Highland Society's Magazine, The Farmer's Magazine, The British Farmer's Magazine, and The Labourer's Friend Magazine.

All the agricultural and country papers are filed for the use of members.

## AGRICULTURAL SOCIETIES, LEASES, GAME, &c.

The following Speech was delivered by W. Richardson, Esq., Great Limber, Lincolnshire, one of the Judges at the Rutland Agricultural Show, held at Oakham, on Wednesday, the 29th November, 1843, in reply to the toast of "The Judges."

In consequence of the absence of Mr. Chamberlain and the diffidence of my friend Mr. Parkinson, the duty devolves upon me of acknowledging the compliment you have thought proper to pay the judges, and to return our thanks to the honourable gentleman in the chair for the handsome manner in which he has alluded to our services on behalf of this society.

He has very properly told you that the office of judge is at all times an unthankful one, and very often disagreeable; and so I have sometimes found it, for sentiments were occasionally uttered by the unsuccessful competitors which were anything but agreeable to those who officiated in that arduous capacity. We, however, have performed our duties to the best of our power and ability, and, although we may not have given general satisfaction, still, if we have acted in a manner to deserve the encomiums which have been paid us, every exertion on our part is amply repaid. The honourable gentleman in the chair has told you that he did not intend to expatiate upon the merits of the animals which have been exhibited, as that is more peculiarly the province of the judges. I, therefore, take this opportunity of stating, that, although in some cases there was a deficiency in numbers, the quality was exceedingly good. Classes 1, 2, 3, 4, 5, 8, 11, and 14, are deserving of great commendation, and, altogether, the show has reflected credit upon the county of Rutland, and would have proved honourable to any county in the kingdom. (*Cheers.*) I entirely agree in the sentiments expressed with regard to the utility and importance of agricultural societies, and it has always been my opinion that much benefit would accrue from the formation of associations like the present. A great improvement has of late taken place in the breed of stock, and opportunities are now afforded of bringing together the landlord, tenant, and labourer, and thereby shewing the latter that, whilst the idle and vicious are discountenanced, the honest, sober, and industrious labourer will always meet with that due reward to which he is so fully entitled. I now wish to make a few remarks upon some observations which have been made, upon various occasions, by landed proprietors. I feel the liveliest interest in everything relative to agriculture: I am myself a tenant farmer, and it gives me pleasure when I hear, from the owners of land, anything which can be considered beneficial to those in the same station as myself. Some landlords, in addressing public assemblies like the present, have recommended the occupiers of their lands to marl, drain, clay, to use artificial manures, to bring science to bear upon agriculture, to increase the produce of the land, and at the same time to diminish the cost of production. Some have also declared that the lands of England were not properly cultivated, and that, in consequence of the bad state of cultivation, the outcry was now made by the Anti-Corn-Law League. At those meetings where such sentiments were uttered, some tenant farmer ought to have arisen and told them that they had expended their private capital in improving their farms, and that it was ungenerous of landlords now to charge them with a dereliction of duty [Mr. Heathcote here

asked Mr. Richardson to whom his observations particularly applied.] Mr. Richardson continued—I was speaking generally: my remarks were not intended to apply to any one present. I have always avoided personalities, and I hope I always shall. (*Bravo, and loud cheers.*) These, gentlemen, are the remarks that have been made by many landlords respecting the occupiers of the soil, and I think it would have been much better if they had come forward and said—"You have effected great improvements in agriculture, by marling, by under-draining, and by the use of the various artificial manures, recommended by men of science—we know that the improvements which have been made have been attended with great expense to you, therefore we will assist you, not only by a reduction of rent, but you may depend upon it, if you can convince us that you have effected these improvements out of your capital, and not from the profits of your farms, you shall be reimbursed by us." (*Loud cheers.*) These remarks would tend to produce that confidence, of which so much has been said, between landlord and tenant. I differ from Mr. Heathcote, who has told you that in Scotland leases were required to bring the waste lands into cultivation. [Mr. Heathcote:—I beg your pardon—I said, when the landlord had not sufficient capital.] Mr. Richardson:—I misunderstood Mr. Heathcote. I should wish to know why leases were more required by the tenant farmers in Scotland than in England—perhaps the reason given by Mr. Heathcote may carry with it some force; but I would ask, is it not a positive fact, that a great part of Lincolnshire was formerly a fruitless waste, and has it not been redeemed and brought into a state of the richest verdure, by the industry, the skill, the enterprise and energy of the tenant farmer? (*Loud and continued cheering.*) I have the honour and happiness to live under an amiable nobleman and a truly kind and generous landlord, whose farms have been brought into their present high state of cultivation without the aid of leases; therefore, I am of opinion, where confidence does exist [Mr. Healy:—Ah! there's the point.] between landlord and tenant, there is no occasion for leases or parchments. There is one other subject only, which has been introduced, to which I would briefly allude, if I am not trespassing too long upon your attention—(*Cries of go on, go on*)—it is the subject of hares and rabbits. If there was one sentence in the speech of Sir R. Peel, at Tamworth, more worthy of attention than another, it was that where he said that he would not allow his tenants to be annoyed by hares and rabbits; that he would kill the hares in moderation, and destroy all the rabbits. Where men have cultivated their land at great labour and cost, was it not a shame that the produce should be thus eaten away by those obnoxious vermin, rabbits? Wherever there is an excess of game, lands ought to be set apart entirely from them. Let the landlords keep their game, and the tenants their corn to themselves, and let them feed the population of this country at the least possible expense. I beg to apologise for trespassing upon your time. (*Cries of no no, go on.*) I shall now conclude by proposing a toast which has been put into my hands, viz.,—"The Vice-Presidents of the Society." I understand they support this association by their liberal subscriptions—I wish they would support it by their personal attendance. I much regret that so few are present; I think that the time of the absentees could not have been much better occupied than in associating, upon these occasions, with the yeomanry of the county of Rutland. (*Loud and long-continued cheering.*)

DESCRIPTION OF MR. ALEXANDER'S DRAINING PLOUGH.

The high importance of thorough-draining, and the great extent to which it is now being carried, together with the heavy expense attending the operation, are producing constant calls for amelioration in the latter point. The casting or opening of the ground for the formation of the drain, though not the heaviest item in the list of expenses, forms yet a sufficiently formidable item to call for reduction. This operation has, for the most part, been, and in numerous localities must continue to be, an operation with the spade; but numerous attempts have from time to time been made to bring it more under mechanical influence, and for this purpose the plough, under a variety of shapes, has

been tried with more or less of success. Seeing that no implement hitherto brought out for this purpose had possessed all the requisite advantages that were desired, and that a general desire still prevailed for an instrument of the kind, the Society offered a premium which appeared adequate to bring out the energies of practical men towards the attainment of this object; the result of which has been the production of the plough now to be described, and which seems to possess, in the opinion of practical farmers, a greater amount of capability for performing the operation required than any implement hitherto adopted.

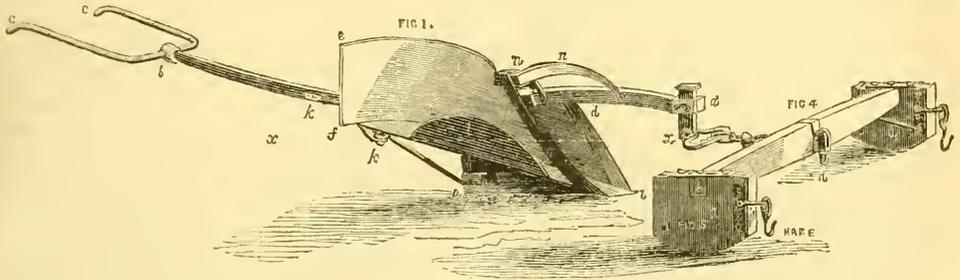
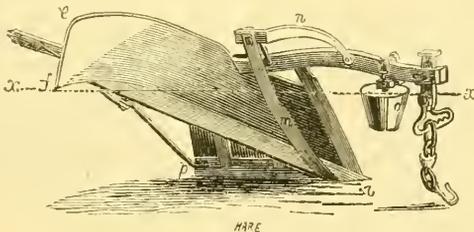


FIG. 2.



This plough, or rather ploughs, are represented above, and are described in general terms by Mr. Alexander himself in the following words:—  
 "This plough was first brought into operation in December, 1840; since then I have drained upon my own farm about 70 Scotch acres, and likewise above 200 acres to neighbours and others; performing, in general, the opening or casting into the drains, 30 feet apart, over one Scotch acre per hour; the depth varying according to the nature of the ground, but averaging about two feet two inches. The operation is most advantageously effected by using two such ploughs—a leader and follower: the first taking out a depth of sixteen to eighteen inches, with a width of seventeen inches at top and seven inches at bottom; the second, or finishing plough, takes out the remaining depth of eight to ten inches, giving to the cut a width of five inches only at bottom, and without producing any change in the surface width. The earthy matters lifted in this second operation are laid on the surface, on that side of the cut opposite to where the products of the first furrow had been laid; and the cut is thus finished, with the

exception of the cleaner or scoop being passed along the bottom before the tiles or drain-stones are laid on. Though I have here described two ploughs as being required to complete the cut for a drain, either of those described may be used alone to finish a cut, by changing the sock and mould-board; and in using the plough in this way, it is proper to go over a half or a day's work with the plough under the first form, and then to change the irons to the second, or finishing form, completing those cuts that have already got the first turn, before the plough is again altered to the first state. In practice, however, I prefer a plough of each kind complete, which allows the work to proceed more uniformly, and without the loss of time to man and horse.

"By removing the mould-boards and other outstanding attachments, these implements can be employed as subsoil ploughs; and though they have hitherto been principally used for cutting drains in strong and deep clay lands, they have also been successfully employed in *dry field* land, where the soil was free of large stones. The weight of each plough is about five hundred-

weight, and the price 9*l.*; but, with the additional mould-board and mounting for making the second cut, a single plough amounts to about 11*l.*

"In comparing the expense of cutting drains by this implement and by the spade, if we take land that has had the drains laid in at fifteen feet separate, which gives 41 chains of drain to the imperial acre, the price for cutting drains, of 26 inches average depth, with the spade, may be stated at 6*d.* per imperial chain, or 23*s.* per acre nearly. The expense of cutting out drains with my ploughs—which, with ten horses, are capable of finishing the drain-cuts of half a Scotch acre per hour, or of half an imperial acre in 48 minutes nearly, and equal to six and a quarter acres per day of ten hours—taking the expense of ten hours, together with men, at 3*l.* 15*s.* per day, gives the expense per acre 12*s.*; showing a difference in favour of the plough of 11*s.*, being a saving of nearly one-half the expense of cutting the drains.

"It will be seen that the principle of these implements lies in their cutting the furrow or drain on both sides with coulter, and gradually elevating the earth so cut and loosened upon the inclined plane of the mould-board, until it is thrown off by the latter, and deposited on the surface by the side of the drain.

"The implements have been in competition at several drain-ploughing matches, where they carried the first prizes; and I beg to submit herewith a number of certificates bearing upon the merits of the ploughs.\* Perhaps it may not be out of place for me to state that they have also been recently introduced into England and Ireland, and in both cases with entire satisfaction."

In further describing these ploughs of Mr. Alexander, there remains to be pointed out, that fig. 1 is an elevation of the first or leading plough; and, as will be seen from inspection, the skeleton or frame of the implement is very similar to the subsoil-plough. The beam, which is twelve feet in length from *a* to *b*, has a depth in the body parts of four and a half inches, and about two inches in breadth, tapering from the coulter forward to *a*, and from the body-frame backward to *b*, to about three by one and a half, and two by one inch respectively. The handles, *c*, *c*, add three feet more to the length of the plough, or fifteen feet in all. The main coulter, *d*, is inserted at two feet nine inches from the point of the beam, and from that to the hind part of the body the distance is two feet eight inches. The length of the sole, including the sock, is three feet six inches; and, when the plough is resting on the sole, the height of the beam at the coulter-box is two feet nine inches; and at the point of the beam, and also at the lowest part of the body, it is two feet five inches, the height of the handles being four feet eight inches. The body, on the land side, from the coulter, *d*, to the hind part, is a uniform plain surface, lying in the plane of the beam; the sole-shoe and sock are similar to those of the subsoil-plough, but here, in the leader, the breadth of the sock is seven inches. The mould-board, *e*, which springs from the back of the coulter, *d*, extends backward

and upward to a length of six feet from the point of the sock; its height at the hind part, from the sole line to the lower edge at *f*, is 21 inches, and its height, from *f* to *e*, 22 inches. The mould-board is not twisted as in the common plough, but simply bent into the curve exhibited in the figure. The flaunch, which, together with the sock, form the inclined plane, *i*, *f*, is a flat plate attached to the lower edge of the mould-board; serving, on the one side, to carry up the furrow-slice, and on the other to support and strengthen the mould-board, which is further attained by the stays, *k*, *h*. The angle-plate, *l*, is inserted in the angle of the mould-board flaunch, and is worked to a concavity suited to assist in turning out the slice taken up by the and plough. The second coulter, *m*, which cuts the right hand side of the drain, has its point inserted into the feather of the sock as a support to its point, while the head is sustained by the stays, *n*, at a width of about twenty inches from the land side of the beam. In working this plough, it is held with a slight inclination to landward.

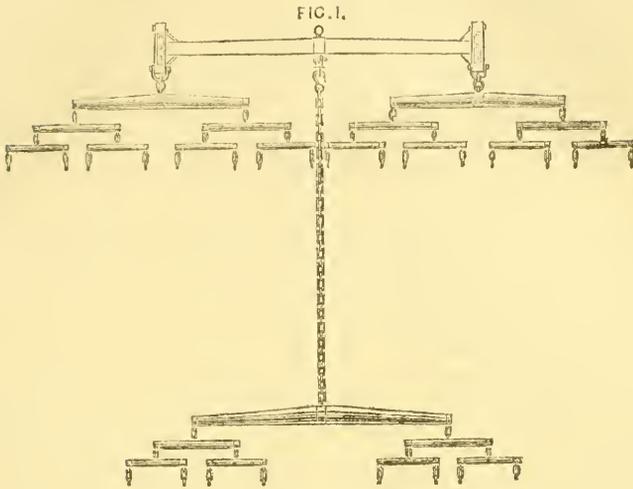
Fig. 2 is an elevation of the furrow side of the body of the second or finishing plough, the tail of the beam and the handles being cut off. In construction, it differs from the first in nothing except the mould-board. In this, the mould-board is seven feet long, from the point of the sock, *i*, to the extremity, *e*; its height above the sole-line, to the lower edge, *f*, is two feet nine inches, and from *f* to *e* eighteen inches. The flaunch, forming the inclined plane, is only four inches broad, while in the first it is eight inches, and the angle-plate, *l*, is left out. The sock, in fig. 3, is reduced to five inches in breadth over the feather, and the coulter, *m*, is set at the same width below—five inches; while its distance from the land side of the beam above is sixteen inches, that this part may pass freely through the former cut. The conical roller, *o*, is also an appendage of the second plough, to serve the purpose of keeping the beam more steady when working at this great depth; the roller may be of wood, and about twelve inches diameter at the base, its height being nine or ten inches. The vertical axis, on which the roller turns, has its upper end fitted to slide right or left on a horizontal arm, which is attached to the beam, and is fixed at any point of the arm by a pinching screw.

Fig. 4 is a side view of the great master-tree, which is immediately yoked to the plough; and to this again is attached the greater and lesser main and common-trees, by which ten or twelve horses may be yoked. This great master-tree is twelve feet long; in the middle it measures ten inches by four inches, and it is furnished at each end with the skid-blocks, *a*, *a*; these, resting on the ground, form a sledge, upon which the tree travels over the ground.

Fig. 5 is an end view of the tree and skid, *b* being a section of the end of the tree, and *a* the skid, which is about two feet long, twelve inches high, and four inches thick, is well supported by iron stays to the tree, and the outward lesser master-trees are hooked to the skids at *c*, while the centre one is hooked to the tree at *d*, opposite to the point of attachment to the plough.—*Journal of the Highland Agricultural Society.*

\* It has been considered unnecessary to publish the certificates, but they are all expressed in terms of commendation of the plough.

ALEXANDER'S DRAIN PLOUGH.



Mode of yoking with twelve horses.

FIG. 1. Arrangement of horses for the first cut or furrow.

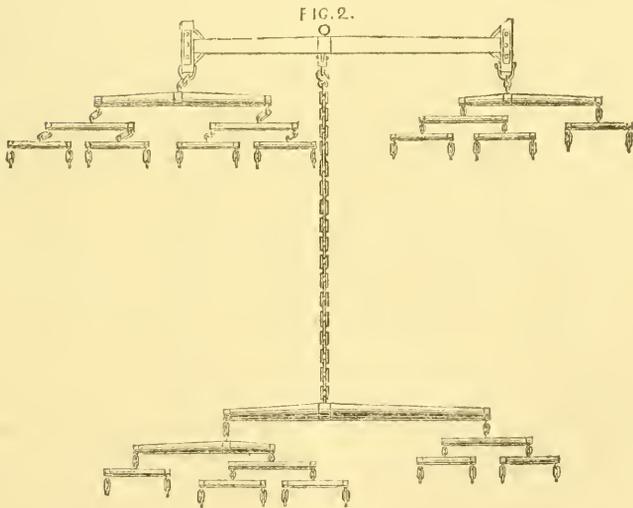


FIG. 2. Arrangement of horses for the second cut. The earth having been thrown out with the first cut, prevents the horses walking so close to the drain in taking the second, and on that account a different arrangement is required.

N.B. When ten horses are used, six are placed next the plough, three on each side; and four in front, two on each side; and, in this case no alteration of their order is required in taking the second cut, as being fewer they have room enough to walk clear of the earth thrown out.

## THE CURRENCY.

SIR,—In September last a memorial was drawn up, and read before a large assembly at Huddersfield, purporting to be presented to her Majesty, for the protection of labour. In making a few remarks on this memorial, in the "Ten Towns Messenger," I ventured the assertion that, for labour to have its just rights, we must either have a sufficiency of valid currency in circulation duly to represent it, or have no currency at all; and thus for labour to represent itself. I will now endeavour to advance proof to support the assertion.

It has long been the prevailing opinion of many, that our present defective and deficient paper currency is the cause of most of our commercial and operative distress, and of very much of our social disquietude also; to which opinion I have long since unreservedly subscribed. We will suppose a wheat grower, cattle feeder, &c., a spinner, weaver, builder, tailor, &c., &c., to form a community. No doubt can be experienced but such a community might not only live, but get rich, by exchanging the produce of each other's labour, without the intervention of money. As labour is the source of all wealth, whatever labour was performed more than the current demands of such a society required, would be real riches or labour stored, in the shape of cattle, grain, yarn, cloth, houses, clothes, &c., &c., for future want. A community of men, have what money they may, without labour, cannot possibly supply current wants, neither create further accumulation of riches. Money appears to me more a representative of riches than riches itself. Be this as it may, property and labour are each essential to the other, more particularly in a civilized community, where the productions of nature are stimulated by art; for, however the property and labour may be concentrated, as in the case of the wheat-grower, spinner, tailor, &c., in one and the same person in such a community, we still find them essentially necessary to each other; for without property, in the shape of bread, corn, houses, clothes, &c., to support, clothe, and shelter the labourer during seed-time, growth of plants, harvest, while furnishing materials for building, cloth for clothing, &c., the labourer could not exist; neither without labour could the land be tilled, building materials prepared and used, &c. Yet in all this, money is not indispensably requisite, and its real character may be shown more in the light of an article of convenience than of necessity; therefore, there certainly must be something very, very wrong, where an article of mere convenience is allowed to interfere with the comfortable subsistence of those who produce this money and every other commodity, or the real wealth of which money is now made the representative, and thus "rob the labourer of his hire."

Is or is not this lamentably too much the case in this nation? I will maintain that it is, and that common justice to the labourer, and common prudence in the property owner, demands an alteration. As the whole of a community, supplying its own real wants, must rely upon the agriculturist for subsistence; so must the agriculturist depend upon the miner, manufacturer, and trader, for artificial wants requiring skill and division of labour in their production. Thus are mutual benefits derived from agriculture, manufactures, and commerce: and that man who thinks by injuring

the one to benefit the other, must be void of reflection; or if from individual interest he strives to sever these bonds of concord, he can be no patriot, but a base traitor to his country. In all this no money is of necessity required. For so many bushels of wheat or other grain, so many cattle or sheep, or so much manufactured goods, taking so much skill, labour, and attention to produce them, may, without the intervention of money, be exchanged for any other product requiring an equivalent amount of skill, labour, and attention for their production; but no man for a moment will dispute the great convenience of money, in making these exchanges, over the primitive mode of bartering goods for goods in the ordinary transactions of life; and as there is as much labour condensed in gold and silver, &c., which constitutes their intrinsic worth—as much so, as in every other product of labour—it only comes to this consideration, whether a sufficient amount of these, duly to represent the labour of the country and support a just demand upon the labour market, are attainable. Through the agency of money a nearer approximation to fractional value may be obtained; and every person in civilized society is willing to receive sterling money in lieu of any other article he may have to dispose of, as it serves him as a depository of condensed labour, to lay by for future want; whereas any other product of labour cannot always command a customer. On the other hand, a man having money, knowing it to be always marketable for any commodity in the market, is less disposed to part with it than he would be with any produce of his own labour, except when his interest or necessity led him to do so. The grower of wheat, &c., having more produce than he requires, and knowing it to be a damageable article, were there no money, may be disposed to exchange it for some article of manufacture that was not liable to damage: thus the manufacturer gets the wheat which he wants, and disposes of his manufacture which he does not want; the farmer gets out of grain which he does not want, but is damageable, for manufactures that he does not want, still that are not damageable. Hence we see the real use of foreign trade, to take off the surplus produce of riches, whether of grain, raw material, or manufactured goods. Then it may be asked, if, by and by, the agriculturists are supplied with all, and more than all, the manufactures they require, and a foreign market cannot be found to take the surplus, how must the manufacturer fare? Why, very much better than he does now with a restricted currency.

In a civilized community, where division of labour is extensively carried out, artificial wants, to some extent, must abound; consequently, wear and tear of manufactures, as well as consumption of food. Still, if the whole wants of society came to require but four or six hours per day to supply their wants and repair their waste, the labourers generally could be called upon to work but four or six hours per day, did labour represent itself. It could not be, as it now is, accumulated, and accumulating stock, reducing wages, and thus compelling the labourer to produce more of that which society cannot use, to make up in increased quantity of work for the loss he sustains in diminished wages; and thus perpetuate his own poverty. The same ruinous system pervades the mercantile community, as well as the operative; indeed, the whole of productive industry suffers

from it. Whereas, did the labour and skill of one man represent the labour and skill of any other man, so much of either as would supply the natural requirements of society would be called forth; but no farther—that is, of necessity. Without money, great masses of wealth may be accumulated; but the accumulation would be voluntary, and not compulsory, on the part of the producers. Immense masses of individuals could not be crowded together, as now is the case; and nothing but idleness, improvidence, or calamities uncontrollable by man himself, could cause the distresses of poverty now experienced by not only individuals, but by far the greater portion of the largest section of English society. Thus to me it appears self-evident, that the operative portion of society would, under the primitive but inconvenient mode of simple barter, be found in an incomparably better social position without any money at all, than with money insufficient in amount to cause that equitable demand upon the labour market that would secure to labour its just reward, yet sufficient in amount to take those advantages of the labouring man's necessities that will keep the general rate of wages at starvation point. No man in sane mind would recommend such a retrograde movement as returning to primitive barter; but every man of honest principle would, I should think, wish to see sound principles of integrity, and strict laws of equity, promoted and secured between man and man; and this certainly cannot be, if we have any money at all, unless we have a sufficiency to represent the industry of the nation, or so much as this industry can call into circulation and duly paid for.

Coin of sterling worth is not attainable to a sufficient amount, or this is the most desirable of all money; but I conceive that a government paper currency, secured upon real, immoveable property, is attainable to any required amount, if productive industry can pay a small government tax, and in addition a moderate rate of interest to induce proprietors of such property to give security in trust to the government, for the public, that the tax shall be paid, and the currency redeemed when no longer required, thus giving it perfect validity. This is a currency that never has been adopted on such a footing; and did our legislators permit it, and the productive industry of the country could not or would not avail themselves of it, then could we not blame the Government. Free trade we surely shall have, for abstractedly the principle is sound; but free trade, with so restricted a currency and so heavy a load of taxation, will, I am very fearful, press sorely upon operative industry. I am aware specious arguments are advanced to prove that free trade, with our present restricted currency and immense taxes, will improve the labouring man's position; it cannot be so, I am much afraid. And, poor fellow! to make his condition worse, would be bad indeed; and this to enrich a few individuals already too wealthy. But with an extension of valid currency to such amount as possessors of real property could secure and render valid, and productive industry could pay for, our great minister may safely untrammel the trade of this great nation, as the taxes—great and burdensome as they are, with our present scanty supply of money to represent our astonishing industry—would then be little felt, and less thought of; and such a government valid currency would bear no more comparison to the vile trash Sir Robert Peel's wise, just, and prudent measure of 1819 threw out

of circulation, than do sovereigns bear to counterfeit coins; neither would Sir Robert be the least inconsistent with his own legislation of 1819, in admitting such well-secured constitutional currency into circulation. As a matter of finance, it could not be surpassed in principle; for should it be to the interest of society to call it into circulation, the tax paid will be a voluntary tax, and, rely upon it, to no small amount; whereas, should the industry of the country prove inadequate to the payment, we are but as we now are. Few men are unwilling to have a power vested in them, if the using of that power depends entirely on their own will, and when neither the laws of honour nor any sense of duty urge them to employ it. And this would be the exact position of our landed proprietors, were Sir Robert Peel to bring forward a currency measure of government paper, to be secured on real property, paying a tax of—say, 1 per cent half-yearly.

I am a Whig, certainly, if any political bias sways my mind; still, I do not think a more prudent, honest statesman exists than Sir Robert Peel; and of this nothing can bear stronger proof than that some or other of his measures have given offence to some of all parties—from Ultra Tory to Ultra-Radical. And I am firmly convinced, if any influential body of men could prove to Sir Robert Peel that a government paper currency—bearing a tax, and secured upon real property—would be productive of national good, that he would not turn a deaf ear to them. But what could be expected from him but the sensible remarks he made when a paper currency was proposed to him, to be secured upon—what do you think?—why the national solvency, not on the *terra firma* of the nation? Can we wonder that he descanted upon the ideal unit? His ideas must have been led into an ideal course, surely.

The farther an adequate supply of valid currency to represent the industry of the people is departed from, until we arrive at no currency at all, the farther are the rights of labour from being duly maintained in a dense population of civilized society; but where this point of adequateness may be, no human legislator can determine. But this is pretty clear as regards the labourer—surpassing it with a valid currency cannot possibly injure him. But this cannot be for long; for were more money, bearing a tax, brought into circulation than the industry of the country could profitably employ, and consequently pay for, the tax must inevitably force such surplus out of circulation. Before we can be overburdened with money, the unjust credit system must be much curtailed; and this common justice much demands. To reflect upon its evils, would be to enter upon the whole catalogue of social misery in some shape or other. We may therefore conclude that, if society is permitted to have as much constitutional valid currency as they can call into circulation and pay for, this is the point of supply most nearly to be approximated; and that the legislator who brings forward such a measure will be a blessing to his country generally, but to productive industry particularly. For want of such a valid currency (and there are but few nations of the earth where the government, the habits of the people, the condensed gold value of the land, and its circumscribed limits can admit of it), a paper currency—secured upon mere personal, or credit without property, and a demoralizing credit system also—has been run into by England, to the great injury of productive industry. Now, bad as this system is, there would not, I think, need any

compulsory legislative measures to cause its abandonment; but merely the permission of a more valid constitutional currency to take its place, if society should give it the preference. And I have no more hesitation in supposing such would be the case, and that our present paper money, and much of our credit system, would die a natural death, than that travelling by stage-coaches has given way to the more desirable mode of travelling by railway trains. That England has arrived at a high pitch of national wealth and grandeur, of individual riches and splendour, under our present system, no rational man will deny; but can such a man—if he have any feelings of sympathy in his composition—be blind to the mass of misery, toil, and privation, on which this superb superstructure has been raised? Surely not. It is a known and admitted fact that, as the currency has expanded or contracted as to general circulation, so has the prosperity or adversity of productive industry been realized. If the trash of the period during the suspension of cash payment by the Bank gave such a spur to industry, what may we not expect from so valid, so efficient, so constitutional a currency as would be a government paper secured upon real property? We should not, with such a steady supply, be periodically elevated and depressed, as the case now is, to suit the interest and convenience of a few bank directors. Productive industry could then furnish itself, at all times, with a wholesome steady supply of valid currency to such amount as it could profitably employ, and consequently duly pay for; instead of which, we now have periodical expansions and contractions, highly prejudicial to the more steady and respectable portion of the mercantile and manufacturing sections of society; and the labourer is hounded about between extreme labour—accompanied too frequently by great profligacy—and want of employment, bringing in its train all the evils of idleness, misery, and want. This ought not to be, it must not be; it cannot be, and England long maintain that state of social tranquillity every well regulated mind must earnestly wish to secure to his country. The consequence of money being scarce amongst the productive classes of society, is a diminished demand upon the labour market. This, of course, is a check to improvement, and to increase of wealth; not only so, but leaves many that would be honest labourers to pine in want, if not by want driven to evil courses their more natural and better feelings would lead them to abhor.

This ought not to be, so long as an acre of uncultivated but improvable land remains to England, the value of which would give to the public valid security for a constitutional currency wherewith to pay the labourer for its improvement, and recompense the proprietor for calling it into circulation; moreover, with so condensed a population as England now has, no man ought to be permitted to let his land lie waste, if parties could be found willing to cultivate the same, on paying a rent to the proprietor for a term of years equivalent to its worth in its unimproved state. If labour is not made the direct representative or measure of labour, without the intervention of money, no income should be derived from money but through the intervention of the labour market. I do not mean to say that no man should live upon the interest of his money without labouring himself. No, no! This would not be fair play towards the moneyed man; for certainly he has as much right to live upon the interest of money he lends to another, as the man who lends the produce of his labour, in the shape of

a house, or goods of any sort, has a right to payment for their use. What I mean is, that no income should be extracted from the earnings of the labourer, when the capital from which this income is derived is not employed in the labour market; thus could a sufficiency of constitutional money, secured upon real property and bearing a tax, be introduced into the labour market, which tax would prove sufficient, gradually but surely, to pay off the national debt. Such amount of debt so paid off must gradually, but surely, go into the labour market, if income is to be derived therefrom; for, under a gradual payment of the national debt, money would be compelled to seek this source, or the owners thereof must use the principal, and this comes to the same, ultimately, but more slowly; and thus the adequate point as to amount of current circulation would be more nearly approximated. Turn and twist the subject of currency, as connected with the rights of labour, by whatever subtle arguments we may, to support different classes and different interests, the main point for productive industry to look at, is to see that there is a sufficiency of valid money—mind, valid money—either of intrinsic worth or secured upon real property, duly to represent the industry and exchanges of society, and cause that just demand upon the labour market which will insure to the labourer the maximum amount of wages the country can advantageously pay. The operative class is too numerous a portion of society, in a condensed population like ours, ever to obtain exorbitant wages; moreover, riches have, and ever will have power, and were wages here to become unreasonable, the competition of foreign labour would soon restore an equilibrium. We may hence conclude that payment of the debt, the interest of which extracts income from the labour market without placing principal therein; the reduction of unnecessary public expenditure, which has a similar tendency; and providing a sufficiency of valid currency duly to represent our industry—are the principal questions for legislative consideration, and all of which come immediately within the true province of government; and not only by equitable administration thereon will the rights of labour be restored and maintained, but the rights of property and national tranquillity also will be secured thereby. Post dated bills as extension of credit, and even commercial regulation as now in use, may continue under an improved and more just money system until they make their exit naturally; for as they have been accepted of from necessity, they will as surely be rejected when the need for them is removed. So soon as it was evident that any man of industry, prudence, and integrity, may obtain a valid currency sufficient to carry on his legitimate enterprises in trade, no man, in a very short time, would be deemed fit for trade who required post dated paper, or extended credit, or promissory notes, wherewith to carry on his trade, that is, for his general mercantile transactions, from which such almost countless millions have been lost to the industrious classes of society, and thus protection to mercantile property would in great measure be established.

No man will, I suppose, assert that too much gold or, in other words, too much condensed labour can be laid by, or legitimately procured and introduced amongst any civilized community; neither will he assert that, so long as gold requires a certain expenditure of labour to bring a certain quantity of it into the market, the price or value of gold

can, for any lengthened period, be much below the amount of this labour. There is a wide difference in effect between gold supplied by honest industry, or surreptitiously, by war, piracy, or robbery; the former is all we ought to have anything to do with. The price of gold would and must be regulated by the amount of labour required to bring it to market, be the quantity ever so great; but were it in excess, in the shape of coin, competition would arise amongst the possessors of this coin, and reduce the rate of interest to its lowest possible amount consistent with the insurance for the risk of lending, if they desired to obtain income therefrom; still this would be a great desideratum for the labour market. But gold is not obtainable, to say nothing of excess, but in any quantity at all adequate for the requirements of society; hence the proposal has arisen of a government paper currency, secured upon real property. I have heard it said that the amount of this currency would be so great that it would do away with interest of money altogether: a more unlikely occurrence could not have been prognosticated. In the first place our coin has no tax upon it; the government paper currency I propose would have a two per cent. annual tax to pay; also a premium, or license to be paid on its first issue, and on every transfer of the property on which it was secured. Then there must be a something like 2 per cent. for risk in lending such valid money; for real property is pledged for the payment of the tax until the property may be redeemed by repayment of the government issue taken upon it, and to which it gives such undeniable validity. I would ask the moneyed man, now possessed of gold, if such a system would not secure to him quite as good an interest as he is now receiving? No man can for a moment deny that a government currency system would lessen the real securities to be obtained by individuals—such must be satisfied with mere personal security; but, by the vile, demoralizing credit and note systems being superseded by the equitable principle of barter, or prompt payments, personal securities would soon be very different in value to what they are now, under these demoralizing influences which have so long and so unjustly pressed upon the more prudent portion of the mercantile community. The proposed tax and premium must secure to the present moneyed man 2 per cent. at least, before the proposed government currency could enter the market at all; and would it be unreasonable to suppose that persons possessing real property would saddle upon that property a 2 per cent. per annum, certain payment, for less than a clear 1½ or 2 per cent. per annum insurance, for the risk of so doing? If they would not, then how much worse off, as to interest for his money, would the moneyed man be than he now is? That an excess of gold currency, if it could not reduce the labour price of gold, would reduce the rate of interest, we have before seen; but that any amount of taxed currency could reduce the interest of untaxed currency, below the amount of annual tax paid, and the amount requisite for insurance as a compensation for risk in lending, cannot be made apparent. In fact it is impossible, from what would be the nature of such a currency, that such a state of things could long exist, even were it possible they could arise to any extent. The tax in such a case must prevent its being further called into circulation; and if in circulation, at depreciated value. Such depreciation would cause those who could redeem their pledges with it at full value to purchase it at

the depreciated or current value, and thus relieve the market, and restore the just equilibrium, and reduce the amount in circulation to the just point—the maximum amount that productive industry could profitably employ and duly pay for. This is precisely what we want, and what such a government paper currency would equitably provide for us, if labour were to have its just rights and property its due protection. It is pretty evident that no more injury or injustice could be inflicted on society generally, or individually, from an adequate supply of constitutional, valid, paper currency, than from an adequate supply of gold currency; and that, in common equity, it is due to operative industry that a sufficiency of currency to represent it duly should be found, and that of a valid and not of a spurious character; or, as before shown, labour ought to represent itself without the intervention of money at all. If the foregoing reasoning is correct these are the conclusions we must arrive at. As society in England is now constituted, money is of indispensable necessity in carrying on the transactions of life; and it is the prescriptive right, and it may be said the bounden duty of the Government also, if possible, to furnish an efficient supply of either a valid paper currency or a currency of intrinsic worth; which certainly now is very far from being the case, either in quantity or quality. The deteriorated quality of much of our present paper money presses more immediately on the mercantile classes; but its deficiency in amount presses sorely upon productive industry generally, but particularly so on operative industry, by staying that demand that otherwise must and would be upon the labour market. Would to heaven that Sir Robert Peel, with his mental capability and political influence, would meet the case and relieve our distresses, and not wait for their excessive pressure to compel legislative enactments! His advice, when president at a late large agricultural meeting, was fraught with good sense and good feeling; but means are wanting amongst agriculturists generally to benefit from it practically. I have not the shadow of a doubt upon my mind, that were Sir Robert to reason patiently and duly as to the social advantages and disadvantages that would arise from a government paper currency, secured upon real property, that the former (the advantages) would so preponderate, both in a national and individual point of view, that he would be led afterwards to bestow his most earnest attention to the subject, and carry out some improved measure thereon. From the peculiar nature of their property, a great boon would be offered to our landed aristocracy on introducing a government currency secured upon real property; but it is for our own good (I mean us of the productive classes) that we would have it offered, and not for theirs only: a great power would be given into their hands, to use or not at their own option; but it would be a power that if used it could never be long abused, as it would carry with it an innate corrective principle, a principle that ever must adhere to it. Therefore I should think any minister would have a majority of the landed interest in his favour, were he to advocate such a measure of relief as it is presumed an extended valid currency would prove itself to be to productive industry generally; indeed to general society, but to operative industry particularly. The government itself would be only trustee and agent in the business, if possessors of real property were induced to call such money into circulation on payment of a tax; merely to hold the writings in trust, between the depositor and the public; that the tax should be paid, and the validity

of the paper be secured, and to keep possession of the money arising from the tax until a sufficient sum was in hand wherewith to make a small dividend upon the national debt, in reduction thereof.

Had we a sufficient, valid, constitutional currency; the national debt in progressive liquidation, so that ultimately all money whence income is derived must, if the income arises from the labour of England, have the principal whence it arises engaged in the English labour market; the public expenditure kept as low as may be, consistently with national integrity, honour, and dignity; and the price of gold allowed to fluctuate with other articles of commerce, as it surely ought to do; then I think no human legislation could exceed that of England, as regarded the just rights of labour and protection of commercial property. We will suppose a case, wherein to show how the agricultural labour market would be evidently benefited by the proposed government currency. A person is possessed of, say 1,000 acres of waste land, which from want of draining, stocking, or some other process of agricultural labour being carried into effect upon it, is almost valueless as to rent to the proprietor, and unproductive to the labourer as to furnishing him with employment; still such land in a country teeming with wealth as England does (but in too circumscribed a section of society), and with a very limited and not to be extended surface of land, compared with the immensely increasing daily population—this 1,000 acres may be worth in the market 6*l.* per acre, or 6,000*l.*; if so, then a government currency to the amount of 4,000*l.* may, with the greatest security to the public, be secured upon it. This would amount to 8*l.* per acre on 500 acres thereof, which would give employment (after paying the premium or license, say of 2 per cent., for bringing it into circulation) to 150 men for one year, at 10*s.* per week; and almost any waste land with 8*l.* per acre thus laid out upon it, if of moderate elevation, would be worth 8*s.* per acre additional rent. Thus the 500 acres would command a rent of 200*l.* per annum, and hereafter would find employment for the farmer, and from five to eight labourers as the case may be. If this supposition approaches to a probable result, were it reduced practically, would not a great present, and very considerable permanent demand be made upon the labour market? At the same time, the emolument to the proprietor would be a pure "God-send," for he would have no unpleasant negotiations as to money, for by commanding it he would benefit, not only himself and the labouring poor, but his country also most extensively, in a physical and financial point of view. 2 per cent. on 4,000*l.* would be a voluntary tax of 80*l.* per year to the public purse; leaving 120*l.* per year to the purse of the proprietor; and still leaving him 500 acres of land in an unimproved condition, but pledged to the public as giving validity to the government paper currency, whereby such permanent good to the country and to the individuals immediately concerned has been wrought. I do not mean to say that money laid out on lands now in cultivation, commanding a fair rent, will command an increased rent of 5 per cent. for the money laid out in further improvements; but I do say that waste lands of moderate staple, now carrying little or no rent to the proprietor, will pay 5 per cent. for bringing them into a state of moderate cultivation, if the money is expended with judgment and economy. It would be no trifling benefit to the country to have 500 acres of barren soil rendered fertile; its yearly produce enabling the proprietor of this hitherto barren land to expend 120*l.* per year

more in his own gratification, which perhaps may lead him to the gradual improvement of the remaining 500 acres, for five to eight of the valuable sons of toil to have daily subsistence thereon, and thus kept in their country's service, instead of seeking their bread in a foreign land, and blessing the same with the benefit of their labour—and for a farmer and his family, or perhaps two or three farmers and their families, to find subsistence thereon: thus, not only keeping up, but increasing the number of this valuable class of our fellow citizens; of whose comparative value the poet seemed well aware, from the penning of the following lines:—

"Princes and lords may flourish or may fade,  
A breath can make them, as a breath has made;  
But a bold yeomanry their country's pride,  
When once destroyed can rarely be supplied."

To go no further, if there is approximation to truth in what has been advanced, these are no mean or trifling considerations for our legislators to look to in these times of distress and destitution from want of employment.

Some may say, as many have said, that unemployed money is in great plenty, at low rate of interest, on good security. Granted, as a well known fact; but it must be under peculiar circumstances, indeed, that a prudent man dare engage with borrowed money—even if he could have it at 2 per cent., but liable to be called in at the will of the lender—to reclaim barren lands, or work permanent improvements on those now in cultivation; for the return is sometimes slow, and his tranquility of mind must under such circumstances be much disturbed. Thus it appears that our present money system is a bar to improvement, and consequently to the demand that ought to be and would be made on the labour market; a bar to prevent a voluntary tax that would arise from a government paper currency, secured on real property, which would amount to a great sum annually, applicable for the reduction of the national debt, an encouragement to gambling speculations, over trading, unbased paper, undue competition, and consequent exploded profits and diminished employment, and consequent diminished wages; and numberless other ills that may be detailed to any length. It is an admitted mercantile axiom, I believe, that increased capital leads to diminished profits. So far as unreasonable profits go, this is very good; but real *bonâ fide* capital will never lead to extinction of just profits: it could not be, for real capitalists would withdraw from trade under such circumstances; but now the wreckless trader on fictitious capital goes headlong to ruin, and takes the man of moderate capital too frequently in his wake. We may safely conclude I think, that no amount of government taxed paper currency, secured upon real property, can do other than tend to support the just, and no more than the just, rights of labour; and give to the labourer "that command over the comforts and conveniences of life" to which his honest industry so justly entitles him, and to property its due protection, of which our present nefarious, and demoralizing money and credit system have so long, so cruelly, and so unjustly deprived both. It is the opinion of many reflecting men, that with an efficient currency we may confidently expect general prosperity and accompanying contentment, in place of that great commercial and operative distress that has so long over-shadowed our once prosperous and happy country; and which alone can enable our agriculturists to meet the change that must otherwise work

their ruin, if free trade measures are forced upon ministers under our present restricted currency and oppressive weight of indirect taxation.

I remain, sir,

Your obedient servant,

Bewdley, Worcestershire.

C. P. BANCKS.

### RICHMONDSHIRE FARMERS' CLUB.

The following have been the subjects discussed during the year 1843, and the decisions respectively recorded thereon:—

On Thursday, the 16th of March, the subject was, "The best method of managing Ewes, especially during the lambing season." THE DECISION—"That at all seasons of the year, the greatest care should be taken that the ewes are depastured upon the soundest land; that for a few weeks previous to the rams being put amongst them, and during the time that he is with them, they should be extremely well kept; that, when the flock is extensive and the blood valuable, it is desirable to employ a *teaser*, as by this means the services of the ram may be made more available (some breeders having used the same ram successfully for 120 ewes in one season,) and a better crop of lambs is ensured; that at the time of lambing great attention is necessary, but at the same time great caution should be used by the shepherd in rendering any assistance, (upon which point several valuable remarks were made by the medical men present;) and that, for the first few days, shelter is of much benefit. Quiet and retired pastures were much recommended for them whilst in lamb, and hay and corn to be given in preference to turnips as extra food." There was some difference of opinion as to whether any extra food should be given prior to their producing their young; but, if any was given, that dry food was preferable to green. A very good plan was suggested by a member for numbering the ewes previous to the ram being used, and having the date of each ewe placed opposite to her No. in a book; by which means the flock may be afterwards divided, and their food given at the discretion of the owner. It was stated that the interval between the ewes being in use, was from fourteen to seventeen days; and that it continued for two days.—Introduced by Mr. James Bell.

On Thursday, the 18th of April, the subject was, "The properties and application of Lime." Upon this subject there was apparently much difference of opinion, and many contradictory statements were made by the members present; but which a change of locality, and a better knowledge of cause and effect, would most probably have cleared up. On the whole, it seemed to be the general opinion of the meeting, that by discretion in the *time* and *manner* of application, and by previously ascertaining the *qualities* of the lime, and the wants of the land, to which it is to be applied, lime may be used very beneficially as a fertilizer; that this information is of the more consequence when applied to arable land, where very general disappointment arises by applying the lime too near to the time of sowing. On grass lands the application of lime seldom fails in its effect, by improving the quality of the herbage, if it does not much increase the quantity.—Introduced by Mr. T. Smurthwaite, of Holme House.

On Thursday, the 11th day of May, the subject was, "The best method of paying the wages of Agricultural

Labourers." Upon this subject there was little discussion; several statements were made as to the mode adopted in Scotland, &c., and the meeting then divided upon the question, whether it was desirable to pay the wages of agricultural labourers partly in kind or not; which was carried by a majority of ten to three.—Introduced by Mr. Lister.

On Thursday, the 8th of June, the subject was "The prevention and treatment of the Foul and Foot-rot in Cattle or Sheep." THE DECISION: "That foot-rot is in a great measure prevented by not confining sheep to rich, damp pastures; and that a cure is effected by a free use of the knife, and an application of nitric acid, antimony, or blue vitriol, diluted with water." A perient medicine was recommended. The meeting was divided in opinion, whether lambs or old sheep were more liable to foot-rot, and it was agreed that sheep having been once infected, are more liable to a return of it. In case of foul, it was recommended to wash the feet affected perfectly clean, and apply tar and salt, or the antimony, &c., as in cases of foot-rot.—Introduced by Mr. J. Fryer, of Kirby Fleetham.

On Thursday, the 6th of July, the subject was, "The best method of making Hay." THE DECISION: "That grass should be cut before the seed is ripe; that, if the weather be fine, it should be strewed immediately—but that it takes less harm in swath in bad weather; that on all occasions lap-cocking is recommended, and that great care is to be taken in making them hollow in the middle; that clover should be rucked, but that it should be half-dry prior to the operation." Hay barns are extensively used; in some districts they are recommended, and in certain localities indispensable.—Introduced by Mr. Jno. Outhwaite.

On Thursday, the 10th of August, the subject was, "The most equitable method of adjusting Rents, more especially with reference to the policy of converting a money into a corn rent, or otherwise." THE DECISION—"That a corn rent would be beneficial in this district," was carried by a show of hands.—Introduced by Mr. Jaques.

On Thursday, the 5th of October, the subject was "The best method of growing Winter Tares, or other Spring food." Upon this subject no decision was come to, but several members were deputed to make trials of different kinds during the ensuing season, and report the result to the Society.—Introduced by the Rev. W. F. Wharton.

On Thursday, the 2nd of November, the subject was, "The best artificial food for Cattle, in case of a deficiency in the crop of Turnips." THE DECISION: "That bruised or ground corn, or linseed cake, should be given with the turnips; and that the selection of the article must depend materially upon the price."—Introduced by Mr. T. Smurthwaite, of Holme House.

On Thursday, the 7th of December, the subject was, "The best method of managing Farm-yard Manure."—THE DECISION: "That, in order to secure the greatest quantity of this indispensable article to the farmer, animal and vegetable substances of every description shall be collected and deposited at the bottom of the fold-yard, or other proposed situation for the dung-hill; that the urine and liquid constantly escaping from the heap, if not preserved in tanks for particular use, should be collected in trenches, or other temporary contrivances, near to the dung-hill, and regularly thrown over them. That in leading out manure from the folds into the fields, a ploughing field should be selected for the pie; and if not wanted for application during the space of three months, that it be placed together in as solid a state as possible (some gentlemen even recommend carting over

the heap), and covered over with soil, in order to keep in the gases and salts, supposed to be the most valuable portions of the manure. And that, in forming the pies or heaps the manure from the different folds, and from animals living in different ways, should be carefully mixed and blended together."—introduced by Mr. Turner.

The following is the subject appointed for discussion: on Thursday, the 4th of January:—"The best method of Shoeing Horses." To be introduced by Mr. Lister.

R. M. JAKES,  
Chairman and Secretary.

## ON BRINGING INTO TILLAGE OLD PASTURE LAND.

TO THE EDITOR OF THE NORTHAMPTON MERCURY.

SIR,—We live in eventful times as farmers, and our occupation is now attracting the attention of men in all grades of society. Time was when every farmer was allowed to pass on in unobserved silence and seclusion; the responsibilities of the present race of farmers have greatly increased, and this arises from the rapid increase of the population, whose wants must be supplied from the productions of the soil, either from this or foreign countries. Hence arises the importance that is now attached to agriculture; and as much of human happiness or misery depends upon a supply of food, it behoves every one engaged in the pursuit, directly or indirectly, to put forth his best energies for the accomplishment of this important object.

While it must be admitted that great improvements have taken place, still we are behind; the demand is greater than the supply afforded by our own country. Allow me, then, through the medium of your valuable paper (which is kindly open to scribbling farmers), to suggest a practice that would, in my humble opinion, supply the wants of all from our own soil, without being dependent upon the foreigner; namely, to bring into tillage our second and third class of grass lands. I shall now venture to give you a few facts resulting from the practice in question, without giving the names of the parties. Mr. A. ploughed 28 acres that had been in pasture seventy years. The first crop produced nine quarters of oats per acre from one ploughing. It has been occupied as arable land these twenty years, giving 50 per cent. beyond what it did when in a grass state. B ploughed up eighteen acres of mixed soil, part of which never had been brought into tillage; bears abundance of crops both of grain and roots, has been under the plough twelve years, and is now in a high state of cultivation. C ploughed a field, grazed for a century, of the second class. There have been grain crops ten successive years without manure (lime excepted), and this season the wheat crop was so prodigious in straw that it fell down from the rains, and was unproductive. D brought into tillage forty acres of third class land by paring and burning. Had been in pasture a century, growing an inferior herbage. By skilful culture it has produced forty-four bushels of wheat per acre, and is now in high condition. I might multiply facts of this kind until they became tedious, but shall leave them and appeal for their truth to the judgment of every intelligent and practical farmer.

Not willing to trespass further upon your space and patience for the present, on this interesting and important subject, I beg to subscribe myself—Your obedient servant,

THOS. UNDERWOOD.

Hardington, Dec. 13, 1843.

## CORNWALL AGRICULTURAL ASSOCIATION.

Report of an Essay on Sub-soil Ploughing, to which a Premium was awarded by the Cornwall Agricultural Association, and read at the Annual Meeting in December, 1843. By Mr. PETERS, Tehidy Farm, Illogan.

**SUB-SOIL PLOUGHING.**—In the essay on this subject, Mr. Peters commences by remarking that in most of the great and permanent improvements in agriculture, considerable time must elapse before the full benefits can be derived. It is only by noting the progress and development of any scheme that we can arrive at that degree of knowledge called experience; after which we may lay down as acknowledged truth, the benefits to be derived, or the period when they will become tangible.

In the greater part of the county of Cornwall, shallow ploughing was all but universal; sub-soil ploughing, therefore, came as a direct innovation here, but it had also something to recommend it, even to the advocates of shallow ploughing, as while it broke and pulverised the sub-soil, it left the same stratum uppermost.

The first object sought to be obtained by the operation was deepening the soil; the second, facilitating the descent of surface water where the sub-soil was retentive; and the third, to secure the beneficial influence of the atmosphere and manure to a greater depth.

The first object is described as mechanical, deepening the soil so as to remove obstructions for the more easy and perfect performance of all the operations necessary to correct cultivation; and the essay points out the advantages of this mode of deepening the soil, over the frequent practice of carrying on earth.

"To cover an imperial acre one inch deep with soil would require 6,272,640 cubic inches, or a fraction more than 134 cubic yards. It is well known that a cubic yard is a good cart load, and if brought from any distance at all, with filling, spreading, &c., would not cost less than 1s. per yard; this would amount to 6l. 14s. 5d., an expense sufficient to sub-soil plough the land, and leave more than 5l. to be applied in manure; this, at the present prices of guano and bone, would purchase 7 cwt. of the former, or 40 bushels of the latter, being double the quantities of these manures applied to an acre, and undoubtedly sufficient to manure several inches of subsoil."

The second object may also be said to be mechanical; when the sub-soil is retentive, or when "a pan or crut" exists, this does much good, not only by facilitating the descent of water, but by equalising the supply of moisture during drought, not only by capillary attraction, but by allowing the roots of plants to penetrate freely below the parched surface into a cooler and damper medium. But besides its mechanical operation, it is intimately connected with and lays the foundation of the third and most important change, that of allowing the influence of the sun and air to penetrate, and, by the filtration of rain, to make that one of the most beneficial, which had previously been one of the most detrimental of atmospheric agencies; thus producing such remarkable changes as are often seen by the draining and deep cultivating of land, without any visible foreign chemical agent or re-agent being introduced.

Then follows a detail of a number of experiments tending to shew the advantages of the operation on various soils—on thin soils with open shelly killas sub-soil—on blue and other clay subsoils—on granite soils when the bottom is retentive—and in cases in which the actual sub-soil plough had been used, and the soil

and sub-soil had been deep ploughed up by the common plough and mixed together.

In conclusion, it is stated, "that if the experiments are not held to prove the advantage of sub-soil ploughing, they prove that it is not injurious. In no case where the writer has seen either deep working with the common plough or with the sub-soil plough has it had the least possible effect; but, on the contrary, the crops have turned out beyond his expectation. And if, as will be conceded, a deep soil is better than one of a contrary character; and if it be of importance *permanently* to improve land, this appears to be one of the most feasible and necessary preliminary steps. Not that all land requires such a process; nor should a practice be condemned from having been tried without producing any good effect where it was absolutely not needed.

"In regard to the expense of the operation, it may be slightly different in different soils and situations; but where four ordinary horses draw the sub-soil plough, with two going before with the common plough, three-fourths of an acre may be a fair day's work. At this rate the cost would be per acre—

One pair of horses and a man  $1\frac{1}{2}$  day, at 8s. £0 10 8  
 Two ditto and two ditto  $1\frac{1}{2}$  day, at 16s. 1 1 4  
 Tear and wear, say ..... 0 2 8

£1 14 8

The land having to be ploughed, at any rate the single plough ought not to be charged against the sub-soiling, therefore deduct .. 0 10 8

Leaving ..... £1 4 0  
 as the additional expense for sub-soiling an acre."

ON THE FORM AND TRUE PRINCIPLES OF BREEDING DOMESTICATED ANIMALS.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—Perhaps two more interesting and important enquiries regarding the successful breeding of stock have not appeared in print for a considerable time, than those in the *Mark Lane Express* of Dec. 18th, and the *Farmer's Magazine* of the same month. "A Subscriber," in the former, says—"I am desirous of knowing which are considered the most essential points in an animal, and what relative proportion do the different points bear to each other?" And "A Young Farmer," in the latter, enquires—"What are the ruling principles to be attended to in the breeding of stock, in order to obtain a stock of superior excellence?" And adds,—“That from not being acquainted with the correct principles of breeding, I am at a loss to know how to proceed.” According to the knowledge that a breeder possesses of these two chief pillars of his undertaking, his success or non-success will depend. Indeed, so deeply was I impressed with their consequence, that some time ago I addressed a communication to the Council of the Royal English Agricultural Society, humbly soliciting it to adopt a *standard* of the form of animals, and the characteristics of their different breeds, as likely to be a most fruitful medium of instruction to those interested in the acquirement of such useful knowledge. From this communication, I received letters of approval from many leading agriculturists in various parts of the kingdom, but the main difficulty to the adoption of my suggestions, was to get individuals to perform such an arduous task, so as to meet with universal approbation. Still, had it been

effected, much and confinnal good would have resulted from it. In the absence of such a reference, I should advise "A Subscriber" assiduously and carefully to study "Cline on the formation of animals," as containing in its brief pages more useful information than any other book with which I am familiar. There are many publications on cattle, describing the form of animals very minutely from head to tail; and were I to relate the numerous points which in my estimation are necessary to constitute *perfection* in an animal, it would be of little assistance to "A Subscriber" in the prosecution of his object, as I am confident I could not adequately express my meaning to meet the conception of others, for the presence of an animal is requisite to aid and assist in the conveyance of such instruction, which is only to be thoroughly learnt by *practice* and *experience*. Until he has erected a standard of form in his mind's eye, he cannot test the merits and shape of stock, or come to any just and satisfactory conclusions respecting it, nor does he stand the slightest chance of successfully breeding it. Frequently do those who are selected as judges differ in opinion when examining animals for competition, thereby showing indisputably the *necessity* for a model of perfection to guide their determinations as much as your "Subscriber," when comparing his short-horned bulls. Sometimes the points are so nicely balanced as to render the office, to the very best judges, by no means pleasant or enviable. Having stated all that appears likely to be turned to good account by the "Subscriber" in search after the best model for farm animals to exhibit, I am naturally led to the solution of the "Young Farmer's" question, "What are the ruling principles to be attended to in breeding?" I shall assume that he has advanced so far as to have decided on the form, and other desirable qualities that he wishes his stock to possess, and to be informed the best and surest means of transmitting them to their descendants without deterioration, and if possible with improvement. In order to effect this grand desideratum with the greatest certainty, animals of a distinct family or race must be procured, which have been found to inherit the desired form and qualities, through a long line of ancestry (and the older the family pedigree the more surely will they be developed). Such animals will seldom be found to disappoint the expectations of the breeder; indeed, the offspring may be calculated on with almost mathematical certainty, and may be so bred, regardless of relationship, to the end of time. The evils that have been attributed to breeding from close consanguinity, are purely imaginary, and have resulted either from selecting animals with (or predisposed to) hereditary disease, or the breeder has paid undue attention to some qualities, and neglected others equally important; whereas, if they had received the same care in their preservation, would have been retained, and even augmented.

To those who may be inclined to doubt or cavil at these sentiments, I beg to intimate that my object is not public disputation, which I shall studiously avoid. To such, as well as to those who may agree with me, should they require further demonstration, I shall be happy to attend to private communications, and to show them cattle that have been bred in strict accordance with the principles above advocated for nearly a century—which is the strongest testimony that can be offered in its favour. Should these remarks prove of any advantage to either your "Subscriber," or the "Young Farmer," my object will be fully attained.

I remain, sir, yours obediently,  
 GEORGE DRAKE.

Manor Farm, East Tytherley, near  
 Stockbridge, Dec. 29th, 1843.

## FRAMLINGHAM FARMERS' CLUB.

FOURTH REPORT, PRESENTED AT THE GENERAL MEETING, NOVEMBER 7TH, 1843.

We have pleasure in laying before our agricultural friends the following summary of our proceedings during the past year.

Our earnest endeavour has been to settle upon more fixed and enlightened principles the disputed questions brought before us; and our future intention is, faithfully to keep the same object in view, feeling assured that we shall thereby secure the continued support of our brother farmers.

The club reassembled on the 20th December, 1842, and proceeded to discuss "the most advantageous mode of consuming the root crop," and arrived at the following conclusions:—

1st, That, as there is but a small proportion of sheep-feeding land in this district, it would be advisable to apply the greater part of the root crop to the feeding of cattle in yards, beginning first with common white turnips, after these Swedes, then white carrots or mangold wurzel, cutting all into slices, and giving therewith bean or pea-meal.

The next resolution (agreeing with one passed December, 1841, recommending that some sheep should be kept even upon our heavy land farms) was to this effect:—"That a portion of the root crop ought to be appropriated to the trough-feeding of sheep in the yard or meadow, during the winter."

The third decision states—"That too much root is usually devoted to the purpose of feeding milch cows, and recommends that a smaller quantity of turnips *only* should be used for them, a cart-load per day, as drawn, being sufficient for eight."

The fourth resolution, in order to economize stover, provides, "That roots may be beneficially given to cart-horses, at the rate of half a bushel per day, with chaff; and a like quantity of corn per week."

The gentleman who opened the business of the evening attached much importance to the cultivation of roots; accordingly, after calling the attention of the members to Mr. Pusey's recent article on the progress of agricultural knowledge, he said he believed that the superiority of modern husbandry, as compared with former practice, was chiefly due to the attention bestowed upon this department of farming. As a grazier, he was strongly of opinion that we ought to endeavour to have a supply of roots the whole year round. To carry out this suggestion, he would delay feeding with beet root or white carrots until March. The last mentioned root he very anxiously wished might be more generally introduced into our rotation, since it would not only prove very useful as a variety of food, but would likewise prevent the too-frequent repetition of turnips upon the same land. The nature of the soil in this neighbourhood, it seems, has hitherto occasioned the farmer to doubt the practicability of carrying out these wishes; but it appears, where the experiment has been tried, it has proved so far successful that several members were induced to believe that there are many farms around us capable of growing them to advantage; a general trial was therefore agreed upon, and sweepstakes entered into for the best specimens to be produced at the next annual meeting.

It was asserted by one party that there was no necessity for cutting common turnips for bullocks—they are so soft as not to need it, and if cut are likely to be eaten too greedily; but this opinion, as the resolution shows, was ultimately overruled.

One member expressed a doubt whether some of the manure expended in the cultivation of roots would not be more profitably employed about our hay and stover crops. "Our meadows," said he, "are too much neglected." He kept cows, and, consequently, considered a plentiful supply of hay and stover more important than an extra quantity of roots produced at their expense.

Others acknowledged that too many roots were given to milch cows, but argued that the breadth of land now under corn crops required more manure than could be obtained without their cultivation. In proper proportions with other provender, cows may now be kept with the aid of roots as well as when more pasture existed, notwithstanding that the land is chiefly devoted to the production of corn. A gentleman stated that Swedes given whole would occasion horses to go blind; he had known ten or twelve belonging to one person lose their sight, as he believed, from this cause. Another made a casual remark respecting the effect of red beet root upon poultry. Hens, he said, were very fond of it, and had been noticed by two or three persons to lay more eggs.

January 17th, 1843. — On "the best Method of filling up a deficient Plant of Wheat.

The annexed questions were put to the meeting:—  
What should be done if the plant is generally deficient to the extent of one-fourth? Answer—Make no attempt at filling it up.

What if regularly deficient one-half? The same.  
And what if only one-fourth of your seed vegetable? Plough it up.

Suppose you have a full plant over half the field, and the rest large patches, entirely naked, what should be done? Dibble in Talavera wheat in February, or early in March; or, as was thought might be better, the new April wheat instead.

A strong opinion was entertained that transplanting from those spots which have taken well might succeed better than any other experiment in the last-mentioned case. It was calculated that an acre might be transplanted for 25s.; consequently, if such a scheme be practicable at all when the land is wet, half a plant might be made good for 12s. 6d. The chances of success, it was thought, are far greater, and the crop would be sure to ripen altogether. In spring sowing, it is difficult to cover the seeds—hence they seldom vegetate; the farmer consequently loses both his seed and his labour.

Filling up by dibbling or sowing, it was said, should be commenced early, in order that it may come to maturity with the rest of the crop, and also that time may remain for some other course to be pursued if necessary. The drill should never be used for this purpose, as it is apt to root up that which has taken; and besides this, when strong land is wet, drills deposit the seed too deep, and make furrows for the water to lodge in. This last remark applies to the drilling of wheat on heavy land, at any time of the year, in very wet seasons; so that sowing by hand, if possible following the plough, is best; or if the drill be employed, it should be without coulters. Putting in wheat near before Christmas was thought to be less likely to succeed than if deferred until February or March.

Sheep-feeding, with repeated harrowings and rollings, were highly approved in cases of thin plants; and when suffering from wire-worms or slugs, six or eight bushels of salt per acre may be used likewise with good effect; if the land will bear, heavy treading with cattle may also be tried. Beans and peas

have been tried with partial success for filling up, as have also oats; but as these last cannot be separated from the wheat, merchants will not buy them.

*February 14th.*—On “*The Propriety of paying more Attention to the Drainage from our Farm-yards.*”

Whatever importance may have been attached to this subject by agriculturists in other parts of the kingdom, an observer will readily discover that it has received but little attention in this county; the perfect indifference with which the drainage from our cattle yards and our domestic offices is allowed to run to waste, is everywhere apparent. It may, however, be somewhat encouraging to reflect that the greater the amount of waste which has been thus suffered, the greater will be the benefit attending more careful management, and greater still the gain should the doctrines which have been recently propounded in regard to animal manures succeed in practice. Assuming that this scarcely admits of a doubt, the business of the evening was very properly opened by an analytical explanation of the constitution of urine. The changes which spontaneously occur, as well as some which may be effected by art, being illustrated by reference to a table constructed for the purpose. From the great attention with which this address was listened to, we may justly conclude that it was rendered both intelligible and instructive; and we doubt not many went home with a clearer conception of the contrivances by which nature makes the animal and vegetable kingdoms the mutual support of each other than they had before any idea of. However desirable such a thing might be, it is indeed idle to suppose that a mere lecture upon any particular branch of chemistry will make chemists of all who hear it; but should we thence infer that no good can arise from such expositions of philosophic research? We are disposed to think that nothing is so likely to dispel ill-founded prejudice, and implicit reliance on precedent, as the making ourselves acquainted with the principles which ought to govern our practice. The farmer is ever careful about collecting the dung of his cattle, and ever anxious to augment his supply of litter; but he must be taught more correct notions respecting vegetable nutrition before he will be convinced that the principal use of the litter is to absorb the fluid portion of animal excretions; he must learn to regard it chiefly as the vehicle by which this is carried to the land, and by the gradual decay of which it is yielded to the crop as required. When this matter is better understood, it is to be hoped that it will point out means of increasing both the quantity and quality of manure without a superabundance of straw. That such a view of the question is beginning to be favourably entertained, we refer with pleasure to the opinions expressed at this meeting—viz., “That too little attention has hitherto been paid to the collection and preservation of our liquid manure, and that it is advisable to form a tank in some convenient place upon every farm.” In this heavy-land district, this may be easily and cheaply done by sinking a pit of such a size as may be deemed requisite, or embankments across a dry ditch will answer the same purpose; and should the soil not prove sufficiently retentive, the interior may be rendered impervious by doing it over with clay puddle. Into this tank drains should be led from every source whatever, whence fluids impregnated with fertilizing principles issue. As the liquid accumulates, throw into it occasionally a small quantity of gypsum for the purpose of fixing the ammonia as it is generated.

In addition to a tank of this description, it was thought proper also that another reservoir should be dug, of larger dimensions, as a general receptacle for all manner of weeds and rubbish, border stuff, loam, marl, sand, or clay, to empty the tank upon as it fills, always taking care that every portion of rubbish gets well saturated therewith, some months being required to fill this pit; the compost may then be carted direct to the field where it is wanted. Regard for the health of the family may make it expedient that these pits should not be too near the dwelling, whilst excessive heat in summer and immoderate rains in winter make it advisable to cover them in. It was afterwards suggested that the better plan would be to empty the liquid upon the earthy bottoms intended for the yard muck, putting it into trenches and filling them in as it gets absorbed. To this a doubt arose whether the bottoms being thus saturated with fluid would take up also the additional quantity of moisture that filters from the manure: it was likewise objected that although the quality of the manure would be thereby improved, the absolute quantity would remain the same; whereas the other method really increases the quantity of manure, by turning to profitable account a variety of hitherto neglected and otherwise useless and noxious matters, and so far economizes an equivalent amount of straw. A similar objection was raised to a third proposition for applying the contents of the tank in the liquid state to layers and pastures, in favour of which it was argued that there would be a difficulty in finding a sufficiency of absorbent refuse matters.

Troughs to the buildings surrounding cattle-yards were again recommended, but should be so fixed as to be easily taken down in the summer.

*March 14th.*—“*The best Description of Vegetables to cultivate for Stock-feeding.*”

It was proposed and adopted by this meeting, “That it is desirable not to confine ourselves to a large growth of any one particular kind of root, but to grow a portion of each, so as to have at least a succession of turnips and beet.” To this a recommendation was added, “That, as our success in farming depends so materially on keeping our land clean, it is prudent to limit the breadth of land devoted to root crops, so as to have a larger extent in fallow; the farmer is thus enabled to do more to insure a full crop, and to use the hoe with greater effect.”

Artificial grasses standing next for discussion, the conversation this evening was entirely confined to roots—i. e., to beet, Swedes, common turnips, carrots, and potatoes.

The variableness of soils and seasons, and consequent risk of failure attending the cultivation of this species of food, when we confine ourselves to any particular kind; the adaptation of the various kinds to different sorts of soils and stock; and different periods of the year; together with the supposed advantage accruing to the land by changing the description of plants grown upon it—were held to be sufficient reasons for introducing as many varieties into our root crop as possible. Some idea of the proportions which it is prudent to grow of each may be formed from the following comments upon their respective qualities.

The common turnip was decided to be equal, if not superior, to any of the roots when fresh, but highly objectionable when long removed from the ground; its succulence is soon lost by clamping, and decay quickly ensues; it is expedient, therefore, so to regulate the quantity grown that it shall be consumed

soon after Christmas. Its coming so soon into use is sometimes a great convenience; there is besides another recommendation in its favour—it does not require to be sown early; an opportunity is therefore given for fallowing previously.

A few words were spoken on behalf of Scotch and pudding turnip for grazing purposes, but both were objected to—the first because, although acknowledged to be rich and sweet, it usually runs very small in this district; the last were liable to injury from frost, on account of their standing so far out of the ground. Swedes were reported to be very valuable to the grazier, to succeed the common turnip; and a considerable outlay for hay and corn may be saved by giving them to horses early in spring. Pigs were likewise said to do remarkably well upon them, but our land is too heavy to produce good quality. They require to be put in early, yet when too early are prone to mildew. They will not keep so long as beet, and can be clamped only in small ridges. One gentleman thought they did not require to be sown very early if the land was dry. Another mentioned the success he had had in grazing, by using linseed pulp with them.

Beet were highly extolled for the valuable property which they possess of keeping to a time of the year when all other food is scarce. It was stated that if they are carefully covered and allowed to dry before being closed in, they will even improve by keeping; but they must not be stirred until wanted, as exposure to the air is very hurtful. No occupation, it was said, ought to be without a portion of beet; if the soil is not favourable, the recommendation noted in the foregoing resolution should be acted upon. In comparing the value of the three roots as articles of food, beet was allowed to stand first for all kinds of stock except young stock, and when given too freely to cows. Swedes occupy the next place, and after them the common turnip; but the choice, of course, must be determined by the nature of the land. Light-coloured beet had been noticed to be richer than red or purple, and the fact seems to be corroborated by the preference given to them by cattle; it was an equal matter of dispute, however, on both sides (and it shows the necessity of bringing such things to the test), whether this gain in quality was equal to the inferior yield of yellow as compared with red beet. Some members had observed a great difference in the comparative weight per acre; others had tried both and seen none; whilst others recommended the yellow globe as better fitted for our neighbourhood. It was suggested that beet ought to be removed from the field soon after Michaelmas, and that they, as well as other roots, should be planted wider than is customary.

The principal arguments adduced against their cultivation were, the necessity for a deal of manure, the expense and trouble, their liability to fail, and their requiring to be planted early.

Observations were made respecting carrots similar to those occurring in our December report.

As to potatoes, it appears our land is generally too heavy to produce either quantity or quality sufficient to answer: but little was therefore said about them.

*April 11th.*—“*The merits of Italian Rye-grass and other artificial Grasses.*”

Some gentlemen having found, notwithstanding the abundant produce of Italian rye-grass, that they were sufferers by the extreme difficulty of eradicating it from the ground, and by the consequent injury to

the succeeding crops; its cultivation, in their view, became a matter of doubtful propriety, and one very proper for discussion: the question was accordingly laid before the meeting. From the information elicited, it appears that the difficulty referred to has not been by any means general. It seems to have arisen either from too early sowing, or too late feeding or cutting, whereby the plant has been allowed to seed upon the land. Some have sown in March, others not till June or July: the first complained, the latter spoke well of it. Some practice feeding in the beginning of April, although not sown till midsummer in the preceding year; and their crop for mowing has been thereby improved, and no subsequent inconvenience has been experienced by them. Others have not begun to feed till later, or not at all; and, some heads seeding, they cannot get the land free of it. The quantity of seed sown also varied exceedingly; two bushels per acre (broadcast) if alone, and three pecks when with clover, were said to produce a good even plant of fine quality, which smothered the weeds and comes earlier to feed; less seed grows in tufts, coarse in quality, difficult to clean, and troublesome to remove from the land. Being ready to turn into before any other green crop, Italian grass is highly esteemed by many of our neighbours; but several objected to sowing it with clover, because they do not arrive at maturity at the same time, the grass seeds being ripe before the clover is ready. This inconvenience, it was suggested, might possibly be obviated by sowing it after harvest, instead of spring-time. Experience has shown that it does very well when sown at this time of the year; it was therefore considered an excellent thing for filling up deficient layers. Sowing it on wheat for early feeding, where fallow succeeds, was much approved of; in this case, some persons mix white clover with it instead of red. A member who has grown it for seed says it then affects the after crops, and he finds it necessary to let the land rest till the scattered seeds vegetate before he ploughs, otherwise they spring up afterwards and cause much trouble. The remarks made respecting thick sowing were reported to be equally applicable to common rye-grass, lucerne, and Passey's grass.

Lucerne is not much grown here, but the attention of the meeting being directed to Mr. Rodwell's account of its extraordinary productiveness, as given in the “*Journal of the Royal Agricultural Society,*” the members were advised to make trial of it, an opinion prevailing that there were tracts of land upon many farms in the neighbourhood which would be found favourable for it. The requisite quantity of seed per acre was stated to be 20lbs.

*May 16th.*—On “*the Payment of Labourers' Wages partly in Kind.*”

The member who introduced this subject was one of the remaining few in this neighbourhood who still supply their labourers with wheat in part of wages; and his object was to prove that the system which he pursues benefits both master and man. His arguments were founded upon the following calculation, which he asked the club to dissect, and, if they could, to point out his errors. He supplied—

	Bushels.
8 men with 4 bush. each per month ..	32
5 men with 3 bush. each per month ..	15
5 men with 2 bush. each per month ..	10

57  
Fifty-seven bushels per month, for thirteen months, is 741 bushels per annum. This quantity,

be the price of wheat what it may, he sells to them nominally at 6s. per bushel, taking it from the same corn which supplies his own family, the allowance being a peck to the man, half a peck to the woman, and half a peck to each child; compelling no man to take more than he wants, and permitting no family to take more than a bushel per week. His standing wages he calls 9s. per week; therefore, he who requires a bushel of wheat per week has 3s. cash in addition; he who takes half a bushel, 6s. cash, and so on. Now, the average price of wheat, for several years, was estimated at 7s. 6d. per bushel; hence the actual market value of the

	£	s.	d.
Wheat supplied as above was . . . . .	277	17	6
Add to this cash paid in addition thereto	198	18	0

It yields a product of . . . . 476 15 6

as the annual wages of eighteen men. Now calculate the wages of eighteen men for 52 weeks, at the usual pay under such averages—viz., 11s. per week: it gives the sum of 514l. 16s., and, consequently, a balance in favour of corn wages of 38l. 0s. 6d., besides the expense which would be incurred in sending this quantity of wheat to market. On the other hand, the labourer gets from his bushel of wheat three and a half stones of flour, of the average value of 8s. 9d., besides 3s. in cash, making 11s. 9d.—i. e., 9d. per week, or 27l. 15s. 6d. a year for eighteen men, more than is paid in money wages; at the same time, the offal furnishes food for a pig, or pay to the miller. This plan, he contended, yields a constantly fair and self-regulating scale of wages, at all times proportioned to the price of corn. For instance, if the price of wheat were 40s. per coomb, his wages would be a bushel of wheat, 10s., and 3s. cash, or equal to 13s.; if wheat were only worth 20s., his pay would be a bushel, value 5s., and cash 3s. or 8s. per week, whereas money wages frequently continue unaltered, although there may be considerable variations in the market value of produce. In proof of the benefits of his system, as regards the labourer, he said he always gave them the choice of taking wheat or not, and they uniformly prefer having it; moreover, he occasionally withholds their weekly supply, and pays them money wages in lieu of it, by way of punishment; and he feels sure that they regard it as a severe deprivation, for they invariably beg earnestly for its restoration. The twofold saving obtained by supplying wheat, he believed, arises from its being furnished at first cost, the flour-dealer's profits being divided between the master and servant; and he is persuaded that the practice not only provides poor families with a sufficiency of the most wholesome necessary of life, but secures advantages to them which, in consequence of the fluctuations of the market, cannot be guaranteed to them in any other way; hence it has a tendency to bring the employer and his dependents into closer connection with each other; they are thus led to regard him as their benefactor, and to serve him accordingly; improvement in their social and moral condition is consequently the result. After acknowledging the trouble of measuring out the corn and keeping the account to be considerable, but much more than compensated for by the advantages referred to, this gentleman concluded by moving "That, in the opinion of this club, it is desirable to find farm labourers with wheat as part of wages, being advantageous to both master and man."

On the other side, it was argued that the practice of paying wages in kind was neither more nor less

than the truck system which has been so universally condemned, and therefore a curse or a blessing to the labourer, according to the disposition and necessities of his employer. In the hands of benevolence, if the means coexist, the poor will certainly reap good. "But," observed one gentleman, "it is not a system for general adoption, inasmuch as it opens the door for oppression. Human nature is such, that when a man's interest and his duty are opposed to each other, the former is too likely to obtain the mastery. Admit it as a fixed principle that it is better to pay labourers' wages in kind; and, whether employed upon the farm or in the factory, necessity must often compel them to lie at the mercy of those who have no mercy. If a man is paid 10s. in cash, he knows what he earns; he can buy what he wants, where he likes, or save what he chooses; but tell him he shall have corn, butter, cheese, or pork, cloth, leather, or calico, to the amount of 10s., and it may turn out to be worth not more than 5s., or he may not want some of the goods, and be obliged to sell them at a loss."

It was further shown that the plan of giving wheat as part of wages did not always work fairly; for example, if wheat is worth 30s., a man may get a bushel, value 7s. 6d., and 3s. cash, making 10s. 6d. for his week's work; another, an equally good workman, only gets half a bushel, value 3s. 9d., and 6s. cash, together 9s. 9d.; making a difference of 9d. a week, which increases as corn advances. When wheat is below 24s., the man who takes the least has the advantage; but as the averages run higher, the system manifestly acts as a premium to married men with families. Further, although the calculation was not disputed, it was denied that paying in wheat could be profitable to both parties, since the miller always prefers the grist trade; why, it was asked, should it be so, if he does not extract a larger profit out of wheat sent to be ground than competition permits him to levy upon flour? To confirm this view of the question, one farmer said he had sold all his corn for three or four years, and bought flour, and found he lived cheaper. Another, in opposition, said, he got from a coomb of wheat, for which he could only get offered 25s., flour which would have cost him 30s. Many other arguments were employed on both sides, and the debate ended by the following amendment being put and carried:—"That it is better to pay wages in money, and let the men go to what market they please."

#### June 13th.—"The management of Swine."

Swine being always supported in some measure with the refuse produce of the farm, there must of necessity be great difficulty in prescribing any specific rules for their management; for the same reason, it is equally difficult to arrive at the actual cost of keeping a pig upon a farm, or at the comparative advantages which might attach to any systematic plan; our remarks are consequently confined to such points as experience shows us are generally applicable.

The first question to be answered is this, is it more profitable to the farmer to breed or to buy his pigs? Several members made calculations upon this head, showing that there is considerable advantage in breeding. It was resolved, accordingly, "That every 100 acres should be stocked with two breeding sows; that these should be long, and the hog short; that pains should be taken, if possible, to regulate the time, so that the pigs fall conveniently for shank, and that they do not come in the depth of winter; and that the sow is well kept whilst the pigs are

upon her, soaked beans, barley-meal, and milk being supplied to her liberally, and increased in quantity as the pigs grow. At the end of six weeks the latter may be weaned, and a fortnight after this cut, care being taken that they are fasted for twelve hours preceding the operation. From this period until they are shut up for fattening, it is right that they should be maintained in a thriving condition, first with soaked beans or barley-meal, and dairy waste or milk, till they are a quarter old; then give them the run of the bullock-yard or the meadow, with from half a pint to a pint of corn per day during the winter, and tares, or green beans from the field, in the summer. For fattening, barley and peas, mixed and ground, were recommended with whey or milk, all given in limited but sufficient quantity at stated intervals. Soaked beans were believed by some to possess superior fattening properties. Lastly, an opinion was given that hogs cannot be profitably kept beyond fifteen months."

*July 11th.—"The Dairy versus Grazing."*

Taking this subject in its literal sense, we can hardly say that two opinions existed upon it. As a pecuniary speculation, dairying was allowed on all hands to be attended with the least risk. From this source, it was said, there is always something coming in wherewith to defray current expenses; whereas the grazier's outlay continues to increase more and more, until he sells out; he is obliged then to turn about and stock himself in again, and should the markets prove unfavourable, he will probably find that nearly the same amount of capital must be invested for a whole season as before. It was, indeed, argued that the superior quality of grazing manure indirectly yields a profit equal to that obtained from keeping cows; this, however, was not admitted to the full extent. "Your extra manure," says the dairyman, "is chiefly expended in producing the large quantity of food required for grazing purposes; so that, after all, little or no visible progress is made."

It was, moreover, contended, that if the same outlay was devoted to the keeping of cows as is commonly applied to grazing, not only would manure of equal value be produced, but we should have all their produce as a set-off against the direct profits on grazing. Good keep, with great care and attention, particularly within doors, were urged as indispensable to successful dairying. Many persons, it was observed, allow their cows to consume vast quantities of straw required for other purposes; the quality of their manure is thus impaired, whilst their produce is diminished in proportion. If some of the cost lavished on grazing beasts were employed in such cases, it might prove advantageous. It seems, however, according to our resolution, that it is not right to depend entirely either upon the dairy or upon grazing. To keep a sufficient number of cows, and to keep them well enough, *wholly on home produce*, the land will suffer. The ruling maxim is, "Cows, bullocks, and sheep—some of each, and too many of neither;" but it is one which requires mature judgment to act upon. It is influenced by so many varying circumstances as to make it impossible to fix upon any standard proportion for a given number of acres; the seasons, the climate, the size of the farm, the extent and quality of the pasture as compared to the ploughed land, the distance from home and from market, the prices which generally rule at the market, the plan of the premises, &c., every farmer knows, must all be considered in apportioning the stock upon a farm. Upon the average

quality of land in this district, with from one-third to one-fourth pasture, it was believed that four cows, three or four bullocks, and 40 lambs, would be something like a fair proportion for 100 acres. Where dairying has been the main object, some objection was made to sheep, because they generally occasion the cows to fall off in their milk; but as a few of them often tend to improve the quality of the grass, and in most cases pay something, this circumstance is overlooked; nevertheless, where a great many are kept, it is usually thought right to dispose of them before midsummer, or the pastures are a long time before they again recover for cow-feed.

One member, at the request of the meeting, gave a minute account of the stock upon his farm, and of his mode of management; he also stated the profits arising from his cows. This account excited much interest; still, whilst it undoubtedly evinced much judicious care on his part, his pastures are of such a superior description as to make the statement of little value as an example of the comparative advantages of dairying. In the course of his relation, he remarked that he never kept a bad cow; his number was six only, and he always renews one every year. He likes his calves to fall in February or March; if earlier, the cows consume a great deal of hay. He allows two acres of good pasture to a cow. Through the months of May and June, he feeds all his young stock in a shed upon border-grass, and he finds enough to keep them all in an improving condition. This practice was alluded to by other members as being a great saving to their meadows. Borders grow a deal of food, and improve by mowing. The cost of setting a dairy of six cows was estimated at 190*l*. The discussion terminated with a resolution to this effect:—"That a proportion of cows, bullocks, and sheep, regulated according to circumstances, is preferable to depending entirely upon the dairy, or lying at the mercy of the markets by grazing only."

*September 5th.—"The best mode of breaking up Pasture; also, the best way of laying down ploughed Land to permanent Pasture."*

Many members being still in their harvest, the attendance this evening was thin. Our notes supply the following observations only:—

First, in breaking up pasture, a member recommended flaying thin, burning the flag, and returning it to the field; except where there exists a good depth of mould, in which case he would cart off about one-third for bottoms, &c. He would first plant with oats, next with beet or turnips, then with oats again; and, if he considered it necessary, apply clay in the third year.

Another member advised ploughing the turf to the depth of an inch and a half, and carting it off, *in all cases*. "Old lands," he said, "are renovated and much improved by the addition of vegetable mould; whereas the crops on newly broken-up fields often fail from excess of it." This person recommended breaking up in the spring, and, if possible, to finish the work in time for a crop of turnips. As to clay-*ing*, one gentleman thought it did not always repay the cost; he would not resort to it unless the soil were loose and spongy.

In laying down arable land to pasture, it was proposed that the seeds should be sown down with a crop of barley, if the land is in clean condition; but this proposition was deemed admissible only when the field was a long fallow the preceding year. It is

very difficult, sometimes, either to clean or level a piece of land in the spring; for this reason it was concluded, "That grass seeds for permanent pasture ought always to be sown upon a long fallow."

*October 10th.*—*"The desirability of changing Occupations and Servants at new, instead of old, Michaelmas.*

The circumstance of old Michaelmas being still adhered to in this county, as the period for changing occupations and servants, carries so many inconveniences with it, that it is a matter of astonishment how the practice can have been so long persisted in without any attempt to remove it. This practice was believed to be almost peculiar to Suffolk; we therefore desire to point out a few of the inconveniences arising out of it, in the hope that some of the leading landed proprietors of the county who may chance to read our report, will be induced to set the example of making their contracts terminate at new Michaelmas.

In the first place, we will briefly notice the effect of the anomaly itself. A member stated that his father, in removing from Essex to Suffolk, was obliged to seek shelter for his family, stock, implements, and furniture for twelve days, because the tenancy of the farm which he was about to enter upon did not expire until the 11th of October. Other instances were mentioned where parties have been put to very great trouble and inconvenience from the same cause.

Time is money. No man knows the truth of this maxim better than the heavy-land farmer; to him the twelve days preceding old Michaelmas are very valuable, because they are longer and generally finer than those which follow, and because this is just the time when he wants to be laying up his long fallows, ploughing up his stubbles for the future root crop, carting on his manure for his wheat sowing, putting in his winter tares, drawing off his beet, and carrying on a variety of other important operations, which, in short, wet winter days, proceed very slowly and at great disadvantage. These twelve days are also important in respect to the after-grass, which is valued to the new tenant; in wet and low situations, this frequently comes to very little account if reserved till old Michaelmas.

As regards the outgoing tenant, in the event of a late harvest, it was suggested that he might prepare himself for an earlier quittance by setting on extra hands; and as it would occasionally happen that his bean-fields could not be cleared before the 29th of September, a clause might be inserted in his lease, empowering him to cart them after yielding possession to his successor; indeed, there can be no reason why the same provisions which affected the change in other counties should not be applied to Suffolk. A letter from a gentleman in Essex treated the subject in detail, and showed that tenants (particularly farmers) found much advantage and comfort in changing at new Michaelmas. Such being the case, the members of the Framlingham Farmers' Club do hope and trust that other kindred societies will cooperate with them in their attempts to bring about not only this but every other change that may tend to forward the interests of agriculture.

The prizes for roots, at the meeting on the 7th of November, were adjudged to—Mr. Peirson, Framlingham; Mr. G. Edwards, ditto; Mr. James Read, Laxfield; and Mr. G. Edwards, Monk Soham.

The red prize beet was beaten by Mr. Goodwyn Goodwyn, and Mr. Broadhurst carried the prize for white carrots.

## A FEW REMARKS ON THE FARMERS' BEST FRIEND—THE MIXEN.

It may be considered presumptuous in a person who has had little or no knowledge of practical farming to venture an opinion on a subject which is generally supposed to require a life of experience. But I have often observed in other pursuits, besides the one under consideration, that an uninitiated person often solves a difficulty which the most experienced had failed to remove. I shall consequently put together a few observations, from which, although probably incorrect in part, some benefit may be derived. It appears to me that farmers pay too little attention to what are in general considered trifles and unworthy their observation, not considering that these things lead to great results. They are economical in some things where a small outlay would be advantageously employed, and prodigal in others which do not eventually yield much profit. This habit in a great measure arises from inexperience, caused by their not keeping regular accounts and striking a fair balance of their books at the end of each year, not only of the general result of the farming operations, but likewise of many individual ones which it may be necessary to know in order to ascertain whether the outlay on them had been covered. One of the principal things to which too little attention is always paid is the farm-yard manure, which must be allowed to be the most valuable object on the farm; but how much of it is lost in the course of the year from the want of care and indeed from want of common attention, and why? Merely, perhaps, to economise the wages of a man, although the outlay would be quadrupled in three months by the improved quality and increase in the quantity of the manure. Farmers are generally sufficiently careful in harvesting every ear of corn they can collect together, and in thatching or housing it afterwards to prevent its being injured by rain or otherwise, always employing a sufficiency of hands for the purpose; but do they act in the same manner towards the manure which is to produce this corn? I believe few will reply in the affirmative. The dung is generally thrown out of the cow-house and stables, and left to accumulate opposite each building until required to be carried into the field. The consequence of this mode of procedure is, that the dung generally covers a very large surface of ground, thereby receiving much more wet than is required for fermentation, and much ammonia or essential part of manure escapes in the atmosphere to enrich the neighbouring land; as the more extended is the surface of the mixen, the greater will be the evaporation which will necessarily take place. Another great evil is, that as a large quantity of rain falls on the mixen from the unnecessary extension of its surface, and as all this liquid cannot possibly be retained, a portion of it goes off by evaporation, carrying with it, as I before mentioned, the best portion of the manure, and a great part escapes through the bottom of the mixen, charged likewise with good manure to injure, as it very often happens, the public roads, but never by any chance to be spread over the pasture land, where it would do so much good. Seeing this state of things, any person not a farmer would ask why is this method still carried on if found to be so detrimental? I will endeavour to answer the question, and afterwards to suggest a remedy.

The farmer, from inattention, from prejudice, or from having been accustomed all his life to pursue one particular course, does not consider that he is himself receiving the damage which his own neglect in-

fiets, and will not believe that so long as the *substance* is there, the escape of the *essence* will do him any harm. And now for the remedy.

Farm buildings are generally very badly situated with reference to the object of allowing the most being made of the manure, being wide apart, with no connection between them. The best form, in my opinion, is that of a quadrangle, the doors of the stables and cow-houses opening inside, so as to allow of the dung being deposited with little trouble in the centre; but as farm-yards cannot be altered, except at a great expense, which the landlords are generally speaking too unenterprising, and the tenants too poor, to bear, I would propose the following plan:—Let a convenient site, of sufficient extent, be selected for the mixen on the highest part of the premises, at least sufficiently high to allow of a descent of six or eight feet on one side. After the site is marked out let it be excavated to the depth of five or six feet, and the bottom of it flagged (with good clay between the stones) with a small descent from every side to the centre, in which there should be a well, grated over and connected with a good sized drain to convey the moisture which oozes through the mixen to a bank or reservoir made to receive it in some convenient spot. Then build a stone wall (using clay instead of mortar) all round the excavated space to the height of six feet above the surface of the ground outside, leaving an opening on every side for the convenience of putting in and taking out the manure. Over all this a roof should be placed to prevent the rain falling on it; and as some water is required to aid the fermentation and decomposition of the manure instead of thatching or slating the roof, let it be covered with a tarpauling or any other substance which can easily be removed when required, so as to allow of the rain falling on the mixen. The place for the mixen being now ready, instead of leaving the manure outside of every cowhouse or stable door, in perhaps half-a-dozen spots, let it be wheeled to and deposited in the place above described, and this will not be much more trouble for the cowman or waggoner, if done, than would be caused by his present slovenly system. The dung will, by this means, be regularly mixed, that of horses with cows, and a good mixen be made with little trouble. As there is always a large quantity of dung about the farm-yard and buildings from pigs, poultry, horses, and cattle, when turned out, which it is no one's business to clean up, there should be a man about every farm-house employed in some office which would keep him always on the spot. He should clean up once a day, and collect every particle of dung or other substance which can be turned into manure, and deposit it in the mixen. Once a week also he should empty the necessaries, of which there ought to be two, one for the family and another for the farm-servants, so as to collect every particle that may be possible, which is of some importance when we consider that the feces of a human being voided in a year will produce 300 lbs. of wheat (vide *Smith's Productive Farming*), and allowing fifteen individuals to a farm-house all the year round (not counting the extra number employed in the harvest), the product will be 150 bushels of wheat, worth about £60 sterling. This man might be employed in a number of useful offices besides the one above mentioned, viz. as gardener, which, on a large farm, is absolutely necessary. He might likewise keep all the hedges well trimmed, in order to collect a quantity of material to burn soil and clay dug from the hedgerows, which I will venture to say will give sufficient ashes to serve to mix with guano to manure a field of turnips. These offices will afford a man full occupation all the year round, and pay a

farmer well for his wages, which would not exceed 20l. per annum. When hedges are trimmed, which is not often, the stuff is allowed to remain in the ditch where it has fallen, absolutely of no use to any one, whereas if collected and burnt with the cleansing of earth out of the ditch it would pay the wages of the man employed. This is a source of manure little thought of. Another is the litter and chaff thrown out of a barn after thrashing and winnowing. The pigs certainly pick out a few stray grains from it, but afterwards it is of little or no use, as the wind blows away the greater portion of it. Cannot this be made use of for fodder, by mixing it with cut hay and straw? The farmer will answer that he has sufficient fodder without it; but if he use this instead there will be a saving in his hay, which he can sell. Or if, which I do believe, it cannot be applied in the way I have mentioned, let it be carefully collected and carried to the general deposit to restore to the land a small portion of what has been taken out of it in the straw.

The want of the man I have mentioned above is never more fully exemplified than when you see a farmer taken with a fit of cleanliness, which is sometimes the case, when he puts a boy to scrape his farm-yard. It is done, and the result is apparent in a dozen goodly heaps of manure; but what becomes of them? They are left where they were collected, for the cattle to trample over the fold again, or the rain to wash all the goodness out of them, so that this boy's labour absolutely goes for nothing.

Returning again to the necessaries, I would observe that the produce of them is rarely made use of; and if it is after a series of years, it is of little value compared to what it might have been had proper care been taken of it, as the greater part of the ammonia has escaped. Another occupation for the man above mentioned, if he has any spare time, would be to destroy the thistles, docks, nettles, and other weeds in the pasture fields before they grow to seed, and augment their number thousand-fold. These will also yield manure, if collected. A farmer is often surprised to see the immense quantity of thistles on his land; but if he will only search the hedge-rows in the summer, he will find, almost hidden, a great number of these noxious weeds, which are never destroyed, and the consequence is that they run to seed, and in the autumn are furnished with wings which convey them all over the fields, affording a plentiful crop the next spring, and then the wonder is whence they came.

Hitherto I have only spoken of the dry manure, or solid excrements, the only kind ever thought of by the farmer; but there is another equally valuable, and that is the liquid manure. What becomes of the 2 to 3000 gallons of urine secreted and voided by every cow on his farm in the course of a year? (*Smith's Productive Farming*). Some portion of it certainly finds its way to the mixen; but will a heap of manure made by a hundred cows or young cattle, in six months, contain 225,000 gallons, or 446 tons weight of urine in addition to the rain which by every shower is added to it? Certainly not; for, at the lowest calculation, three-fourths of it escapes; as, were the dung in such a mixen subjected to the pressure of the most powerful hydraulic press, 35,000 gallons of mixed urine and water could not be extracted from it. We will suppose that 90,000 are lost. Does a farmer know how much wheat could be produced by this quantity? 360,000 lbs., or 5,625 bushels, even allowing that a pound of urine will only produce half a pound of wheat, and the general calculation is double. (*Smith's Productive Farming*.)

The dry solid saline matters contained in the above-mentioned 90,000 gallons will weigh about 21 tons,

worth 18*l.* per ton, or equal to 3*l.* 15*s.* each animal. This may appear incredible, but it is nevertheless true. Even in Flanders, where manure is cheaper than in England, 2*l.* per annum is paid for the urine of a cow, and allowing that only this sum, or one half of it, could be obtained in England, is it not worth a farmer's while to preserve it? This may easily be done by constructing the gutters in the cowhouse in such a way that the urine may run into drains or pipes to convey it into a common reservoir, whence it may be taken out in water-carts to put upon the grass lands, or as a top-dressing for wheat, as may be considered most advisable. The urine from the dwelling-house should likewise be collected in lieu of throwing it into the farm-yard, with other substances to create miasmas—which cannot but be injurious to health. Other liquid substances from the kitchen and pigsties may also be collected in the common receptacle, by means of underground drains or pipes, which, mixed with the urine and the drainings of the mixen, would form an abundant and invaluable manure. The mixen should be turned often, so as to aid the decomposition of the different substances of which it is composed, and as much care taken of it as of the granary (for it is equally valuable) instead of allowing it to take care of itself, as is generally the case.

There is another thing connected with the accumulation of manure to which I would call the attention of farmers; viz., the practice so prevalent of feeding cattle in open yards, in lieu of stalling them, through the winter. The disadvantages of this system appear to be the following, viz.:—A great waste of fodder, which is generally carried out in much larger quantities than they can consume; the consequence is, that it is trodden under foot and wasted. The dung which is spread over the surface of a large yard must inevitably lose a great portion of its goodness by being exposed during the winter to the rain and snow which fall upon it, and the urine is all lost. If the oxen were fed in stalls there would not be half the expenditure of fodder, as it could be cut for them; they would feed much better, and all the dung and urine would be preserved. I cannot see any advantage in the present system, as a beast, when it has done growing, feeds in less time in a stall than out, exposed to the weather. When young, exercise is of course required to aid in the development of the muscles, &c.; but even in this case the young cattle might have their fodder given to them in open stalls for them to run in and out, and the yard could be cleaned every day, and made with a fall to the centre, in order that the urine might run into a drain and be preserved.

Whilst on this subject I will allude to another reprehensible practice, that of turning horses out into a clover field instead of cutting it for them to eat in the stable. At least one-fourth of the clover is wasted, and the dung and urine lost, it being of little or no use on the field, as voided by the animals.

Mixens will sometimes require to be watered when there is no rain to do it naturally. This may be effected by means of a small garden engine, by the man who has the care of the mixen, and as the fermentation will be increased by the addition of water, let the dung be well turned over, so as to expose the interior of it to the atmosphere.

Farmers do not generally consider that by attending to what are thought to be trifles, the increase in their substance is in a compound ratio. For instance, we will suppose that by taking a little more care in the collection of manure they add five tons of dry dung and five of urine to their usual stock. These ten tons shall be applied as a top-dressing to three acres of Italian rye grass, thereby increasing the produce by 30

tons, weighed green. These 30 tons, after having been eaten by horses, will give, say ten tons of manure, which will produce on the second year 30 tons extra on three acres. So that the increase is not as at first sight would be, suppose merely ten tons yearly, of manure; but the first year 10 tons; the second 10, and 10 increase, or 20 tons; the third 40 tons, and so on. These calculations may not be quite correct, as I have not had an opportunity of testing them; but what I wish to make apparent is, that the wheat, hay, grass, &c., produced by a certain quantity of manure, when converted again into its former state, will be augmented instead of being diminished, thereby causing, as I said before, a *compound* ratio of increase in the product of the land.

I sincerely trust that my remarks may tend to set on foot a better system in the management of farm-yards, on which the prosperity of the farmer mainly depends, than has hitherto been pursued. The landlords should make the beginning by affording their tenants proper buildings, or making alterations in those already erected, in the way of sheds, drains, pipes, reservoirs, &c., so as to collect the liquid manure, and preserve the mixen from the deteriorating effects of the rain which falls upon it, as let it be remembered that an uncovered dung heap, measuring 20 yards long by 10 broad, will imbibe, from Dec. to May inclusive, according to Dalton's tables of the mean average quantity of rain which falls in England, nearly 8,000 gallons of water, every drop of which, in passing through the mixen, carries with it a portion of the richness of the manure.

The system of cutting fodder and crushing corn, I should wish to see more generally followed, as an immense saving is effected by it. Agriculture is now making rapid strides; and would landlords afford to their deserving tenants that countenance and support to which they are so justly entitled, I am convinced that in the next ten years we should see such improvements in this principal branch of our national industry as would enable us to bid defiance to foreign competition.

A FRIEND TO AGRICULTURE.

## PRESTWOOD AGRICULTURAL MEETING.

The eleventh annual meeting given by Mr. Foley to his tenantry took place the day after the late meeting at Stewponney. Mr. Foley, accompanied by some of the friends and tenants round the estate, to view the different farms, when everybody was much gratified by the uniform neatness and regularity of the cultivation, and were struck with the industry and activity displayed by all the tenants in cutting their fences and cleaning their turnip fallows, the whole of the ground intended for this course next year being now in a state fit for that purpose, between four and five hundred acres of good drilled and ridge turnips were to be seen (notwithstanding the failure of that crop in many places), and appeared to be of the same quality as usual. The party ended the day by partaking of an excellent dinner at the Hall. The following prizes were given on this and other days during the present year:—

A chased silver jug to Mr. John Robins, of Dunsley, for the best cultivated farm.

A silver tankard and cover to Mr. John Yardley, of Stapenhill Farm, for the best drilled and ridged turnips.

A brown jug, with silver cover and foot, to Mr. James Corbett, of Prestwood, for the best fences.

A sweepstakes for the best cultivated meadows be-

tween the tenants occupying lands adjacent to the Stour, and Smeestone. The losing party to pay for a dinner, and two dozen to be added by the landlord. Awarded to the occupiers of land near the river Stour, August 12th.

### LABOURER'S PRIZES.

#### TURNIP HOEING.

For a quarter of an acre of turnips hoed and set out in the best manner.

Candidates.	By whom recommended.	H.	M.
Joseph Burford . . . .	Mr. J. Davies . . . .	3	45
Thomas Childs . . . .	Ditto . . . . .	3	45
John Cox . . . . .	Mr. J. Beddard . . . .	3	7
John Penzer . . . . .	Ditto . . . . .	3	0
John Shepherd . . . .	Mr. J. Corbett . . . .	3	45
Joseph Webb . . . . .	Mr. G. Cook . . . . .	3	0
Thomas Webb . . . . .	Ditto . . . . .	2	30
Thomas Bennett . . . .	Mr. J. Yardley . . . .	3	0
William Haywood . . .	Ditto . . . . .	3	0

A prize of 1*l.* was awarded to William Haywood; 15*s.* to Joseph Webb; and 10*s.* to Thomas Webb.

#### HEDGING.

For five perches of hedge, cut and trimmed in the best shape for future growth.

Samuel Johnson	J. H. H. Foley, Esq.
William Bevan	Mr. J. Beddard
Thomas Williams	Mr. G. Burgess
John Davies	Mr. J. Corbett
Thomas Bowen	Mr. J. Davies
Thomas Bennett	Mr. J. Yardley.

First prize 1*l.* 5*s.*, Second 1*l.*, Third 10*s.*

Samuel Johnson, William Bevan, Thomas Williams, and John Davies, having performed their work so nearly alike, and in the same time (viz. 40 minutes), the judges were unable to decide which was most entitled, and they agreed to divide the prizes equally between the four. The unsuccessful competitors were given 2*s.* 6*d.* each for refreshment.

### BURTON-UPON-TRENT FARMERS' CLUB.

The first meeting for discussion, after the annual dinner, was held on Thursday, the 7th ult., at which Sir O. Mosley, the president for the year, took the chair.

Mr. DANIEL brought forward the subject of "The best rotation of crops for heavy and light soils." He began by censuring the system of taking several grain crops in succession, as tending to impoverish the soil; and to choke it with weeds. He instanced a farm which had attracted his notice, where, after the third grain crop, the land was covered with couch grass close enough to be mown. On heavy land the course of cropping he preferred was a six-course shift, on which the land remained in pasture two years. 1st. Turf broken up for oats. 2nd. Wheat. 3rd. Turnips. 4th. Barley laid down with clover and rye grass. 5th and 6th. Clover and grass. He drilled his barley 9 inches apart, horse-hoed it, and put in the seeds at the same time. Turnips had not proved a successful crop this year on heavy soils, yet he found them on the whole a profitable crop, on account of the increased stock of all kinds which they enabled him to keep, and also because he could by means of them convert the straw of his farm into good manure. He some times extended the course, and took beans in the place of turnips, in which case unless the land was kept clean by

horse-hoeing that crop, he made a summer fallow; or otherwise he followed it by barley, and, after the barley, turnips, and finished the course as before with barley laid down with clover as before mentioned. He generally sowed vetches twice in the year—in September and in the spring. With these he soiled his horses in the summer. He sowed them usually on the wheat stubble; or, when more convenient, on the oat brush; and in either case they served to lessen the severity of the course of cropping which he pursued when turnips did not immediately succeed the wheat. By this system of rotation, he had found that he was able to keep the land in good condition, and to avoid the necessity of summer fallows; whereas, if the cropping with grain be carried further, the land requires additional manure and fallowing, the expense of which more than balances the value of the extra grain crops; and if manure and labour be not applied to the land to repair the damage of the grain crops, it must necessarily be both weak and foul at the end of the course, the clover and seeds will be unproductive, and consequently the land cannot recover its lost fertility as it would do if the clover were abundant. On light lands the four-course Norfolk system, of wheat, turnips, barley, and clover, could not be improved; but he remarked, that some of the farmers who took wheat after clover, and then another white crop, practised an exhausting course, and by no means strictly adhered to the Norfolk system. He concluded by recommending a spirited and improving system of farming, to meet the difficulties which now beset those engaged in agriculture. The improvement of the soil by lime and every kind of manure not made on the farm, though it might not always repay the farmer in a proportionally increased value of his produce, would always increase the value of the soil itself, and hence landlords should consider it as an imperative obligation on themselves to remunerate any farmer who might leave his farm in such an improved state of cultivation as would enable them to realize from it a larger rent.

The CHAIRMAN suggested that the question as to the best rotation for heavy or light soils should be discussed separately.

A MEMBER objected to the practice of growing turnips on heavy lands, and would substitute for them a crop of vetches; which would equally well, when they were carried off, help to convert the straw into good manure. They would also come off early in the summer, and give time for a good fallow, which would clean the land more thoroughly than turnips.

Another MEMBER agreed that on the really heavy lands in this neighbourhood turnips could not be grown to a profit, while in their present state; but thorough draining would so alter the character of a heavy soil as to make it suitable for turnips.

One of the members thought that the rotations for heavy lands advised by Mr. Daniel would not sustain the condition of the land. Of all the courses which he had seen recommended he most approved of Mr. Stace's plan as described in his Essay, to which the prize was awarded by the Royal Agricultural Society. The Essay was to be found in the *Journal of the Royal Agricultural Society*, and, at the request of the club, Mr. Greaves read it. His system approaches nearly to the alternate one as it is usually practised on light lands; the proportions of green crops mixed with the corn being sufficient to repair the waste of the latter, without having recourse to laying down the land into pasture for

awhile, as is done on what is called the convertible system of husbandry; but the kind of crop, and the time of the tillages, and sowing, are so modified as to suit heavy land. Such crops are grown most frequently as have a tendency to lighten the soil, and for which the tillages are required at seasons when the treading of the horses is least injurious. The following is the course he proposes:—1st. Winter tares to be fed off with sheep, and followed by turnips and rape; the rape and part of the turnips fed on the land, the remainder carried off to the yards. 2nd. Wheat. 3rd. Clover, to be cut for hay on one half, and trefoil and rye grass mixed on the other half, to be fed off by sheep in the spring; and followed by spring tares, also to be fed off by sheep. 4th. Wheat. 5th. Winter beans. In the succeeding course the clover is grown on the ground occupied by the trefoil, and rye grass in the previous one, and thus an interval of ten years occurs between the successive crops of clover. By this system 100 acres of land would produce, each year, 40 acres of wheat, 20 acres winter beans, 30 acres tares, 20 acres turnips and rape, 10 acres clover, to be mown twice, 10 acres trefoil and rye grass, to be fed a few weeks in the spring.

A MEMBER bore witness that Mr. Daniel's system had answered on his (Mr. D.'s farm.) When he took it in hand it was cold, poor land, which would grow little besides rushes, but it now grew good crops of everything.

Another MEMBER said, in allusion to the plan of Mr. Stace, that he considered it more suitable for strong loam, than for what were called heavy lands in this district. On really heavy lands the tares and the turnips and rape could not be fed off without rendering the land very difficult to prepare for the next crops. In reference to Mr. Daniel's plan, he would prefer, if the market price of beans were favourable, to grow that crop after the oats; but in the present state of things he himself grew wheat, and did not find his land deteriorated, and it was the practice of most good farmers about him to do so.

The CHAIRMAN most ably summed up the arguments which had been adduced, for and against the plan of Mr. Daniel, and the question being put, the club approved of it by a large majority.

Mr. COLVILLE, M. P., said, in regard to rotations on light lands, that he was of opinion the Norfolk course, recommended by Mr. Daniel, was faulty in two points. The clover recurred so frequently as to render its abundant produce a matter of great uncertainty; and by having so much as a fourth part of the land in turnips, the work of the team was too heavy at one particular period of the year. He greatly preferred the plan pursued by Mr. Morton, on Lord Ducie's model farm, which combined all the excellences of the Norfolk course without the objectionable points he had alluded to. The following is the course proposed by Mr. Colville:—1st. Swede turnips and mangold wurtzel, sown in alternate half acres. The mangold carried off for food in the sheds, and the turnips fed off, the sheep being folded so as to range over both the turnip and mangold ground. 2nd. Barley, with clover, and the next course rye grass in the place of clover; the barley drilled and the seeds hoed in. 3rd. Clover. 4th. Oats. 5th. Rape and vetches, the vetches part fed and part carried to the yard. 6th. Wheat; and after the crop is removed, rye and rape are sown for feeding with sheep in spring, previous to the turnip crop. Mr. C. recommended a crop of early common garden cabbage for spring keep before the turnips, which he had seen grown to advantage, even

high in the Peak. By this plan seven crops are grown in six years—three grain, and four cattle crops. The greater part of the green crops being consumed on the ground, but little manure is required in addition to support the condition of the land. Fifteen tons of manure for the turnips, and a little bone manure and rape cake are all that the land needed in the course. Only one-sixth of the land is in turnips, and the clover only recurred once in twelve years.

Mr. J. GREAVES opposed to the plan advocated by Mr. Colville, his own, which equally well removed the objection. He thought cabbages much too expensive a crop for spring feed after a corn crop, and even doubted whether they could ever be grown to a profit, when sown in the autumn to be eaten in the spring, so great was the expense of the plants and of their culture. His system on light lands was, to let the turf lie two years, and then to take two white crops:—1st. Wheat on the turf, pressed and hoed. 2nd. Barley drilled and hoed, and sowed in autumn, half with rye and half with winter vetches. 3rd. The rye eaten off early, followed by Swede turnips, and the vetches carried to the yard and succeeded by common turnips. 4th. Barley drilled, and clover and grass seeds put in with the second horse-hoeing. 5th and 6th. Grass and clover, either fed or mown as convenient. He put three tons of lime on the wheat stubble, and used more or less manure for turnips, according as the previous seeds had been fed or mown. In this rotation the seeds only recurred once in six years, while the turnips being only one-sixth of the land, and being besides half Swedes and half white, which were sown at different times, the work of the team was economically engaged. Seven crops were also grown in six years—four cattle, and three grain.

The CHAIRMAN having put the question, the Club approved of the Norfolk or four-course shifts for the light soils of this neighbourhood.

A member read some remarks on the general theory of rotations of crops, the object of which was to show that every rotation should fulfil these three requirements:—1st. To grow cattle crops as frequently as is necessary, to keep the land capable of bearing the greatest amount of produce. 2nd. To alternate crops which admit of cleaning or prevent the growth of weeds with the corn crops, which favour the growth of weeds, so as to avoid fallows. 3rd.—To alternate deep rooted plants with others which only occupy the upper soil, so that all the food of plants which resides in the soil may be brought into use.

It was contended also that there was no good reason for supposing that the failure of a crop, when frequently repeated, was owing to any poisonous matter left in the soil in the previous years of its growth, but was altogether owing to the land being exhausted of the particular salines which the crop required for its vigorous growth.

A simple preventive from injury by lightning to corn and hay ricks, is that of merely putting an inverted broken bottle on the point where the thatch terminates; instead of which a spar or spiral pinnacle of reed is placed at the summit, both of which are, with the exception of iron, the best conductors of the electric fluid, and are the general cause of the accidents which occur from lightning; whereas glass and sealing-wax are non-conductors, and, therefore, repel the fluid instead of attracting it.

## ON THE POSSIBILITY OF GROWING WHEAT CONTINUOUSLY AND PROFITABLY ON THE SAME LAND;

BY MR. BRIGGS, OF OVERTON.

READ BEFORE THE WAKEFIELD FARMERS' CLUB, AT THEIR MEETING HELD ON THE 1ST OF DECEMBER, 1843.

Having been requested to draw up a condensed statement of the arguments that I made use of, in my former paper, on the possibility of growing wheat, &c., continuously and profitably on the same land, accompanied with any additional observations on the subject that may since have occurred to my mind, I willingly accede to the request, in the hope that in doing so, a spirited discussion may be provoked; for nothing, perhaps, is more calculated to elicit truth, and to enable us to arrive at just conclusions, than by having a subject coolly and dispassionately presented to the mind in all the points of view in which it occurs to different individuals. Parties generally view different subjects according to their various temperaments; the sanguine man accordingly sees no difficulties in any new schemes that are propounded to him, and frequently looks into dark futurity with almost the same feeling of confidence of success, as he now enjoys in any undertaking in which he has already surmounted all difficulties, still untaught or undaunted by the failures that may have arisen in prosecuting many—perhaps the majority—of his schemes. Again, there are others who see objections and difficulties insurmountable in any new plan that is presented to them, or in any variation from the modes of operation to which they have been accustomed from their youth up. It is the part of wisdom to hear what arguments can be made use of, by both these opposite characters, and the opinions of those of less sanguine dispositions on the one hand, and of those who less pertinaciously adhere to old notions on the other, before a judgment is finally pronounced. I hope, therefore, that all now present will unreservedly state their opinions of what I advance, for I have no other object in view than that of promoting the best interests of the agriculturist and the country at large, and if the plan that I propose is not grounded on fair and reasonable principles, it is but right that the theory should be exploded. The groundwork of the theory, then, is this—that all crops extract certain nourishment from the soil, which by successive cropping must eventually be exhausted, unless means are adopted for restoring those nutritive ingredients which have been so extracted. I think that all parties will agree to this first step in the argument.—Again, if by chemical analysis it can be ascertained of what ingredients the different crops are compounded, it seems but fair to deduce, that those ingredients or substances must be the most appropriate food for those crops; and that as they become exhausted in the soil, they must be restored; which restoration, it is presumed, renders the land capable of producing, successfully, the same crop year after year—provided that nothing absolutely injurious to vegetation exists in the soil,—a proviso, indeed, which is equally applicable to all systems of farming. The next step in following up this interesting question is—what are these constituents of cultivated vegetables? To simplify the matter, I will take wheat as the particular crop for examination. Now, in wheat (that is, the *plant*, containing both straw and grain)

about thirty-nine parts out of forty are volatile or gaseous, which may be, and indeed are, almost exclusively, obtained by the plant from rain and the air. The remaining one-fortieth part consists of several fixed or solid ingredients, in different proportions, namely, potash, soda, lime, magnesia, alumina, silica, sulphuric acid, phosphoric acid, and chlorine. These are, and must, all be extracted from the soil, and in proportion as the farmer neglects to replace them, after the crop is reaped from the land, so will the fertility of his fields decrease. But then, again, will the simple restoration of these substances, bring back the land to its original state? I believe it will—always providing that proper cleanliness and freedom from weeds are attended to. I know it is maintained that plants give out some poisonous matter by their roots, which renders the soil unfit for bearing successive crops of the same species. This I conceive to be a supposititious cause for a known effect, that will not bear strict scrutiny, as I have never met with any proof of its correctness. A more rational mode of accounting for the incapacity of the land to bear continuous crops of the same plant, appears to me to be, the exhaustion of the necessary nutriment, rather than the imparting to the soil of something injurious. It is a notorious fact that some soils have produced good crops of wheat for many years successively, without any tillage having been applied; which certainly could not have been accomplished, had the land, according to this poisoning theory, been rendered incapable. To illustrate this theory of restoration, I will familiarly compare the process to a barrel of beer which is full to the bung, the fulness standing for the high state of fertility in the soil. If you keep drawing, pint after pint, from the tap, without replenishing at the bung-hole, you soon exhaust the barrel of its contents; but if for every pint that you draw, you introduce another at the hole, you always keep your barrel full. So I imagine it to be with land,—if you constantly replace the ingredients extracted by the crop, you may go on “ad infinitum,” growing wheat on the same land—provided, as I before said, that you pay proper attention to cleanliness. I certainly have not yet practically proved the feasibility of this plan, but in our farm we are this year commencing a trial of it, and have sown, or are about sowing, upwards of eighty acres that were wheat last year. To accomplish this we are putting upon the land, per acre: two bushels of bones; fourteen pounds of common salt; ten pounds of gypsum; and about two dozen of lime per acre, in fields that have not lately been limed; which ingredients I imagine will yield all the constituents of wheat that are deficient in our soil—potash and the remaining constituents being already in sufficiency.

The bones yield phosphoric acid and lime;  
Common salt yields soda and chlorine;  
Gypsum yields sulphuric acid and lime;

potash, alumina or clay, and silica being already present.

I imagine that if any one of the constituents before enumerated are absent from the soil, you must not look for a good crop. To insist upon having a good crop without all these constituents, is like insisting upon your cook preparing savoury viands, and not providing for her the necessary seasoning. I stated in my previous paper that I have grown potatoes on the same land for eighteen years,—of course manuring them each year,—and the produce is still as good as it originally was. Why then cannot wheat be equally grown on the same

land? for potatoes are certainly quite as exhausting a crop, and I do not know that wheat is any more given to exuding poisonous matter into the soil than potatoes. In endeavouring to obtain good crops from land, the first effort of the farmer ought to be to ascertain what injurious ingredients his soil contains, or what is the cause of infertility.—Want of proper draining is most frequently the primary difficulty in obtaining good crops; but when that is accomplished, even then the farmer may be disappointed, in the result not being so desirable as he had anticipated. This will generally arise from the presence in the soil of injurious compounds, frequently from the salts of iron, that is of coppers, or the sulphate of iron, and the protoxide of iron; the former of which is decomposed by the application of quick lime with which it enters into combination, and forms other compounds which are fertilizing; the latter is corrected by exposure to the air, and by burning. After these bad ingredients are disposed of, and the soil is rendered more pure, then the application of nutritive constituents may be proceeded with. Since I read my last paper I have met with a report in Liebig's Agricultural Chemistry, of an experiment that was made at Giessen, which strongly corroborates the position which I maintain, of the possibility of successfully restoring the constituents of plants to the soil. He took a quantity of pure sand, in which he sowed different seeds, and into another portion of the sand he introduced the different substances of which plants are composed, thereby making an artificial soil, and in this soil he also sowed the same sorts of seeds. The result was, that the seeds in the sand certainly germinated, but grew in a very imperfect manner, and had not strength to come to maturity, having died before the seed was even formed. The seeds, on the other hand, that were sown in the soil formed by the addition of the mineral constituents, germinated luxuriantly, and subsequently matured their seed in a proper manner. There cannot be a doubt that this was caused by the addition of these constituents. It is my intention to try the same experiment in the spring, and to report the result to the club. I have also lately met with a passage in Liebig, which hints at the possibility of accomplishing what I advance, which runs thus:—

“A soil will naturally reach its point of exhaustion sooner, the less rich it is in the mineral ingredients necessary as food for plants. But it is obvious, that we can restore the soil to its original state of fertility, by bringing it back to its former composition—that is, by returning to it the constituents removed by the various classes of plants.”

And another passage in Johnstone's lectures:—

“It may be said that this explanation (speaking of the mode of plants imbibing nourishment) seems to imply that the same kind of crops may be reaped from the same soil for an indefinite number of years, by simply adding to it what the crop carries off. This is certainly implied in the principle—and if we knew exactly what to add for each crop, we might possibly attain this result, except in cases where the soil undergoes some gradual chemical alteration within itself, which it may require a change of treatment to counteract. At all events it does not appear impossible to obtain crop after crop of the same kind—and we may hope, hereafter, not only to be able to effect this, but to do it in a sufficiently economical manner.”

Thus you see that these great men seem to give a colourable sanction to the idea with which I set out; they hover about it, but appear not yet to have

come positively to the same conclusion. I will not anticipate what objections may be made to the theory, in the discussion which I trust may ensue this evening, but will merely state two, which have lately been mentioned to me; namely, 1st, that if we can grow wheat successively on the same land, the landlords will advance rents: and, again, that they will never allow it, as it will exhaust the land. In reply to the former, I will merely say, that if, by following the proposed plan, the tenant can afford to pay more rent, he will be in no worse condition, and the advance would no doubt not be adequate to the increased production of wheat; and to the latter objection, I hope that what I have before stated will be considered a sufficient answer. There may be some difficulty, under this system, in obtaining the proper dressings of the land; but I stated in my former paper that to obviate this I should recommend different sorts of wheat being sown, beginning with the Michaelmas wheat and finishing with the spring or March wheat, which will give more time, and a better opportunity of cleaning than if all had been sown before Christmas. And I also recommend drill sowing, and spring hand-hoeing, for the purpose of keeping the weeds down.

The same principle, I imagine, is applicable to all sorts of crops; and by knowing what ingredients are exhausted by any given crop, the farmer may turn his attention to any description of produce which is the most profitable, and the best adapted to the nature of his land. The system of rotation of crops is certainly efficacious in keeping the land in a state of fertility, but if you can make more profit by growing the same crop year after year, and by so doing produce more food for man, without injuring the soil, the sooner the slavish adherence to the prescribed system is abolished the better. Under the four-course system the land obtains a thorough cleaning only once in four years, and those noxious weeds which mere ploughing and harrowing do not exterminate (which is the case with couch grass, colts-foot, and some other running weeds that are very tenacious of life) are gathering strength, during the whole of that time, and helping to exhaust the soil of nutriment which ought to be appropriated solely by the cultivated crop. Under the system of growing the same crop successively, a slight dressing may be made every year (accompanied by hand hoeing in the latter end of spring), and will no doubt be much more efficacious in keeping down the weeds, than by having recourse only to one great dressing every four years. Farmers generally, I conceive, are too sparing of labour, thinking that hand-hoeing and other cleaning are very expensive; but the grudging this labour, trouble, and expense is, in my opinion (to make use of a homely expression), being penny wise and pound foolish; for a shilling spent in cleaning a crop will often bring back eighteen pence in additional produce, yielding 50 per cent. profit, besides affording ample employment to the poor cottagers, and thereby economising in the poor rates, as well as acting a patriotic part by increasing the resources of the nation.

It is a common saying, that he who makes two stems of corn or two blades of grass grow where only one grew before, is one of the greatest benefactors to his country; for plenty of food, produced by plenty of employment, is one of the strong foundations of peace and happiness. Let us then each try to render himself one of these benefactors by fulfilling these conditions, and give all the work that we can to our industrious poor.

As I conceive that very erroneous ideas are fre-

quently entertained about the effect of different manures, I will repeat what I before said respecting them—and that is, that their relative value consists entirely upon the circumstance of their containing either a greater or less number of the constituents of vegetables. To exemplify this, I have copied a table of analysis of different sorts of tillage, drawn up by Mr. James Haywood (who, I am happy to say, has this evening favoured us with his company), which I consider very valuable, as giving us the desired information at one glance:—

MR. HAYWOOD'S ANALYSIS OF MANURES.  
ONE TON OF EACH.

	Chlorine.		Sulphuric Acid.		Phosphoric Acid.		Soda.		Potash.		Nitrogen.
	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.		
Farm-yard Manure.	1 9	1 4	5 1	1 10	2 4	11 0					
Night Soil . . . . .	3 0	2 3	120 0	4 10	6 7	39 8					
Fresh Bones . . . . .			580 0			120 0					
Rape-dust . . . . .						70 0					
Dry Blood . . . . .						366 0					
Guano . . . . .	62 0	93 8	283 9	36 15	66 8	182 8					
Shoddy . . . . .						270 0					
Sulph. of Ammonia . . . . .		357 0				470 0					
Soot . . . . .						41 6					
Nitrate of Potash . . . . .					1054 0	299 0					
Pearl Ashes . . . . .					1102 0						
Nitrate of Soda . . . . .				833 0		364 0					
Common Salt . . . . .	1344 0			994 0							
Gypsum . . . . .		317 0									
Urine, per 100 gal.	1 6	3 8	2 6	5 9	2 0	15 8					
Gas Liquor, per 100 gallons . . . . .											18 0

Here you will observe that, out of an enumeration of sixteen manures, only four contain all the necessary constituents of plants, and therefore they are the only tillages which are efficacious when applied alone, provided that previously the land was deficient in all the ingredients referred to. The other twelve manures may, however, be highly beneficial when the other constituents, in which they are deficient are present in the land. Many of the substances enumerated above, namely, farm-yard manure, night-soil, bones, guano, and gypsum, contain lime; but as the table was prepared for a limestone district, and as it is presumed that no good farmer will attempt to cultivate his land without application of lime, the precise quantity is not stated.

Mr. Briggs concluded the reading of his paper amid the applause of the company.

Afterwards an animated discussion ensued, which resulted in an unanimous resolution to the effect—"That in the opinion of the members present, it is feasible to grow crop after crop on the same land, provided that the ingredients extracted from the soil are restored."—*Wakefield Journal*.

## AGRICULTURE, MANUFACTURES, AND THE CURRENCY.

FIVE LETTERS TO THE RIGHT HON. SIR ROBERT PEEL, BART., FIRST LORD OF THE TREASURY, IN RELATION TO AGRICULTURE, MANUFACTURES, AND THE CURRENCY.

### LETTER I.

SIR,—Upon the subject of agriculture, as being of the highest national importance, and having engaged your personal attention, I beg leave to address you in

relation to a few topics which I conceive to be of paramount importance.

Much research and ingenuity have been exercised about the discovery, invention, and procurement, of the most efficient manures. Bones (even human) are imported from foreign parts, and guano a distance of several thousand miles; but there does not appear to be sufficient attention bestowed upon a principle which occurs to me as entitled to the most serious consideration, and to which I will at once proceed. If all produce in its decomposed state were returned to the land from which it originally proceeded, the fertility of that land (other circumstances remaining the same) would be maintained at least at its original standard, by its own native resources; and I believe with good cultivation would become considerably improved. I do not mean that an identical parcel of ground should re-absorb its own productions exclusively, which in general would be neither possible nor desirable, and perhaps fertility may be advanced by the application of exotic dressing, as animal fecundity is said to be by the crossing of breeds: I mean that the effect stated would follow with respect to a country generally, upon which were bestowed dressings equal in amount and quality with the soil or manure derivable from all the animals (including the human species) maintained by the land of that country.

Now, suppose that the population of Middlesex should not only consume the produce of their own county, but also require supplies from other parts of England (which indeed is the fact), and that upon the lands of Middlesex were bestowed, not only all its own decomposed products, but also the spent produce derived from other counties. I apprehend that the fertility of Middlesex would increase from time to time (beyond the improvement occasioned by proper cultivation) in proportion to the amount of food imported into that county, so as eventually to bring the productiveness of its soil to a level with the wants of its inhabitants, provided the population was not at the outset greatly disproportioned to the cultivated soil of the county. But if the farmers and horticulturists of Middlesex should neglect to economise and apply to their lands the extra dressings which the foreign supplies afforded, that county would become gradually more and more dependent for food according to the increase of its population, instead of gradually less and less dependent, as it might become by exercising the economy referred to. What I have argued amounts to this—that a country's power of production may and ought to be improved in proportion to her importations of foreign produce, so as eventually to overcome the original inability of her soil to maintain her inhabitants.

I do not claim entire originality for the principle above stated, or allege that it is *wholly* disregarded; for it is well known that agriculturists are alive to the advantages of feeding and folding on their lands, and that they systematically dress them with the accumulations of the farm-yard. But most wofully, as appears to me, is this principle violated with reference to the decompositions which our public drains and sewers are suffered to carry off in waste into rivers and public waters. The manure abstracted by those channels is more stimulating than that afforded by the farm-yard or fold. What return is made by the metropolis to the land, the fat of which is devoured by more than 1,800,000 persons, mostly good feeders? At this place (Bristol) the Avon and the Bristol Channel carry off what ought to be returned to the lands of the adjacent counties and of Ireland. What an amount of national substance is daily swept away by

the Thames, the Mersey, the Bristol Avon, the Humber, &c., besides the immediate drainage into the ocean from such places as Brighton, Dover, Portsmouth, Southampton, Plymouth, &c., &c.! We may obtain bones and guano from abroad—the importation of which may be advantageous at all times—yet only by the exchange of an equivalent; but to allow matters generated within the country, and highly valuable for maintaining and increasing its fertility, to be washed away, or to remain unemployed, is an absolute loss of national wealth.

I have before me a published estimate of the weight of food consumed in the metropolis, which for 1,800,000 persons amounts to 913,776 tons annually, exclusive of wine, spirits, drugs, and *horsekeep*. Surely economy ought to be exercised with respect to the decomposed matters resulting from this vast consumption. If we continue to neglect the economy here advocated, we may, with all our industry and skill, stand for ever before the world as a realization of the fable of Sisyphus.

I have the honour to remain, &c.,

Bristol, Dec. 14th, 1842.

R. J.

P.S.—(January, 1844) According to the census of 1841 the population of London and suburbs amounted to 1,873,676. I believe it will be found upon investigation that, upon an average, the consumption of each of the inhabitants of the metropolis is equal to the produce of an acre of land. Consequently the population above stated consume between a thirteenth and fourteenth part of the whole produce of England, taking the quantity of land in cultivation at 25,632,000 acres. Any man who can put two ideas together may tell, without teaching, what must necessarily be the ultimate consequence of the disproportionate increase of town population, coupled with a neglect of the economy advocated in the foregoing letter, adding to these causes the absorbing power of accumulated wealth.

#### LETTER II.

SIR,—The profit derivable from due manuring and cultivation being immediate, and the necessity of those operations being of annual occurrence, tenants may be left, as to those particulars, to the influence of their own interests, of improved instruction and example, and of such covenants as they and their landlords may mutually agree upon. It is true that the landlord, as well as the tenant, derives benefit from proper manuring and cultivation; but the interest of the latter in these particulars is so immediate and substantial as to induce him to advance in them as far as his means may enable him. But an efficient *draining* is not an improvement of this description: once accomplished, it is in a measure permanent, and many years are necessary to enable the tenant to realize an adequate return for his outlay therein. The expense of draining is therefore one which a tenant should not be expected to undertake wholly at his own cost, unless he has before him a sufficiently long term; and even where the tenant may probably derive a profit from such improvement, the fact of the landlord ultimately taking a gratuitous share in the tenant's expenditure may in some instances disincline the latter from undertaking it.

Long leases have been lately insisted upon as a *sine qua non* for encouraging improvement in agriculture. This is very well as a recommendation, and I doubt not but that both landlord and tenant would in general benefit by its adoption; but being a recommendation only, not to be enforced, I pre-

sume, by legislative provisions, it is to be expected that, under the influence of various reasons (whether wise or fallacious, commendable or condemnable), many landlords, and perhaps some tenants, may not choose to adopt it; and there are many existing leases, the unexpired remnants of which being of various durations, the tenants holding under them would be entitled to fair adjustment with reference to any permanent improvements they may undertake. It appears to me, therefore, that, instead of limiting the view to long leases as the only basis of agricultural improvements, some principle of adjustment ought to be adopted so as to suit every variety of tenure.

As regards draining (which is all that I intend here by permanent improvement), there are two faces to the subject: either the landlord or the tenant may be desirous of undertaking it at his own expense. If done by the landlord, the rent ought to be increased to the extent of a fair return for the capital expended; if by the tenant, he ought to receive, at the expiration of his holding, the sum expended, reducible according to the length of time during which he may have had the benefit of the improvement, or a lease ought to be immediately granted him at a rent reduced proportionably to the reversionary benefit to the landlord. Therefore, if a landlord will not grant a lease at a reduced rent to a tenant desirous of draining, the landlord ought either to drain at his own expense, in consideration of an improved rent, or undertake to pay his tenant upon the determination of the tenancy a sum of money equitably adjusted, according to the outlay incurred by the latter, and the time during which he may have enjoyed the benefit of the improvement.

I think that the party desirous of draining should, in the first place, cause an estimate to be made of the cost, and then upon that basis let a calculation be made (if on the part of the landlord) of an increased rent to be paid by the tenant, or (if on the part of the tenant) of a reduction of rent commensurate with the unexpired portion of a lease then existing, or with the length of a lease to be granted, or of a sum to be paid the tenant at the expiration of his tenancy. In case of tenancies from year to year, or of leases having only a year or two to run, neither party should be subjected to compulsory terms; for in any such case, either party has his remedy against the contumacy of the other by a speedy determination of the tenancy; but in case of leases of which a certain number of years or upwards were unexpired, a legislative enactment would be necessary. The process might be in the way of arbitration, under which (if upon the tenant's application) the landlord should be compelled to the alternative, between which he should be at liberty to choose, of a certain reduced rent or payment to the tenant of a certain sum at the expiration of the tenancy; or (if upon the landlord's application) the tenant should be subjected, in the alternative, to a certain increase of rent, or the forfeiture of his lease.

I have the honour to remain, &c.,

Bristol, Dec. 16.

R. I.

#### LETTER III.

SIR,—I believe that one of the most important and difficult cases with which you have to deal is that of the cotton manufacture, as at present circumstanced. There are probably other manufactures more or less involved in the same circumstances, and to which may be applicable in some measure the same observations and suggestions. The cotton manufacture has, no

doubt, been productive of great wealth, and though it may also have been prolific of much misery and embarrassment, yet I imagine that the wisest course is as well to restore its vigour as to check its degenerate tendency, rather than to contemplate its downfall. I would advocate neither the "razing of the manufacturing towns," nor the conversion of this island into "the workshop of the world." Our main dependence for national safety and lasting prosperity should be placed upon the soil; but in a thickly populated country, manufactures well regulated afford a great auxiliary. The great evil incident to the cotton manufacture, carried on with powerful and extensive machinery, consists in the alternations which often occur between excessive and contracted production, and the most grievous social diseases which spring from those irregularities are the physical wretchedness and moral depravity of the workpeople.

It appears to me a duty incumbent upon the master manufacturers, whose average profits are magnificent, to provide against the consequences of depressed trade as respects their workpeople; for neither the latter nor the country in general (which also suffers) can control the speculations or remedy the want of foresight of manufacturers in the conduct of their operations.

Let means be taken for ascertaining periodically a minimum market value of labour, below which manufacturers should not reduce wages, and allow no short time work under a certain number of hours a day at lower wages. If a manufacturer was unable to provide full work, he should be required to turn out such hands as he could not afford to or would not retain at the current legal rate of wages. The people thus put out of work must be provided for until again employed, subject to a notice from the master manufacturers, to be presently mentioned. The fund for that purpose should be raised and maintained at a certain amount by a moderate *ad valorem* duty upon the product of the mills. The plan might be brought into operation in the following manner. In the first place enter in a list or register the names, &c., of all persons employed in the factories; then, suppose the people so registered to be in full work and in receipt of full wages, and that afterwards more hands were required and employed at full wages, the latter would also be registered when taken on. On the other hand, suppose a falling off of work, disabling a manufacturer from keeping on the same number of hands at wages of the current legal rate, in that event he should not be allowed to reduce the wages below that standard, but must relieve himself by turning out all hands except those for whom he had so much work as to enable him to pay wages at the required rate; and that operation would be repeated from time to time as depression increased, and when a revival took place the mills would make their drafts from the registered workpeople unemployed. The registered operatives unemployed should not be placed on a level with paupers, neither should their allowance equal the pay of those in work; for a master turning out hands would naturally retain those of his workpeople who were superior in capacity or character. The operatives unemployed should be at liberty to abandon their maintenance out of the manufacturers' fund and accept any employment other than that of the mills; and while dependent upon the fund they should be bound to do any work provided for them other than work in the mills, and might take turns with the operatives employed. My reason for requiring that all to whom the manufacturer will not pay as much as the legal current rate of wages should be turned out is, that if operatives remained at reduced wages to be made up

out of the general fund, a manufacturer might contrive to get more than a due quantity of work done at the expense of the fund; and if the hands were not turned out, other manufacturers wanting additional labour could not well supply themselves without taking on fresh operatives, and thereby unnecessarily increasing the registered number and further burthening the fund. The inspectors of factories would be the proper persons to carry the measure suggested into operation.

It would be but fair towards the manufacturers to begin the system at a time when trade was dull, and then being put in operation it would be for the manufacturers so to regulate their future operations as to avoid being burthened for any length of time with a large number of unemployed operatives. I would not render the unemployed workpeople permanently chargeable upon the fund, but would allow the manufacturers to relieve themselves of the whole or any part of them by a six months notice to be given in pursuance of a resolution to be agreed to at a general meeting of manufacturers, and, as a further relief in the meantime, the allowance to an unemployed operative should be liable to be reduced to the level of a pauper's, upon proof of conduct which would afford a reasonable objection to his being employed. There are many other regulations and checks which might be mentioned for ensuring the efficient working of the measure, but which it is not possible to detail (had I leisure to do so) within the ordinary compass of a letter. I have the honour to remain, &c.,

Bristol, Jan. 10th.

R. I.

#### LETTER IV.

SIR,—I take it to be well understood that general distress may be produced, not only by fluctuations in commerce and manufactures, but also by variations in the currency—that general exponent of contracts and universal medium of commercial dealings.

Fluctuations in trade and manufactures cannot be wholly prevented by direct legislative measures: merchants must be free to export and import, and manufacturers to fabricate at their discretion. We can only hope that experience of the evils resulting from doing those things at random or to excess, will by degrees teach the classes referred to the duty of governing their transactions by a sober judgment, and a conscientious regard to the public interest. However, a great blow may be given to an unsound commercial and manufacturing system by prohibiting private issues of paper money, and an undue extension of manufactures may be further checked by the measure suggested in my last letter (No. 3 of this series).

The abolition of private issues, and the substitution of government paper, also appear a necessary foundation for regulating the currency. The substitution of government paper should be to an amount equal with the average total of banker's notes heretofore in circulation, which is about 35,000,000*l.* for the United Kingdom.

It is impossible to maintain an *inconvertible* government paper. It *must* be convertible in one way or another, direct or indirect, so that the mixed paper, and metallic currency of this country may adapt itself from time to time to the relative condition of the currency of other countries, and the circumstances of our foreign trade. It seems highly desirable that such convertibility should not be direct and immediate, but be limited to some channel which would not be available for other than legi-

itimate operations, so as to obviate the necessity (which otherwise the government would be under) of maintaining a large amount of specie to provide against uncertain demands, and the possibility of an extensive run; a necessity which would rob the system of government issues of a great portion of its benefit. Now, as gold cannot be required in exchange for treasury notes for any legitimate purpose within the country, I would suggest as an efficient means of obviating all difficulties, that no person should be entitled to receive specie at the Treasury in exchange for government notes; but that, either in exchange for such notes or for gold, the Treasury should issue its notes, or *drafts payable abroad*, to enable persons in this country to make payments out of it, or to transfer their property from thence. To meet those drafts the government would of course be obliged to export the precious metals; and the exportation of them, except by the government, should be prohibited under pain of forfeiture, so as to preclude the possibility of a derangement of the currency, or the country being deprived of any portion of the profits to be derived from differences of exchange, by the operations of private exporters. It is possible that the treasury might occasionally be short of the necessary amount of gold to meet its obligations abroad, but then (having the exclusive exportation of that article) it could command a sufficient supply at a very trifling premium.

The system suggested would render necessary the employment of government agents abroad, who might perhaps be advantageously selected from amongst native bankers, or brokers resident in foreign states; or British ministers and consuls might transact the agency—but that is a matter of detail. The general management of the business would require skill and experience, and if it were ably conducted, and due advantage were taken of the relative and varying states of the exchanges of foreign countries, it would be productive of considerable profit, independently of the original gain arising from the issue of 35 millions of paper money. The Treasury would transmit, from time to time, to its agents abroad an amount of the drafts upon them issued, with a specification of numbers, marks, and other necessary particulars, so as to prevent the payment of spurious instruments. The time which such drafts were to run after sight should be sufficiently long to enable the Treasury to make necessary remittances, and no such drafts (not remitted abroad) should be received back and cashed at the Treasury unless returned within a limited time, and should then be paid only with Treasury notes circulating in this country. It would also be well to require that notice by the holder should be immediately given to the Treasury of the remittance abroad of any foreign Treasury draft. Such regulations would enable the government to keep all their foreign transactions within a safe manageable and profitable compass, and to restrict their exportations of gold to the amount actually required.

I have set down the immediate financial gain to the Treasury from the substitution of government for private paper at 35,000,000*l.* The indirect and consequential pecuniary gains from that measure are too uncertain for me to hazard an estimate of them. The grand benefits, as I conceive, which the country would derive from it, are that of maintaining the money circulation upon a just equilibrium; of putting a stop to that excess of manufacturing and trading, which is fostered by the ill-exercised power to issue

private paper money; and of protecting the people against the distress and ruin caused by the failure of banks of issue.

All *experiments* with the currency upon any theory as relating to prices, or the improvement of trade, or any other speculative and visionary object, I denounce most fully; advocating government issues only to the extent of private paper money now in circulation, and in substitution thereof. Under the title of private issues I include the notes of the Banks of England and Ireland, and the Joint Stock Banks.

I have the honour to remain, &c.,  
Bristol, Jan. 28th. R. I.

#### LETTER V.

SIR,—While on the one hand measures should be adopted (as suggested in my last letter) for preventing great fluctuations in the currency by means of financial operations, it is necessary, on the other hand, to provide against the effect of changes in the value of money, arising from extrinsic causes, as affecting contracts of long continuance. The most important of such contracts comprise the national obligations, which ought to be governed by a less variable standard than that of nominal money amounts. Adopt the principle of the title commutation, adding to the corn averages other ingredients, as the base metals and staple commodities of trade. For the sake of illustration, and to simplify it, suppose a mere corn average—the holder of £100 Three per Cent. Stock, should receive from time to time such a sum, by way of yearly dividend, as (according to the averages) that quantity of corn would sell for which may now be purchased for £3. Considering the large amount of Government expenditure, besides the interest of the debt, it is important that this principle should be applied to the whole of the national payments—an arrangement which might be fully carried out with ease.

I will not add any observations in regard to the application of the principle in question to private obligations, as to which it is so far less important; as that these are generally of short duration, while those of the state are, for the most part, permanent. I must, however, observe (for the observation relates to a class of private contracts of the greatest and most general importance), that lands on lease ought not to be subject to strict money payments, but to rents varying according to the prices of agricultural produce.

I have the honour to remain, &c.,  
R. I.

Bristol, January 30, 1843.

P.S., January, 1844.—Is it not strange that the Legislature should gravely and deliberately apply a great and sound principle in relation to tithes, which amount to about £3,500,000 per annum, and leave utterly neglected in this respect a general yearly expenditure of nearly 50 millions? As if a farmer should take great pains in the cultivation of his garden, and afford no attention to his farm! Who cannot well understand what must be the effect of an increase in the value of money, or, in other words, a reduction of prices and wages, with such an enormous taxation always standing rigidly at the same nominal amount? There is no section of the community more deeply interested in this subject than agriculturists, though such questions are mostly considered the province of commercial men. The agricultural members in Parliament neglect a great duty in leaving this matter in its present state.

## THE WOOL TRADE.

LIVERPOOL, JANUARY 1.—We are glad to be enabled to give quite as satisfactory a report of the wool trade as we anticipated in our last annual circular. For the first six months of the year, the main features of the woollen, worsted, and wool trades continued unaltered, and characterized by extreme caution in the purchase of all the raw materials used in the manufacture, and production of goods limited, except to order.

The prospect of a good harvest, and the effects of cheapness and plenty upon the home trade, which were happily realized, gave a decided impetus to trade, in August and September; and the improvement in both demand and prices of wool which then took place, has since been maintained, and in some descriptions still further advanced, whilst stocks have run down to a very low ebb; and a large business, conducted with entire absence of anticipation or speculation, has marked the year of cheap provisions and steady employment for labour.

As we foresaw, we find that there is a considerable falling off in the imports of wool at this port, the apparent equality with last year's being constituted of ballots of Alpaca or Peruvian wool, of 80 to 100 lbs. weight. The causes of this deficit, we fear, are not easily to be surmounted, and we apprehend that nothing but higher prices, and the abolition of the absurd and injurious wool duty, will bring up imports to their former extent. We refer particularly to Peruvian, Buenos Ayres, and all the low Mediterranean wools washed and in the grease. A duty of  $\frac{1}{2}$ d. per lb. upon an article value here only  $2\frac{1}{2}$ d. to 6d. per lb., added to the prime cost, expenses of transit and landing charges, must be a prohibition to their regular import, during the continuance of low prices here; the duty driving the British importer out of competition with the American and French, who are now the two largest purchasers in Buenos Ayres, and forcing return cargoes of low-priced wools into continental ports where this enormous tax is avoided, besides somewhat higher prices realized.

The suicidal short-sightedness of this barbarous impost is every year becoming more apparent. When it has dwindled to non-productiveness to the Exchequer, by excluding all low foreign wools, it may possibly be abandoned by Government.

Australian wools being uniformly offered by public auction, always meet ready sale, and these wools being in esteem with manufacturers, have commanded a steady advance in value during the year—prices, which had receded, being now fully equal to our quotations twelve months ago.

East India wools are in great favour with consumers, and have sold with great spirit throughout the year, our quotations showing an advance of  $1\frac{1}{2}$ d. upon all the better qualities, since January last.

Alpaca and Peruvian Wools continue to be so promiscuously entered at the Customs, that accuracy cannot be arrived at in estimating the imports of each. Taking the arrivals of Alpaca at 35,000 qrs. 8,750 cwt., this will show a large deficit of Sheep's Wool compared with previous years' imports, the combined result of unremunerative prices, and the operation of the Wool duty. The demand for Alpaca for export, to a large extent this season, deserves notice, as marking the inroads of foreign competition on the English manufacturer, in a branch which he has had almost exclusively to himself, and again demonstrating the impolicy of levying 1d. per lb. import tax upon him, from which the foreign buyer is exempt. The effect of this new and large demand has been to raise the

price of Alpaca to nearly the highest rates ever obtained for it. Portugal and Spanish Wools must also be added to the list of diminished imports. The bulk of this class has been coarse Lisbon Wool this season, prices of Merino Wools ruling too high for this market, and being chiefly purchased on French account, we believe.

We cannot foresee causes for any material variation from the present course and rates of business in the Wool, Worsted, and Woollen trades for some months to come, which would be dangerous and undesirable on many grounds. In the present low state of stocks of Wool, with the steady drain of consumption upon them, the tendency of prices will be upwards, till the supply be better adjusted to the demand, or other causes affect general business, among which next harvest is one of the most influential, for good or for evil. As the two last plentiful harvests were the germ and cause of the present improved state of trade, so upon the next, under existing laws, its continuance depends. That a large business is doing on improved terms, is admitted; still there is a cautiousness—amounting almost to mistrust of the permanency of present improvement—generally prevailing; purchases continue to be made, as it were, from "hand to mouth." Engagements are contracted to a much narrower compass than formerly; and the whole attitude of business is defensive, and indicates doubt and want of confidence in the sources of demand and employment. There is not that activity and vigorous prosecution of business—that confidence and consciousness of the stability and soundness of our great manufacturing and commercial interests—that full occupation of machinery and labour, which used to mark "good times," and which are the characteristics of a healthy and profitable trade, such as the capital, ingenuity, and industry of the manufacturing districts are equal to sustain, were their limbs unfettered, and free scope given to their capabilities. Every trade feels this, and instinctively acts upon this impression; nor will it be safe or prudent in the manufacturer to do otherwise till the prospect is widened, and he possesses the power of *free exchange* with every customer and every country he trades with, free from the fetters of restriction, and able to negotiate on equal terms with foreign competitors wherever he may meet them; whilst his home trade, created by the regular employment of capital and labour, is regulated and sustained by the sale of his surplus production in foreign markets.

DAWSON AND HANCE.

## THE WOOL TRADE.

LIVERPOOL, JANUARY 1.—In reviewing the wool trade for the past year, it is satisfactory to be enabled to give a more favourable report than in our last annual circular, which was marked by almost uniform depression and despondency. At the commencement of 1843, although stocks of the raw material were not large, yet importers were subjected to such heavy losses from the low rate of prices ruling in the consuming markets, that a very contracted importation for the year was expected; whilst the low price of provisions, and the generally favourable aspect of our commercial negotiations in the east, led to the hope of an extended trade abroad, with increased means of consumption at home. Both these anticipations have been realized. With a diminished import we have experienced a considerably increased demand, both for the home and foreign markets.

During the early months of the year the transactions were characterized by the utmost caution, both in the purchase of the raw material and the scrupulous avoidance of any accumulation of goods on the part of the manufacturers. This continued up to June, prices fluctuating about 5 per cent., with a moderate amount of business doing. About this period, the prospect of the approaching harvest being favourable, a lively action in business commenced, which has continued unabated to the present time.

It is gratifying to remark that, whilst the consumption is greater than, perhaps, ever before known, the trade is healthy and legitimate, being principally to order, not the result of speculative demand, and unaccompanied by any excess of stock of the manufactured article.

The import of Colonial wools shows no material increase; whilst on Foreign, generally, there has been a considerable falling off. The diminution applies more particularly to Buenos Ayres, and other low foreign wools of that class, which we attribute principally to the heavy duty imposed on their admission, amounting to from 10 to 25 per cent. This is much to be regretted, for they are a class of wools required by our manufacturers, and if admitted duty free would open an extended and beneficial trade. They are for the most part imported in the unwashed state, and, being infested with burrs and other impurities, the increased cost for freight, the loss in washing and cleaning, amounting to from 40 to 60 per cent., with the expense of the process, which is considerable, make the duty onerous almost to prohibition. The removal of the duty would secure the advantage of the carrying trade, give a better supply of a commodity required by our manufacturers, and form a useful article of return, which is the great want of our merchants in foreign commerce. Many English houses have lately consigned their cargoes to the United States and the Continent, where the pressure of duty is less felt and the quotations offer a better margin. The greater portion of these wools received here, during the year, has been re-exported. The exports of wool from Buenos Ayres to the 9th September, 1843, to Great Britain, have been but 1,418,125lbs.; those to France, to the same period, have been 3,966,625lbs.; and to the United States 3,763,272lbs.: the greater part of which, were the duty removed, we hesitate not to say, would have found its way to this country.

The first public sales of Australian wools for the season took place here in June, and were immediately followed by a large series of sales in London. The opening prices were low, notwithstanding a numerous attendance and spirited competition. At each of the succeeding sales prices have rallied, and we now quote them 3d. per lb. higher than at the first. The wools, generally, have been well got up, and not open to the objections with regard to condition, &c., we have had to notice on former occasions.

In Alpaca wools we have to notice a considerable increase of imports; but, from being mixed in the Customs return with sheep's wool, it is difficult to arrive at the exact quantity. In fixing it at 14,000 ballots we shall not be far from the mark. For the first five months of the year it was in extremely limited request, at declining prices, with a heavy stock in the market, amounting at one time to 10,000 ballots. At the beginning of June prices had fallen so low as 1s. 6d. for white, for black 1s. 2d., brown 1s. to 1s. 1d., with a prospect of still further reduction. During this month a little demand arose for export, chiefly for experiment, which caused a trifling advance in prices: matters continued tolerably quiet till August, when an extensive demand existed for export, which led to an

advance of about ten per cent. In October the exporters again came forward, the inquiry being very general and on a large scale, and almost cleared the market, the prices paid showing an advance of about 25 per cent.: prices have since remained steady. It is expected the arrivals for some months hence will be extremely small, and all at present advised of have been purchased by the home trade to arrive. The last price paid was 2s. 4d. for white, and 1s. 10d. to 1s. 10½d. for colours.

In Peruvian, East India, Mediterranean, and Russian wools we remark a very diminished import. Prices since June have improved from 15 to 20 per cent., leaving a scanty stock of all at the close of the year.

Up to the time of clip the demand for English and Irish wools was languid, and prices ruled low: since then they have been gradually advancing. The stock, which then was large, is not now about an average. The rise in the meantime is about 20 per cent. on combing, and 15 per cent. on short wools. At the commencement of the present season there was a brisk demand for combing wools for the continent. For the last few months there has not been much doing for that quarter.

There has been a good demand for Scotch wools since the clip, and we never remember, at this period of the year, so little remaining in farmers' hands, or, indeed, in the country. Notwithstanding the unusually large import into Liverpool, the market is quite bare. The advance on Laid Highland is 20 per cent., on Laid Cheviot about 15 per cent., and on white Cheviot and Cross 10 to 15 per cent.

HUGHES AND RONALD.

## SPADE HUSBANDRY.

TO THE EDITOR OF THE TIMES.

SIR,—After your excellent observations the other day on the too common infatuation in agriculturists preventing their own larger per centage of immediate profits by pursuing modes of husbandry, which also operate against public and popular good by diminishing instead of increasing employment among our increased population; and also taking into consideration the letter of "Observer" on spade husbandry, with the reply of "Subsoil Plough," from the Union Club, in your paper of Tuesday, I am induced to think that a copy of the following letter, from a practical farmer near Easingwold, with the addition of other experience, will be acceptable to you, and interest a very large proportion of the readers of *The Times*.

You must allow me first to explain that I had ridden over to call on the writer, which gave me the opportunity of conversing with some of the labourers around, besides seeing the field dug last winter, and another which was undergoing the spade at the time of my visit. Mr. W. S. was not at home, so I did not see him, but left a note, to which I send you the answer. He is a perfect stranger to me; but any one doubting any detail, and ever visiting the neighbourhood between Thirsk and Easingwold, will have no difficulty in finding out this farmer, and his letter to me sufficiently predicts the welcome which they will find. I am not at liberty to write the farmer's name at length:—

"October 18, 1843.

"Rev. Sir,—I have great pleasure in answering your inquiries respecting my having employed poor

men to dig in the field last winter. When I commenced I had no intention of doing more than an acre or two, partly to try the experiment, and partly to employ a destitute labourer or two who could not procure work. Others unemployed soon applied, so I gave leave for any to dig who chose to do so, when they could procure no work elsewhere. At the commencement I offered them 5s. per land, without any regard to, or calculation of, what it would amount to per acre, but found afterwards that it cost me 25s., which I considered a fair price. They did not clean nor stone it, but merely turned it over. I was very particular in having it turned well over for the benefit of the fresh soil. The quantity done was 12 acres. A few lands indiscriminately left were turned up by the plough in the same field to see if there was any difference in the crop; and it was very perceptible when reaped that the lands ploughed were inferior, I think at least by 12 bushels per acre.

"The field (being the nearest I had to the men employed) was drilled in the spring with oats, after a wheat crop. Those lands which were ploughed I am digging this autumn, and drilling the field with wheat (an extra crop). That part of the field which was last winter dug turned up now as rich and mellow as a garden, and I have no doubt will be much improved and produce better crops in future years. By thoroughly draining arable land and then digging it a good depth (where there is a sufficient depth of soil) I think nearly double the quantity of corn might be produced, and by that means both owner and occupier benefited, the poor employed, and poor-rates reduced.

"The earnings of the men differed according to their ability and industry. On an average they earned about 1s. 3d. per day—none too much.

"The depth I had it turned up was 12 inches, except in the furrows, which was about six or eight. I had a pretty good depth of soil, rather strong but not very stony. When the land is very stiff and strong I should consider 25s. per acre rather too little, if very light too much.

"I have some doubt of its answering so well on very light sand, and on very tenacious clay I think the benefit would not be visible the first year or two. I so much approve of 'spade husbandry' that I intend, if spared, to have a field dug every year until the whole of my arable be turned up. If I am not remunerated for the extra expense in the crops, it will afford me abundant satisfaction to see some of the starving poor employed, who would otherwise have been without employment. If the land was hand-weeded and cleaned when dug, it would require more price, and that according to the quantity of roots and quicks and the nature of the soil.

"You will perceive that the extra cost of digging to me is only 20s. per acre, that is, after deducting, say 5s. per acre for ploughing, if ploughed. The supposed 12 bushels of oats per acre, at 2s. per bushel, is 24s.; so that I consider it has more than paid me in the first crop, exclusive of the extra straw.

"Digging land intended for a fallow, I think, would be about as little expense as ploughing. It would require to be ploughed five or six times, as well as dragging and harrowing. After digging it would require less dragging and harrowing, the land would be so much lighter, and loose and open, and the quicks much easier to get out; and it would require only one ploughing (light) for the seed furrow.

"It would, in my opinion, be more humane, as well as beneficial, if the owners and occupiers of land

would in every township allot portions of land to the labourers to dig in the winter months, and pay them a fair remunerating price, than to send them to the poor-house, or compel them by hunger to rob and steal, and foster in their breasts hatred and ill-will towards those who ought to employ them.

"Yours, &c.,

"W. S.

Now, sir, I shall not weaken this right-hearted and sensible letter from this practical Yorkshire farmer by any enlargement, beyond communicating other facts. I myself last month consequently had dug, with the Sussex flat-pronged fork, an acre of a fallow field of my glebe, only just then taken into my own hands, because I could no longer endure to see it so under-valued and scandalously farmed. I only advert to this to show that this acre was in the state of all others to occupy men the longest time in digging, cleaning, and stoning as they went on. I put two men on it at 2s. per day each, with two village boys at 3d. each (one of them thought by others too dear at any price); but I shall raise him above par in time. The acre was dug, cleaned, and stoned by these in 13 days, not including the carting away the stones and rubbish, which were laid in heaps till all was finished. The cost, therefore, to me for this acre was this first time, digging, cleaning, and stoning, 2l. 18s. 6d.; but one of the labourers said, "I would rather dig it next time for 20s. per acre." The acre was immediately dibbled, three pecks to the acre, and it is now showing a very promising crop of wheat. It was dibbled in rows, 9 inches and 12 inches apart, to prove Mr. H. Davies's theory of very thin sowing a great saving in seed.

There is another point which seems worth mentioning to prevent discouragement on shallow soils. The soil on half this acre is unusually deep, so that we did not bottom it; but digging 12 inches turned up only about 6 inches fresh soil on this part. It gradually grows shallower till it runs up to barely 6 inches on the limestone. Yet no difference as yet appears, and I anticipate none will, if the seasons next year are favourable to our soil at all; for the more wet in the spring and early summer, the better for us farmers.

A farmer well known to all around him as a shrewd man is now digging out several acres near Borough-bridge, stiff soil, turned quite over ("topsy turvy and 12 inches deep," are the words of the agreement). He is paying 30s. per acre. Numbers of labourers, far and near, have consequently asked him to let them have some digging. They work long or short, as they like. The old men earn about 1s. or 1s. 2d. per day; the strong and lusty from 1s. 3d. to 2s. The days are very short, otherwise these latter would earn nearly 2s. 6d., I reckon. The employer is confident that he is a considerable gainer, especially in these respects—burying the quicks and weeds so deep that they will die and operate as manure as far as they go, and thus so improving and cleaning his farm, lately entered on, that in due time it will resemble a garden, and employ more fellow Christians, and entail fewer horses to realize better results continually.

A gentleman a few miles north of York, though personally unknown to me, favoured me with some details from his experience in spade husbandry, which I knew him to have tried to a considerable extent with very great satisfaction to himself and neighbouring labourers. He deprecates adopting it only when employment is scarce, so convinced is he of its profits to all parties in the long as well as the

short run; and he names 30s. per acre for stiff, and 26s. for light land, as the price at which he is confident that generally labourers would gladly take digging when once they get accustomed to it.

I hope that it will not appear saying too much of myself if I conclude by adding, that as the remainder of the glebe comes into my hands under notice given, which is about 26 acres arable, I purpose as much as I am able to follow the good example of those friends to "the employment of the people" instead of horses who have introduced spade husbandry into their neighbourhoods. May others wealthier, and in every way more able, come and do likewise in these perilous times of accumulated wealth on one side, and accumulated destitution and desperation on the other.

Yours,

Rectory, Newton Kyme, Dec. 21. E. D.

### PROBUS FARMERS' CLUB.

The annual meeting of this club was held at the Hawkins's Arms Inn, Probus, on Saturday Dec. 29, when there was a very good attendance of members and their friends. The chair was occupied by Mr. TRESAWNA, the president of the club, and Mr. W. H. CARDELL, the treasurer, acted as vice-president, in the absence of Mr. R. Doble, who was kept away through the severe illness of a member of his family.

After the withdrawal of the cloth,

The CHAIRMAN proposed the health of "the Queen" (*loud cheers*), "Prince Albert, the Queen Dowager, and the rest of the Royal Family" (*loud cheers*); and then called upon the secretary to read the Report.

Mr. WILLIAMS proceeded to read this document, which stated that the proceedings of the club during the past year were such as would redound to its honour, and secure its future prosperity. It was gratifying to the committee that nothing had hitherto transpired calculated to mar their onward progress or divert their minds from the objects which they had kept steadily in view, viz.: *Agricultural Improvement*. The report went on to state that no means were so well calculated to attain this end as the establishment of farmers' clubs, which were in reality schools for grown-up persons,—where experience was matched against fanciful theories, and prejudices arraigned against truisms. "One acknowledged evil," observed the committee, "to which agricultural life in the mass has hitherto been exposed, arises from the isolated situation of the farmer; and this has, perhaps, tended more than any other to confirm his prejudices and narrow his understanding. He sees little of society, and even his limited intercourse with his fellow men, especially if the few he meets with entertain similar views to himself, by the daily repetition of the same sentiments, if wrong ones, will confirm him in the belief of the most absurd opinions. The establishment of Farmers' Clubs will remedy much of this evil, for in addition to the many agricultural subjects discussed at the different meetings throughout the year, they placed books of sound and useful instruction in the hand of the farmer, such as he is likely to read and comprehend, and thus he is gradually and steadily informed of the true principles on which farming should be conducted and regulated, namely, by the union of *practice with science*. The encouragement of Farmers' Clubs, therefore,

ought to be an important object among the friends of general and local improvement." In conclusion, the report stated "that the committee would beg to acknowledge the receipt of some very important communications on the relative value of different kinds of food used for feeding live stock, from Professor Playfair, the consulting chemist of the Royal Agricultural Society, in explanation of the tables of nutrition adduced by him before the members at their annual December meeting in 1842."

The CHAIRMAN next gave "the health of the county members" (*cheers*); this was followed by the toast, "Prosperity to the Probus Farmers' Club." (*Great cheering*.)

Mr. KENDALL responded to this toast, observing that he felt a great interest in the welfare of the club. He was fully sensible of the great benefits to be derived from meetings of this kind, and he thought that there was no institution more deserving of the consideration and support of farmers, as well as other persons, than a club that taught a correct acquaintance with the principles of agriculture. (*Cheers*.)

The CHAIRMAN next proposed the health of Mr. Peters,—whom he warmly eulogised for his readiness on all occasions to assist in the spread of agricultural knowledge among his brother farmers. (*Loud cheers*.)

Mr. PETERS returned thanks, and observed that he was perfectly satisfied with the utility of these clubs where they were placed on a right footing; but it was a matter of regret that some of the clubs had declined, while the Probus club was increasing every year. (*Cheers*.)

Mr. TRETHERY then proposed "Liberal landlords and deserving tenants." (*Great applause*.)

Mr. JAMES DAVIS, in responding to this toast, said that some of the tenant farmers laboured under great disadvantages in the tenure of their estates. Some landlords preferred letting their estates for a seven years' term. Could it be expected that a tenant would cultivate his farm properly under such circumstances? (*Loud cheers*.) Tenants would like to have an interest in their estates before they laid out money in improvements. (*Cheers*.) He was very well aware that the tenant farmers of this neighbourhood were foremost in the most approved system of cultivation, and this he attributed principally to the liberality of Sir Christopher Hawkins. (*Loud applause*.) He was the first landlord who granted for terms—not only for 21 years, but for longer terms than that;—it was to him and to his praiseworthy conduct, as well as to his agent, Mr. Trethewy (*loud cheers*) that farms in this neighbourhood had been brought into so high a state of cultivation.

Mr. DREW, in proposing the health of the Chairman, said that the prosperity of such clubs was greatly ensured and their benefits advanced by the order kept by the gentleman who presided over their meeting. They owed much to Mr. Tresawna, who had presided over them from the formation of the club, and he begged to propose his good health. (*Loud cheering*.)

Mr. TRESAWNA, after thanking the company for the manner in which his health had been drunk, spoke of the unsatisfactory way in which, to himself, he had performed the duties of Chairman; but as it was again the pleasure of the club to elect him, he would do all in his power to promote its prosperity. He considered these clubs not only useful and beneficial to the members but to many others—in fact to a great part of the farmers; for they might depend

upon it that the seeds which were sown at their monthly meetings would take root, and although they might not spring up in abundance for some time, yet they would spring up, one here and another there, and prove that their labours had not been lost. (*Cheers.*) When they contemplated the object that farmer's clubs had in view—that it was by a better state of cultivation to increase the food for the use of mankind—he thought such clubs were worthy the support of every person; because, if by means of such clubs, more beef, more mutton, and more corn were sent into the market, the nation would receive the benefit of it. (*Hear, hear.*)

Mr. KARKEEK having been called on by the chairman to propose as a toast, "the Royal Agricultural Society of England," said that he should be wanting in his duty as a member of the Probus Farmers' Club, if he did not state how much he felt flattered by having the toast committed to his hands. This great society, he said, possessed upwards of 6,500 members, with an annual income of about 5,000*l.*, besides a funded property of about 6,000*l.*; and with such means as these at their disposal, and actuated, as they evidently were, for the general improvement of agriculture, it was impossible to suppose but that an immense good must arise from its establishment. (*Cheers.*) He, Mr. Karkeek, had witnessed the last two exhibitions of the society at Bristol and Derby. At Bristol, the stock generally was very good, with the exception of the thoroughbred stallions, which were not at all calculated to produce a good half stock, when crossed with the general average of half-bred mares. If the horse which won the first prize there was the best that could be produced in that neighbourhood, he was not surprised to hear of the scarcity of good useful hacks and hunters, as was now generally complained of. At Derby, the shew of horses was considerably better than at Bristol, but he confessed that he expected to have seen a very different kind of animal altogether in that neighbourhood. He thought to see animals possessing plenty of bone and muscle, and capable of carrying a heavy weight, with varied pace through deep ground, or across a stony country. It was high time for this society to make some alteration in their rules in that respect, and to offer prizes for a different description of horse altogether. (*Hear, hear.*) The next thing which required censure at the Derby exhibition particularly, was the enormous fatted state of the milch cows of the short horned breed, which, to judge from their appearance, would do much better for the butcher than the pail. It was true that they were splendid animals, as were the short-horned race generally exhibited there, such as he never before witnessed, but he doubted very much whether many of these cows would breed again. It was too common a practice at our Cornish exhibitions to shew breeding ewes in a fattened condition, and immediately after, they were placed upon a reducing or starving system, otherwise they would not be capable of breeding as before. But farmers were not aware of the effect of fattening breeding animals, which was this, that in proportion as an animal was fattened were the organs of nutrition reduced in size; and although this effect would most certainly tend to induce a great capacity of fattening and early maturity in their race, which was highly desirable when a breed required these valuable properties, still in the instance of the Derby cows, possessing these qualities as they evidently did in an eminent degree, any increase of them must necessarily interfere with the natural strength and health of

constitution of the animal, and would most certainly prevent their breeding for the future. He concluded by proposing the toast, "the Royal Agricultural Society of England." (*Loud applause.*)

Mr. H. CROGGON proposed "Agriculture and Commerce," and described their mutual dependance on each other for continued prosperity; expressing his decided belief, that with an unshackled commerce, a greater benefit would accrue to the country; for there would be a greater demand for bread, and that would enable the farmer to meet any alteration which might be made in the laws of the country. (*Loud applause.*)

Mr. JOHN GATLEY briefly replied. He had for many years been carrying on a trade intimately connected with agriculture, and he had always felt a degree of pleasure in lending his assistance to the cause of agriculture. He wished, indeed, that he had met the farmers with different prices to what they were at present getting, for he believed they were selling their produce at much lower prices than they could afford. (*Hear, hear.*) One interest, however, could not flourish without the other. At present, the manufacturers had the best of it, but if they succeeded they would have more money to spend in buying food, from which he hoped the agriculturists would benefit. (*Cheers.*)

Mr. JAMES, of Grampound, proposed the health of "The Strangers."

Mr. DREW next proposed "Science as the result of the happy combination of theory with practice."

Mr. PETER DAVIS proposed the health of "the Secretary," which was drunk with loud and hearty applause, and acknowledged by Mr. Williams.

Mr. WM. JAMES next gave "the Vice-presidents of the club," whom he described as men of talent and men of candour, who readily gave their opinions and advice on agriculture, so that it was no small benefit to young agriculturists especially, to be able to have their advice. (*Loud cheers.*)

Mr. W. H. CARDELL, the treasurer, expressed his regret that his friend Mr. Richard Doble, who was to have taken his place, was not able to be present to respond to the toast just proposed. Mr. Cardell then expressed the pleasure he felt at being a member of the club, and stated that other bodies had sent for their rules, and had established clubs upon those rules, though in too many instances they had only adhered to a few of them, and to that he attributed the failure of many of the clubs. (*Cheers.*) He was glad to see that there was to be a new club established at Stratton, which he hoped would prosper. (*Cheers.*)

The CHAIRMAN next gave "Prosperity to the St. Austell Farmers' Club," which was drunk amid loud and hearty cheering, and briefly acknowledged by Mr. ANSTEEY, of Menabilly. The remainder of the toasts were then postponed, and arrangements made for

#### THE LECTURE.

Mr. PETERS, of Tehidy, now proceeded to deliver his lecture on the "Subdivision of Farms, and Improvement of Fences, with regard to the Economy of Land and Labour, and for the purposes of Shelter," as follows:—

The subject on which I am about to make a few observations, is one of more importance to the practical farmer than might at first be supposed.

The effects of an inconvenient arrangement of the fields, and the greater amount of labour consequently required in working the land, in keeping the fences in repair, and in exterminating a host of

noxious weeds, of which old and irregular fences are great nurseries, tend, although perhaps imperceptibly, to lessen the profits of the farmer, besides the loss of ground occasioned by their irregularities. A farm inconveniently subdivided, like badly arranged farm buildings, is a source of yearly, nay daily inconvenience. These evils do not affect the farmer for a season only; they cling to him while his lease endures; but too often they become as old acquaintances, they are submitted to from time to time, till they, instead of being looked upon as hurtful, become engrafted into the system of management. Rotations, &c., are adapted to the fields, instead of the fields being adapted to the rotations, that might be wished for, and more profitably pursued. I shall not upon this occasion enter into any history of enclosure in England; the practice must be very ancient. If we look at the immense roots of oak in some of the fences in the eastern division of this county, it at once becomes apparent that the fences on which they grew, and where their hollow trunks still remain, had been erected centuries ago. The irregular forms of old inclosures are attempted to be accounted for in many ways, some supposing that they were erected around the cultivated spots which had been previously manured, and that their smallness and irregularity was occasioned by the small quantity of manure at command; while others gravely affirm that "the old men were not so great fools as people might suppose, for these crooked corners of all shapes and forms, were *meant* by them as shelter for their stock in all winds." My own opinion, however, is, that these irregularities proceeded from causes very different. That there was no particular design in these erections is very evident. If we consider the tenure upon which land was held in former times, and the state of ignorance in which the cultivators of the soil were—the total absence of scientific pursuits or fixed habits, we cannot ascribe the irregularities of ancient enclosures to anything else than *chance*. The embryo farms and "town places" perhaps begun in the midst of dense forests, formed a few inclosures, small at first, around their dwellings, where were congregated different individuals, who having different purposes to serve, the inclosures were likely to be as varied as the different views and fancies of the owners. Be this as it may, what we now have to look at is, how we shall best adapt fences to existing circumstances, and how we may improve them so as to enable us to carry out the most profitable, which will, as a matter of course, be the most productive system of agriculture, as at present appreciated, leaving to those who may come after us to criticise us as we do those who have preceded us. The first thing I shall consider, then, is the subdivision of a farm, and this, with the accommodation in houses, is the first thing that will necessarily engage the attention of a farmer in entering on an estate. Every man engaging in the cultivation of a farm has, or ought to have, an idea what rotation he intends to pursue, and what crops he means to cultivate, as, before taking, he knows the quality and nature of the soil. The rotation of crops will have great influence in directing as to the number and size of the fields; for instance, in a farm of 100 acres intended to be cropped after a five years' rotation, ten fields of ten acres each would be a most convenient subdivision, and so in proportion; but it is better to have one or two more rather than two few divisions, as they can come in in case of accidental failure of any crop, or they may be subdivided for trying experiments.

Some prefer having a permanent grass field near the farm yard for rearing calves, &c., or for letting out the dairy cows where they are house fed, that they may have air and exercise. Whatever the rotation on the rest of the farm may be, it appears to me desirable to have a few small divisions contiguous to the farm buildings, and not included in the rotations pursued on the rest of the farm. The manner in which the fields are arranged must depend upon several circumstances, such as, first, *the situation of the farm buildings* (these, if a new site is to be chosen, should be as central as possible); second, *the inequalities in the surface*, so that advantage may be taken for carting manure to the different fields and carrying home the produce; and third, *watering the fields*. It is of the utmost importance to the stock to have access to water in the fields. When it is impossible to have this, I would always prefer carrying the water to the stock instead of driving the stock to the water. The formation of stagnant ponds is, I think, of questionable utility, if they are to remain on the surface of the ground. When a farm is already subdivided into irregular and inconvenient inclosures, a plan of it should be laid down as it is, and the best arrangement it is susceptible of made, by doing away with part of the old and substituting new lines or additions. This can be done without a very great degree of inconvenience, after having arranged the future plan, by only altering such portion yearly, as is likely to come into green crop the succeeding year. In regard to the economy of labour and land, it will be evident to all practical farmers, that this is a very material point. If a field is conveniently situated for carriage of manure from the yard, and of the crop to it, there is a great saving of *labour, time*, and of course *money*. If eight loads of manure can be carried in a day instead of six, the work of four days is done in three. In a field of ten acres, for instance, to be manured at the rate of, say, thirty loads an acre, and the men and horses charged at the rate of 8s. per day, the carriage of the load in the one case would cost 1s., in the other 1s. 4d., equal upon the ten acres to a difference of 5l., a sum in these times worth notice by a farmer. The carriage from the field, if a crop of turnips were grown, would at least during the rotation be equal to the carriage of manure.\*—Again, in ploughing and other operations in an irregular field, much time is lost, especially in the ploughing—in many cases, equal to one quarter of the time is lost; that is, instead of ploughing an acre a day, only three-fourths can be done; the time taken up in turnings, &c., being sometimes equal to the time occupied in ploughing. Thus, taking, say, a ten acre field, or one that after being properly laid down would contain that quantity the same as before, and the same rate per day; † viz., 8s., the loss on a single ploughing (three-quarters instead of an acre) would be 2s. per acre, or 1l. on the field. In the ordinary course of a five years' rotation the land would not be ploughed less than five times, oftener more; this would make a loss of 5l. during the course, which added to the loss of carriage of manure (supposing it to be manured but once) 5l., and home carriage for the rotation 5l., makes a total loss of 15l. on the ten acres, in the course of five years—to 30s. per acre

\* I have often calculated the value of an active servant in comparison with a lazy one, upon the same principle. The lazy fellow idles his time in filling his load; he then either overdrives his team, or loses his time; it is doubtful which is most hurtful.

† Rate of labour in Scotland 1s. per hour.

—6s. per acre added to the yearly expenses on an acre, the same as if 6s. were added to the rent. This is not an overdrawn picture, and ought to come under the consideration of landlords as well as occupiers. The economy of land in the better arrangement of fences is considerable. I need only refer to the plans shewn. In one about eighteen acres of ground, the saving is fully half an acre,—besides, there are 250 yards less fence to uphold; in another, the saving amounts to several acres; in a third, a saving of one and a quarter acre of ground, in twenty acres. In a small field which was previously six fields, there is a great saving of ground, and looking at the plan of this, it will be admitted that the field can now be ploughed in half the time. I do not pretend to say that I am an advocate for converting all small fields and farms into larger ones, but in my opinion, I have heard a great deal of false argument in favour of small holdings. *They must be worked*, and if they are so by a greater amount of labour, it must be a loss if that labour could be employed elsewhere, *as all extra labour from bad arrangement that does not tend to increase produce is labour lost*. And although I am a most decided advocate for the employment of labour, I cannot see the advantage of employing it where it makes no return. The case is different if we cultivate the desert waste, as although it should not yield a profit, it increases the amount of our actual produce. I am aware that in advocating the doing away with many of the unnecessary hedges, I would be doing away with all the resources of manure that many resort to—manure did I say? alas! too often it is but a name. The practice of ploughing the field into the ditch to grow weeds, and then get full of their seeds preparatory to its being again carried out into the field for manure, cannot, in my opinion, be too soon done away with; and a proper arrangement of the fences, and alternately ploughing the land outwards and inwards, would render it necessary; while improved care and management of the *real* dung heap would create less labour, and be attended with much better effect. The filling the fields with weeds, and the constant attendance required if these are to be kept under, forms an item of expenditure which produces no return. It ought to be laid down as a maxim, by proper care and cultivation to prevent the growth of weeds, rather than to make a virtue of pulling them after they have acquired strength and have exhausted the soil. The construction of fences is different in different districts of the kingdom, according to the materials most readily procured in the district. Dry stone walls are used in some places where stones are plentiful. They look naked and do not afford much shelter, but have many other advantages; they harbour no vermin, and grow no weeds, while “they are major from their birth.” Hedges of white thorn are to be found in almost every part of the kingdom, and where properly trained make excellent fences, both for beauty and shelter, *but their management while young in too many instances that come under my observation is bad*, either from neglect and inattention, or from a want of knowledge how they should be managed. Instead of being planted on the fence and never more attended to, they ought to be hoed at least twice a year, and kept regularly clean for a number of years. They are too thickly planted. One strong plant nursed individually in every eighteen inches would be better, and become a stronger fence than double lines with the plants only six inches apart each way. This can be easily accounted for, as in the case of

other plants when standing too thick. In regard to the sort of fences used in this neighbourhood, I need not describe them; they are well known; but it is evident that more care and attention when young would render them more regular. It is neither the soil nor the climate that causes the deficiency, as on looking over the fences, strong and luxuriant white thorns may be seen here and there without an apparent reason for the hedge not being all as strong, had it been properly planted and attended to. The last point I propose to consider, is the shelter afforded by fences. If we were to judge from the current of the present agricultural movement, fences would soon be rendered needless, as shelter on all the better class of arable land, as house feeding, from the increased supplies of manure and produce, seems to be gaining ground. Mr. Blacker, of Armagh, has aroused the attention of all parts of these islands to the benefit of the system where small holdings abound. The experiments of Earl Ducie and other great agriculturists, have proved that even that naturally roaming animal, the sheep, can be fed to most advantage in sheds or houses. It must, however, be a long time before such a practice could become general; therefore, as the results of their experiments prove the advantage of shelter, it is well to obtain it in as high a degree as possible under the circumstances, where it is needed. I shall only offer a few general remarks on the subject. In providing a shelter in the fields, the highest and driest situation should be chosen for the resort of the stock during the winds or storms. It may not, in the fields of an arable farm, be possible to have a shelter from all winds in each field, but it can generally be so arranged that if it is not in one, it may by shifting the stock be found in another. It is a mistake to suppose that stock, more especially sheep, will take shelter in damp hollows; they in general prefer braving the storm. This is readily accounted for by the difference in the temperature in the marshy as compared with the dry ground. If then it be found necessary to have a shelter in such a place, the ground should be effectually drained before the animals will resort to it, or remain healthy. Clumps of plantation upon the higher grounds, where trees will thrive, form the best shelter, and are calculated to improve the climate of the neighbourhood, while low marshy grounds, wholly or partially covered with wood, have a directly contrary tendency. The form of clumps for shelter are various, but this form (referring to a plan) seems best adapted for shelter from the different winds, while from its extended fronts it shews a large wood in all directions, without occupying a very great space of land. In bleak mountainous districts, where trees will not grow, hedges of stone or turf erected in the same form are serviceable, and I should consider that stock would prefer the external shelter to the internal, where whirling currents are likely to prevail. On the tops of the cliffs along the sea shore, the sheep generally take shelter on the very brink, where the current has been broken by beating against the cliff.

Mr. TRETHERY said he would ask about the division of the fields suggested by the lecturer. In the first place it must be understood that the farmers, generally speaking, who held under a lease, had not the power to alter those fences. He agreed with the lecturer that for tillage fields those alterations made in the fields exhibited in the plans were better, but not for a sheep walk.

Mr. PETERS said there was one observation which he intended to have made. He then stated that the fields in question were to be grazed on by bullocks, and that they were protected by having a plantation on one side of them. However, it is difficult to explain this well, without a reference to the plans which Mr. Peters had. There was one thing he said which he must apologise for having forgotten; most of them were farmers, and they had got very few landed proprietors amongst them. Now he should suggest that the farmer should consider the alterations that he wished to have made on his farm, and those alterations should be agreed upon with his landlord before the tenant put his hand to the lease. (*Hear, hear.*) With regard to the expense, either the landlord ought to allow the tenant a lease at a lower rent for the first five or seven years, or let the landlord pay the whole of the money, and the tenant all interest for the outlay. He was always for a lease of considerable duration, for without that he would never lay out a shilling on any man's land. (*Loud cheers and cries of bravo!*) It was no use to talk about the goodness of the landlord or anything of the kind; if a landlord was good, was a lease going to make him bad? (*Loud cheers.*) Besides, although the present landlord might be good, who could tell what the landlord might be who came after him? Never would permanent improvements be executed in a proper manner, till leases were obtained. (*Cheers.*) For who in the world would go and make all these alterations with a faith on any man's word? Words were wind, and too often vanished like the wind. Besides, there were ways of avoiding verbal arrangements, or of giving to them a different meaning, which could not be the case if leases were granted. He was afraid it was the want of this condition—the want of sufficient encouragement in good leases—that made so much bad farming. (*Cheers.*) The moment they found the landlords say they would give a lease, they should do as Sir Robert Peel's tenant did—they should avail themselves of the offer and take the lease. (*Cheers.*) The lady whom he served was a decided advocate for leases. (*Loud applause.*) He knew she was, or he would not have used her name; and she says that the tenants will never be on the right footing that they should be till they are secured by leases. (*Loud cheering.*) Why should a man go and invest two or three thousand pounds on a farm unless he have a lease? What certainty had he that he would be allowed to get a return for his investment unless he had a lease? This was the ground-work of all good farming. (*Cheers.*) Mr. Peters then referred to the mode of planting hedges, and recommended that they should not be planted so thick as was the custom in Cornwall. But farmers could not, he said, get on if they were thwarted at every step in their improvements by their landlords. The parties should sit down and talk the matter over, and see what alterations were necessary. He considered the science of farming was to know what was necessary to be done before a beginning was made. Let the farmer have all his designs matured; let him then say to the landlord, "I will take your property on such and such conditions," and the landlord would find his interest in so transacting his business. (*Cheers.*) It would not be an unfair thing for the landlord, at the end of twenty-one years, to say, "I indulged you with every thing in your lease; now you have improved the farm and our agreement is at an end, it is now only right that you should give me the fair value of the estate." (*Cheers.*) But while a tenant held his farm on an uncertain tenure, why should

he make those improvements? The fact was, that under the present system, the conditions between the parties never allowed the time to come for either improving the land or raising the rent, nor yet for the farmers to improve their circumstances. In a great many cases where he saw the farmers trying to get on, they appeared to be satisfied if they could only make the two ends meet, and never tried for anything further. (*Hear, and cheers.*)

A discussion ensued on several points touched upon in the lecture. None of the observations made were opposed to the principles laid down by Mr. Peters, but the carrying of those principles out on old farms, and in sterile and exposed situations, appeared to be attended, in the minds of some of the farmers, with considerable difficulty.

Mr. TRETHERY said that the expenses of removing some of the old fences would be double that of building new ones; besides which they might destroy their shelter, and it would be long before they could raise another.

Mr. PETERS replied that Mr. Shearim, of Stratton, had taken down a great deal of old hedge; he had removed about 200 yards for 25s., the party taking down the hedge having the fire-wood. They could erect new hedges for about 5s. for 18 feet. Mr. Peters then described the means he had adopted for obtaining shelter.

Mr. TRETHERY perfectly agreed with Mr. Peters that straight fences were best for tillage purposes, but the expense of removing old fences and building stone fences could not be less than 6d. a foot, and in some cases it would take as much to remove the old fences. But then there was a saving in the land.

The discussion then turned, on a question from Mr. Trethewy, upon the growth of the whitethorn in Cornwall, to which Mr. Peters expressed himself very favourable.

After the discussion on Mr. Peters's paper had concluded, Mr. TRETHERY proposed the thanks of the meeting to Mr. Peters, which was seconded by Mr. GILL, and carried with acclamation.

Mr. KARKEK next proposed "The Press," which was responded to by Mr. CHORLEY and Mr. LATIMER.

This was followed by Mr. GILL proposing the health of Mr. Trethewy—a toast which was drunk with applause that was loud and long continued.

Mr. TRETHERY having responded, many other toasts were drunk, and speeches made, and the day passed off altogether most pleasantly.

## MAIDSTONE FARMERS' CLUB.

### LECTURE ON THE PRACTICAL APPLICATION OF MANURES.

(From the Maidstone Gazette of July 18th, 1843.)

Mr. NESBIT, in commencing his lecture, stated that chemistry taught them the action of particles of matter on each other, and enabled them to discover their various properties, and to apply them to the greatest advantage. One great result of the labours of chemists had been to show that these substances may all be divided into, and comprised in, fifty-six elementary bodies. These bodies must not be considered as absolutely elementary, but simply as not having yet been decomposed. Manures are the food of plants; and all the substances which can be found in plants, on analysis, must so be considered as the

food of plants. On analysing the various substances which farmers are in the habit of putting on the land, such as dung of various kinds, chemists find certain substances. On analysing the crops which afterwards grow on the land, similar substances are found. These substances were very various, and differed in their comparative proportions in different crops—as in oats, beans, and wheat, for instance; but the greater part of these crops comprised perhaps not more than eight or ten of the elementary bodies. The principal of these ingredients were, as he had previously stated, oxygen, hydrogen, nitrogen, and carbon. The inorganic or earthy parts of plants chiefly consist of combinations of the following elementary bodies:—phosphorus, sulphur, silicon, potassium, sodium, calcium, magnesium, iron, manganese, and oxygen. These names might at first be strange, but they would, by repetition, rapidly become as well known as the terms plough and harrow. Phosphorus and oxygen form phosphoric acid; sulphur and oxygen form sulphuric acid, or oil of vitriol; silicon and oxygen form silex, which is the same as sand, or flint, or rock crystal; potassium and oxygen form potash; sodium and oxygen form soda; calcium and oxygen form lime; magnesium and oxygen form magnesia; iron and oxygen form oxide or rust of iron; manganese and oxygen form oxide of manganese. Phosphoric acid and lime form phosphate of lime, which is contained in wheat; phosphoric acid and magnesia form phosphate of magnesia, also contained in wheat; sulphuric acid and lime form sulphate of lime, or gypsum; sand and potash united form a glass, which is the same that covers and protects the straw of wheat and other plants. Carbon and oxygen form carbonic acid gas, and this, united with lime, forms carbonate of lime or chalk; hydrogen and nitrogen form ammonia, and this, united to carbonic acid, produces carbonate of ammonia, a substance contained in good manure, and absolutely essential to the growth of wheat. Oxygen and nitrogen form common air; oxygen and hydrogen form water; and carbon and hydrogen form the gas which we burn in our streets and houses. To show the powerful action which might be excited by the combination of those bodies, he would place a piece of carbon (charcoal) in contact with oxygen gas. If these bodies remained of their usual temperature, no immediate effect appeared to be produced. If, however, he raised the temperature of the carbon with the blow-pipe, combination would take place directly the two substances were brought into contact. (The lecturer here placed a piece of heated charcoal in a jar of oxygen, and combustion took place instantly.) An action similar to this was constantly going on in nature, although the same amount of heat was not produced at once, and the action was slow and gradual. Iron, again, was one of the most combustible substances in nature, and burned much more rapidly in oxygen than wood did in common air. (The lecturer here heated a coil of steel wire with the blow-pipe, as before, and burned it in a jar of oxygen.) The action in this case, it would be seen, was more vehement. It would be seen that the oxide, thus formed on the iron, was nearly the same as that which was produced more slowly by exposing iron to the common air. He would next show them the combustion of sulphur in oxygen. When in common air, sulphur burns very slowly, but when in contact with oxygen, the action is much more vehement and powerful. (The lecturer here burned sulphur in oxygen.) The result of the combustion of sulphur in oxygen is sulphurous acid. Sulphur, with more oxygen, forms

sulphuric acid, which is much more powerful than sulphurous acid, and is to be found largely in gypsum, a substance so beneficially applied to agriculture. Phosphorus was also an exceedingly combustible substance. He would burn a small portion of phosphorus in oxygen—an experiment, however, which was seldom tried without the glass being broken by the violence of the combustion. (The lecturer here heated a small quantity of phosphorus, and placed it in the oxygen; the violent combustion which succeeded broke the glass jar to pieces.) The action would not commence until some exciting cause was applied. In this case, the exciting cause was the application of heat to the phosphorus. He had mentioned before, in speaking of the different substances of which plants were composed, that a powerful chemical action took place between some of these substances. He should now refer to the substances which were obtained by plants from the air, and first to carbonic acid gas. He would make some of this gas by burning a piece of charcoal held in copper wire in a jar of oxygen. (The lecturer performed this experiment.) One of the best tests of carbonic acid was lime-water, the carbonic acid uniting with the lime which the water held in solution, formed chalk—making the water white and opaque. He would then prepare the carbonic acid gas of the chemists, by adding muriatic acid and water to carbonate of lime, or chalk, till it effervesced, when carbonic acid would be liberated. If the test of lime-water were applied to gas, so prepared, the result would exactly correspond with that obtained by applying lime-water to the gas prepared by combustion of carbon. Any carbonate would liberate carbonic acid gas when mixed with a stronger acid. This gas was heavier than air, was generally found in foul wells, and was called “choke damp” in the coal mines. As oxygen was essential to the maintenance of animal life, so carbonic acid gas was essential to the life and growth of vegetables. If carbonic acid gas were to be poured into a jar, and lime-water poured upon it, the lime-water would become white and opaque. He had mentioned before, that vegetables, in daylight, breathed oxygen, and that animals breathed carbonic acid gas; if he (Mr. N.) breathed, for instance, through a tobacco-pipe into lime-water for a few minutes, the lime-water would also become white, having been acted on chemically by the carbonic acid gas which came from his lungs. (These experiments were exhibited.) These three experiments proved that the gas made by combustion, and that made by mixing carbonate of lime with muriatic acid and water, and that expired by animals, were identical. It was this gas which supplied plants with about two-thirds of their bulk. This substance, it would be recollected, was not derived in any quantity from the land, but from the air. He had before mentioned that this gas was separated from the atmospheric air by the leaves of plants. The use of leaves was formerly not known. It had been found, however, by recent experiments, that they performed functions as important to the plant as those of the root. If the plant was deprived of its leaves, it would be deprived of life; and although the plant might still have strength enough to throw out fresh leaves, if these buds were to be nipped the plant would die. As the animal digested the food which had been taken into its stomach, and the chyle was subjected to the action of oxygen in the lungs, and thus became blood, so did the vegetable imbibe by its roots the food which it found in the soil, and the juices of which, being combined with the carbon of the air which was taken up by the leaves, formed to-

gether the sap that was required for its growth and subsistence. If a plant were deprived of any of its leaves, it would be to that extent deprived of its means of growing and existence. For this reason, stripping off the leaves of mangel wurzel and other plants was highly prejudicial to the plants so treated. If large plants were required, the leaves were indispensable; if small ones, no better mode of getting them could be adopted than that of pulling off the leaves. So necessary were the leaves to a plant, that a large tree exposed some hundreds of yards of surface to the action of the sun and air by its leaves. The action on the leaves in the sun's light and heat was necessary to enable them to decompose this carbonic acid gas, and when they did so, they gave out oxygen and retained the carbon in the juices of the tree. This gas comprised a thousandth part of the air. Starch, wax, turpentine, oils, and many other substances which plants produced, were nearly wholly formed of carbon, hydrogen, and oxygen. He would now refer to nitrogen. This substance is found in almost all vegetables, and abounds in all animal substances. It is separated from the atmospheric air in the form of ammonia, and every acre of land receives from this source about 85lbs. per annum. This quantity would answer all the purposes of nature, but it would not answer the purposes of the farmer. The object of nature was to make one grain of wheat grow where one grain grew before; but it was the object of agriculturists to produce as many grains as they could. In this case, the efforts of nature must be assisted. It had been found that nature has in this way furnished quite enough nitrogen for most of the gases, and for many other plants, as, perhaps, the turnip and mangel wurzel; but she does not so furnish enough nitrogen for wheat, to which, as also to beans, oats, and barley, nitrogen has to be applied. This substance was contained in small quantity in the solid excrement of cows, which, as also that of the horse, contained about one-half per cent.; but of all animal manures, that of the human race, especially the liquid portion, contains the largest quantity of nitrogen, and was consequently the most conducive to the growth of wheat. Human urine contains five or six per cent. of nitrogen. That of the cow contains five or six times as much nitrogen as its solid excrement. It had been said that almost all manures were good for the land—no matter how they were applied—if applied directly, so as to keep the ammonia from escaping. It was to prevent this loss that experiments were now being made, at the suggestion of Professor Henslow, to ascertain how this was to be done. It had been long known to chemists that sulphate of lime (gypsum) would prevent the escape of ammonia, but it had not been known to what extent, and this was what practical farmers alone could ascertain. Mr. Nesbit earnestly exhorted the members of the club to join the hundred Suffolk farmers who were now trying experiments on this subject: for unless practical farmers lent their aid to the chemists, it was impossible to know to what extent chemistry could be applied to agriculture. If any gentlemen present were to read over carefully the letters of Professor Henslow on this subject to the farmers of Suffolk, they would have a much better idea of what can be done for agriculture by science than they could possibly have previously entertained. They might find a piece of land to abound in some of the chemical constituents of any given crop, and if they placed in that piece of land the same quantity of these ingredients which had been abstracted from it, its fertility would still

be maintained. It was essential that they should maintain these substances which the crop required, or the land would no longer be fertile. It was usual for agriculturists to put on the land whatever manure they might happen to have, although it might perhaps contain very little of the substances required. This was just as useless as to place clay upon land which required to be improved by a mixture of sand or gravel. If the land wanted silicate of potash to make it grow straw, and phosphate of lime were added, straw would not be produced, any more than wheat, which required phosphate of lime, would be made to grow by adding silicate of potash. Vegetable manures would produce straw, and bone-dust, which contained phosphate of lime, would produce wheat; but neither would answer as a substitute for the other, or for the presence of ammonia. If the food of men had been produced on the land, it would be necessary to add some substances which men produced; if the food of sheep, the dung of sheep must be applied, and so on. This, however, was frequently found inconvenient, on account of the distance to which, it might be, such substances had to be carried. Consequently, chemists had analysed the excrements, liquid and solid, of man and other animals. This was no very delightful labour, but an ardent love of science had induced scientific men to do this, and much more, for the improvement of agriculture. It had been found that many of the substances which these excrements contained could be prepared in the chemical laboratory. These bodies must evidently have the same effect on the land, whether they are prepared by the chemist in his laboratory, or by men and other animals in their stomach, or by the disintegration, corruption, or putrefaction of animals and vegetables. He would now direct their attention to the making of mixens or dung-heaps. Vegetable substances alone would not decompose, if kept dry. If moistened and exposed to the air, they would effectually decay, but the process would be slow. Take, for instance, the straw thatch of their barns, which had been exposed to rain for years without being rotted. If wet vegetable matter be laid in a heap, it would certainly heat, and might perhaps take fire, as many a farmer had found to his cost; but the proper manure would not be produced. If animal matter, such as dung and urine, be put to vegetable matter, the proper action will take place, and good manure may be produced. No organized matter was ever taken up as the food of plants, which must first be decomposed. Animals could not exist without the organized substances of plants, but plants could not take, as food, any substance which had not been previously disorganized. This was an essential law of nature. The carbon and hydrogen of a piece of paper, when lighted at a candle, would, in burning, unite with the oxygen of the air. The flame of the candle communicates the exciting cause of combustion, which afterwards continues, the paper remaining unchanged in those parts where the exciting cause has not reached it. So it was with many substances, which, when once excited, might produce a most powerful chemical action on each other, but which, without the commencement of the exciting cause, might remain in close contact with each other for a long time without chemical action. He would show another instance of bodies, which were calculated to produce a violent action on each other, lying in contact without producing this action, until the exciting cause was applied. He would place some iron filings in a glass, and add to them concentrated or strong nitric acid, which was calculated to produce a most

violent action on the iron, but would not do so unless water were added to them. The oxygen of the water in this case combined with the iron, forming oxide of iron; part of the nitric acid was decomposed, and the other part united with the oxide of iron. Great heat was evolved by this action, and a similar action was taking place in their dung-heaps during fermentation and decomposition. If the juice pressed from grapes were immediately bottled, and the air kept from it, it might be kept for years without fermentation. Once, however, take out the cork and admit the atmospheric air, when, even if the cork were to be immediately replaced, fermentation would commence and continue. In making their mixens they must mix the urine and excrements of their animals with their mould, straw, and other vegetable matter. The proper fermentation would be excited by the presence of the animal matter, and a much better manure would be obtained than by the mere decomposition of vegetable matter. The decomposition of urine commences almost as soon as it is formed. The result of this decomposition is the carbonate of ammonia, which is a substance of a very volatile nature. This body might be escaping as a gas from a mixen, without their being able to see it; but if they placed muriatic acid near it, they would then see fumes arise, which would convince them that this vapour was flying off, to manure in a friendly way the surrounding farms, and the commons and waste lands of the neighbourhood. Without ammonia, in some shape or other, it was impossible to grow wheat and other crops. He would recommend agriculturists to try whether the escape of this gas could not be prevented in the same way as its escape was prevented by chemists in their laboratory, by the application of gypsum or sulphuric acid. Unless they adopted this plan, they would find that if the heat exceeded 98 deg. or 100 deg., the ammonia would escape, do what they might. Their mixens, to prevent the escape of this gas, ought not to be above 70 deg. or 80 deg.—certainly not more than blood heat, which is about 98 deg. Another mode of retaining the ammonia was by mixing with the dung the old soil of hedges, or peat, or anything else which contained vegetable mould. If this mould were placed in heaps and watered with urine, the ammonia would, in a great measure, be mechanically retained. The only way, however, to make sure of retaining the ammonia, was by some chemical means. Chemists, in their laboratory, had a hundred modes of doing this. He would show one mode of doing so, by pouring on carbonate of ammonia, in powder, some dilute sulphuric acid. The sulphuric acid, in this case, united with the ammonia, and liberated the carbonic acid gas. Carbonate of ammonia (common smelling salts) is a mixture of carbonic acid (formed of carbon and oxygen) with ammonia (formed of hydrogen and nitrogen), so that in this substance was contained the four principal elements of plants. The ammonia, as he had shown, could be fixed by the chemists, and it then became a question whether the same could not be done by the farmers. This was a question which the farmers could alone decide by their own experiments. He had already shown them one mode, and they would find that, after pouring the sulphuric acid on the carbonate, the ammonia was retained, and the carbonic acid gas driven away. They had observed that the smell of ammonia was not found afterwards, but it could be proved by a very simple experiment that the whole of the ammonia remained in the liquid. This experiment sufficiently proved the ruinous and absurd character of the custom of putting lime on dung-hills.

He would, however, prove this further. The mixture of ammonia and sulphur was perfectly without smell, but by moistening with it a small portion of lime, they would find that the ammoniacal gas was again evolved. He was not aware that chalk was of any benefit in dung-hills, excepting, perhaps, by its acting mechanically; at all events, its deleterious effects were not so great as those of quick-lime. The action of quick-lime was chiefly beneficial on the land, but it must be always borne in mind that it had no beneficial effect in the manure heap. In order to improve their dung-heaps, he should recommend, wherever it was practicable, that agriculturists should obtain as much as possible of these animal substances which were procurable in towns; for they must remember that, whatever quantity of straw they might have, they could not procure from their mixens all the elements which were essential to the growth of plants, unless they placed them in contact with some putrifying animal substances. The mixens to which these substances were applied should, however, always have gypsum mixed with them, so that the carbonate of ammonia contained in the urine and excrements of their animals might be prevented from flying off; for it was of so volatile a nature, that it certainly would do so if not prevented. It would be for agriculturists themselves to decide by their experiments whether it were better that the dung should be dug fresh into the ground or not. His (Mr. Nesbit's) own opinion was, that it would be better after being well fermented. It should not, however, lie on the ground for any length of time exposed to the air; indeed, he thought it would be well for one set of men to be digging it into the ground, whilst another set were carting it from the mixen. He would next consider artificial manures, or substances such as were not produced on their own farms. In growing wheat, he had before mentioned that it was necessary to supply to the soil some substances which were required for the ear. If they were not aware which of these substances were necessary, they might perhaps put into the land only those substances which would produce a good crop of straw; or, on the other hand, they might not supply those substances without which straw could not be grown. It was essential that the land should contain the elements essential to the growth of straw, in order that the juices necessary for producing the grain might be taken up. Generally speaking, the heavy clay lands contained a great quantity of soda, or potash, and of some of the phosphates, which were good for the growth of wheat; but if crops had been taken from them more frequently than the materials for the growth of straw could be formed by the sun and air, these materials must be supplied in some way or other. The powdered glass produced was nearly the same substance with the straw of wheat. This was furnished by the disintegration of vegetable and earthy matters in the soil, and this process took place slowly; but if the substances themselves were to be placed in the soil by the farmer, they would of course answer the same purposes. All clay lands were not alike. In some heavy clays nitrate of soda was of no use, whilst in other heavy clay lands it was found highly beneficial. The first of these abounded in materials for producing straw, whilst in the others these materials were deficient. It would seem that, on chalky soils, nitrate of soda was generally good for straw and grass crops. Wherever, indeed, the soda and potash were exhausted, it would be beneficial, but not so where they were not exhausted. One of the principal uses of fallows was to allow the action

induced by the sun and air to disintegrate the particles of matter in the soil, and thus to furnish potash and soda. Every acre of land was also supposed to receive from the air 85lbs. of ammonia during the year. Where lands were found to require fallows, it was not difficult to ascertain what substances they required. If they found that the land produced good straw, but was deficient in ear, they would have to apply ammonia, in the shape of guano, or sulphate of ammonia, or carbonate of ammonia. And it must always be borne in mind that though the ammonia received from the air was as much as nature required, the farmer wanted more. A fallow, of course, gave nearly twice the quantity to a field for the next crop. If, on the contrary, the land grew short or imperfect straw, it was evident that it required potash and soda, which might be applied in the shape of nitrate of soda, or of nitrate of potash, or saltpetre. He believed that the sulphate of ammonia was highly beneficial to all lands to the extent of from one cwt. to one and a half cwt. per acre. [Mr. J. Ellis, of Barning, here mentioned that he had very successfully tried sulphate of ammonia when mixed with an equal quantity of salt.] He (Mr. N.) had not before heard of the sulphate of ammonia having been used in this neighbourhood, and was glad to hear that it had been used so successfully. It was most important that the value of this substance in agriculture should be fully known, because enough of it was produced in the several gas-works to supply all the farmers in England, if they had no other manures. Guano was another manure of which he had to speak in the highest terms. This was the excrement of sea-birds, found in vast accumulations in certain islands of the Pacific Ocean, near the coast of Peru. Where exposed to the spray of the sea, this guano was of inferior quality, and was of an unusually dark colour. Agriculturists should bear this in mind, in purchasing guano, and only buy that of a light colour. This was Vöckel's analysis of guano:—

Urate of ammonia .....	90
Oxalate of ammonia .....	106
Oxalate of lime .....	70
Phosphate of ammonia .....	60
Phosphate of ammonia and magnesia	26
Sulphate of potash .....	55
Sulphate of soda .....	38
Muriate of ammonia .....	42
Phosphate of lime .....	143
Sand and clay .....	47
Organic matter—traces of salts, of iron, and water .....	323
	<hr/>
	1000

It contained about twenty per cent. of the salts of ammonia. He could speak from personal knowledge of the action of guano, having known it to have been used by Mr. Allen, of Wilmington, near Dartford; Mr. Parkhurst, of Grove Farm; Mr. Hodson, of Ash; Mr. W. Andrus, of Meopham; by Mr. Love, of Shoreham, and several other gentlemen near Ashford. Mr. Parkhurst had tried on wheat some guano alone, and also some guano and nitrate of soda. The results of the application were quickly perceptible, and could then be witnessed at a considerable distance. The strength of the piece of land dressed with nitrate of soda and guano, as much exceeded that dressed with guano, as the latter did the portion that had not been dressed with either. The best of the two had wheat six or eight inches higher than that which had not been dressed. Farmers had been known to put on the same kind of

manure for years together, to manure their fields plentifully with it at an expenditure of large sums, but without any beneficial result; not because this manure did not contain many substances which plants required, but because some one or two important ingredients were absent. If they had every other ingredient for growing wheat excepting potash, they could never grow straw; if they had all save ammonia, they could not grow grain. The London urate was also spoken of as an excellent manure. It would produce some, and try if there was any ammonia in it. It would be observed that it had no smell. (The lecturer here mixed a little quick lime with the urate, when a smell of ammonia was perceptible. The odour was not so strong as when the sulphate of ammonia alone was used with lime.) The experiment showed that some ammonia was contained in the urate. If the ammonia was too strong, it would destroy their crops, just as too strong a dressing of guano would destroy them. Indeed, on the islands where the guano was collected, no plants would grow; for all the seeds were killed before they could germinate. Any farmer would quickly observe this; for the portion of the field where a bag of guano was laid would almost certainly produce no plant for some time afterwards. He (Mr. N.) had seen pasture lands where the guano had been applied, where every step missed by the man who had distributed it might be distinctly seen. On Mr. Hodson's farm, at South Ash, he had seen wheat growing on land which had been dressed with two cwt. of guano per acre, which was estimated to produce from five to six quarters. Mr. Parkhurst, at an expense of 35s. per acre of guano, had found great benefit from its use. The lecturer then described how the sulphate of ammonia might be procured from the ammoniacal liquor of the gas-works, either by the direct application of sulphuric acid to the gas liquor, or by allowing the ammoniacal or gas liquor to percolate or filter through a bed of powerful gypsum. The resulting liquid is boiled down and crystallized, and then formed the sulphate of ammonia of commerce. He had mentioned that silicate of potash was necessary to grow straw, and that phosphate of lime was necessary to grow wheat. This latter substance, which is the earthy part of bones, and contained in bone-dust, is always to be found in small quantities in the soil, but not in sufficient quantity. To ascertain in what proportion this substance existed in any soil, they must, of course, know the particular constituents of the soil. This required a considerable knowledge of chemistry, and until the agriculturists gained that knowledge of particulars they must be content to go on calculating on generals, which, however, was much better than going on on chance, as they had mostly hitherto done. A very little knowledge of chemistry would, however, enable them to know that they might grow some wheats containing only five per cent. of that essential of good wheat, gluten; while other wheats might contain 35 per cent. In bad harvests, when wheat possessed little gluten, it was usual to say that it was fit for nothing but making starch. All poor wheat was principally fit for making starch; whilst the good wheat, containing gluten in large quantity, was used for making bread. They could not, indeed, grow wheat without a certain per centage of gluten. There was one substance which contained all the most essential materials of the wheat itself, and which the chemist could prepare artificially at an expense very little exceeding that of guano, and which preparation would prevent the price of guano being raised to any very considerable extent; he alluded

to the artificial guano prepared by Mr. Potter, which he believed to be quite as good as the natural guano. Gypsum was a substance largely contained in clover, to which crop it was generally beneficially applied. It had been in some cases complained of, that gypsum burnt up the crop; that effect might as probably arise from the absence of some other necessary ingredient as from the presence of gypsum. He would beg to impress most particularly on the agriculturists the necessity of organizing themselves in a practical association for the advantage of agriculture, of science, of themselves, and of those parties, who, knowing something of science, want to ascertain facts relative to the operations of nature, with which the agriculturists only could supply them. There were scientific gentlemen who were willing to do anything for the agriculturists, if the agriculturists would do something for themselves. If the agriculturists would assist these gentlemen in ascertaining what were the laws of nature, they might soon perhaps find it unimportant to ask the protection of any other laws, so valuable, it was believed, were the improvements which might be made. There were a thousand things, in reference to the application of science to agriculture, which could only be determined by practical experiment. It was only by carefully watching the manner in which nature performed her duties—it was only by comparing the results of a large number of combined practical experiments, that science could be beneficially applied to any very large extent. A striking instance of the certainty and importance of such combined observation existed in the calculations on annuities. It was most difficult and uncertain to calculate the average duration of life of any man at a given age; but, by ascertaining the average duration of life of some thousand men of that age, it had been found easy to base certain tables on the laws of nature as to the average expectation of life of each of them. There were laws of nature applying to the growth of wheat, and other agricultural produce, as well as to the mortality of man. Little of these laws was at present known; and what these laws were, it was the object of scientific men to learn. If agriculturists proceeded in opposition to these laws, they were sure to be defeated in everything they did; if, however, they could ascertain what these laws were, and act in accordance with them, they could not fail to succeed in everything. Mr. Nesbit then stated that a plan was in course of suggestion by Professor Henslow, for forming a co-operating body of agricultural experimentalists, in all parts of the kingdom, and earnestly recommended the gentlemen present to give their names as willing to join in this good work, which would not cost each of them probably ten shillings per year, and of which the advantages might prove inestimable. In a letter which he (Mr. N.) had had the honour to receive from the Duke of Rutland, his grace had said, "I shall be most willing to give my feeble support to the important object of your exertions. That chemistry and science are most necessary to be applied in aid of agriculture, there can be no doubt; and the enlightenment of the cultivators of the soil must be productive of the most beneficial results." The letters of Professor Henslow, of which the club had authorised the purchase of fifty copies, were then in the room, and were calculated to convey to every farmer who read them some most valuable knowledge on the nature of the experiments to be tried, and of agricultural improvement generally. He concluded by beseeching them to give the closest

and most serious attention to those proposed experiments, by means of which he confidently hoped that the day was not far distant, when all the phenomena of nature would be brought under the laws of mathematical science, and be susceptible of demonstration by the same method of analysis (*Applause*).

After a very interesting conversation amongst the members, on the constituents of various substances, a vote of thanks to Mr. Nesbit, for his excellent lecture, was proposed by Mr. J. ELLIS, of Barming.

C. G. WHITTAKER, Esq., the Chairman, in putting the motion, reminded the members that if they required a good scientific and general education for their sons, Mr. Nesbit, to whom several of his (the chairman's) friends had sent their children, was quite competent and ready to give it them.

The motion was carried unanimously; Mr. NESBIT returned thanks; several members gave in their names as co-operators in Professor Henslow's projected experiments; about thirty copies of that gentleman's letters were purchased by the members; and the meeting adjourned.

### PLEASANT PROSPECT TO THE FARMER ON THE REPEAL OF THE CORN LAWS.

Our Lincolnshire friend shows the probable proceeds of three acres of land cultivated on the three-field system, of four acres on the four-field system, and of five acres on the five-field system, with the present protective law, and under a free-trade, thus:—

PRODUCE OF THREE ACRES WITH PRESENT LAW.		WITH A FREE TRADE.	
	£. s. d.		£. s. d.
Rape or turnips.....	2 15 0	Rape or turnips.....	2 0 0
8 qrs. oats, 19s. per qr.	7 12 0	8 qrs. oats, 13s. per qr.	5 4 0
4 ¼ qrs. wheat, 52s.	11 1 0	4 ¼ qrs. wheat, 37s.	7 17 3
	<u>21 8 0</u>		<u>15 1 3</u>
Deduct rent on three acres.....	6 0 0		
	<u>15 8 0</u>		
FOUR ACRES.			
Rape or turnips.....	2 15 0	Rape or turnips ....	2 0 0
4 ¼ qrs. wheat, 52s.	11 1 0	4 ¼ qrs. wheat, 37s.	7 17 3
4 ¼ qrs. beans, 29s.	6 1 3	4 ¼ qrs. beans, 22s.	4 13 6
4 qrs. wheat, 52s.	10 8 0	4 qrs. wheat, 37s.	7 8 0
	<u>30 5 3</u>		<u>21 18 9</u>
Rent of 4 acres.....	8 0 0		
	<u>22 5 3</u>		
FIVE ACRES.			
Rape or turnips.....	2 15 0	Rape or turnips ....	2 0 0
8 qrs. oats, 19s.	7 12 0	8 qrs. oats, 13s.	5 4 0
4 ¼ qrs. wheat, 52s.	11 1 0	4 ¼ qrs. wheat, 37s.	7 17 3
4 qrs. beans, 29s.	5 16 0	4 qrs. beans, 22s.	4 8 0
3 ¾ qrs. wheat, 52s.	9 15 0	4 ¾ qrs. wheat, 37s.	6 18 9
	<u>36 19 0</u>		<u>26 8 0</u>
Rent of 5 acres.....	10 0 0		
	<u>26 19 0</u>		

So that on a farm of 500 acres—even with a calculation so favourable for free-trade as the above—it is obvious that the farmer would lose by a repeal of the Corn Law about 60*l.* a-year, in addition to the whole of his rent! Whatever, therefore, might be the fate of the landlords, the farmer, it is clear, would be ruined outright.—*Lincolnshire Paper.*

## WRENTHAM FARMERS' CLUB.

FIFTH REPORT. 1843.

The Committee of the Wrentham Farmers' Club, at the close of another year, in accordance with their usual custom, are desirous of performing the duty which again devolves upon them, of placing before the members a brief review of the proceedings of the Club; in doing which, they have to regret that the paucity of matter resulting from the observations which have been elicited, will not allow of any extended remarks on some questions; at the same time, they trust that any information, however trivial, which may be afforded, with regard to those subjects which have been brought before them, will be found of a practical nature.

At the commencing meeting of the year, the preparatory business connected with the management of the Club having been despatched, a desultory discussion was entered into with regard to the properties of white, or Belgian carrots, as compared with other roots.

The introducer observed, he considered white carrots as amongst the most valuable descriptions of roots for feeding purposes grown at the present period, and he believed that frequently, as a change, they can be cultivated to more advantage than turnips, particularly on poor soils, as, under good management, a much heavier crop has generally been produced; and although, it was allowed, the labour and expense incident to a proper cultivation was greater than that attending other root crops, still the increased quantity obtained would be found more than an equivalent for such extra expense incurred. In experiments which he had recently made with regard to the comparative weights grown of carrots, beet-root, and swedish turnips, the preponderance was considerably in favour of the former.

Another important feature, deserving of notice, appears in the value of the carrot tops; which is rather enhanced by its being found necessary, in order to effect a good preservation of the root, to have a small portion of it severed with the top. This being the case, would render it in some measure obligatory, as well as advantageous, that they should be consumed as cattle food, with a portion of cut hay, rather than ploughed in: and where this practice has been pursued, the manure left upon the land by sheep was believed to be quite equal to that from a third crop of common turnips.

With regard to manuring for carrots, it would appear rather paradoxical that no material benefit should result to the crop from so doing; but in those cases where both systems had been tested, little or no difference was perceptible, and by no means sufficient to warrant an application: under such circumstances it was considered desirable that the manure thus intended should be applied to the following crop of barley.

It is necessary to observe, as stated from experience, that where game extensively abounds, the cultivation of this root has almost invariably been found a failure.

The next meeting was occupied in an inquiry with regard to the system of artificial feeding of cattle on the principle advocated by Mr. Warnes; and also to consider the propriety of introducing the growth of linseed for that purpose.

The member who ably brought the subject under the notice of the meeting, observed, it could not be introduced at a more desirable period than the present; for, in adverse seasons, the cultivator must not

blind himself to improvements, but look principally to his own exertions. He, therefore, believed it would be found good policy to consume the native produce, especially when the value of the home commodity is below a remunerating price; and, in order to carry out such a system, the public were indebted to Mr. Warnes for introducing a compound of barley and linseed in lieu of oil cake, which was stated to have led to useful results as far as it had gone. Extracts from that gentleman's pamphlet on the subject were read, in which he strongly urged the desirableness of promoting the growth of linseed in this country. The advantage, however, attending its home growth was considered rather questionable, the climate as well as the soil, in this locality, not being considered congenial; and, in one or two instances, in which it had been cultivated on a small scale, the crops obtained were not sufficiently remunerative to induce a second trial. But, although this may be the case, it would appear highly desirable, as well as advantageous, with a low price of corn, even to purchase the linseed for the purpose of making the compound, should it be found to answer for extensive use.

There having been no experience with regard to its fattening properties by members in this immediate neighbourhood, an adoption of the system, by way of experiment, was particularly recommended, and it was agreed that the question should stand over to a future period. It should, however, be observed, that the reduced price of oil cake at that season had the effect of deterring many from entering upon it who had otherwise intended doing so.

Barley sowing, with regard to the preparation of the land, &c., was the next question which engaged attention. From the remarks offered on this subject, it appeared that, as regards light lands, a good crop of turnips was the great desideratum; and when fed off, at least, two ploughings should be given—the first to be fleet, the second deeper. Where beet are grown it was not considered desirable to plough more than once: those lands having received the frost, would seldom be brought into a better state.

With regard to heavy land, upon which the discussion principally turned, some difference of opinion prevailed as to whether a good clean fallow, or the growing of tares on such soils, were the better system; it was, however, generally admitted that, as a preparation for barley, the cultivation of tares had a favourable effect upon that particular crop, although it appeared rather questionable if such were the case with the crops that followed. If the land shall have been sufficiently pulverized by frost, harrowing, with heavy harrows was strongly recommended in preference to cultivating, this latter practice having frequently been found injurious.

Drilling the seed was the system generally adopted; although, in some cases, on heavy lands, sowing had been successfully pursued. The proportion of seed necessary depended much on the nature of the soil; as instances were stated, in which the quantity deposited varied from six to twelve pecks per acre, although seldom exceeding the greater quantity. On light lands, and more particularly on poor soils, thin sowing was recommended; while on lands of better quality, a heavier seed was deemed essential. A member, farming on good mixed soil, had observed, that by increasing his seed from ten pecks to three bushels per acre, he obtained barley of better quality, without either increasing or diminishing the produce.

The meeting agreed:—

“That in preparing for barley, on light lands, two ploughings are requisite before sowing; but on

stronger soils, after the land has been sufficiently pulverized by frost, no further ploughing is advisable. On either descriptions of soil, harrowing with heavy harrows, at the time of sowing, is, in most cases, to be preferred to cultivating. That drilling, on all lands, is the most desirable system; and that a seed, varying from eight to twelve pecks per acre, is considered as most adapted to this locality, which it is necessary should be occasionally changed."

At the following meeting, the subject for consideration was, "The best method of growing beet, whether ridge or stetch."

At a previous discussion on the cultivation of beet-root, in April, 1840, no conclusion was arrived at on this particular point; each system, it was believed, having its peculiar advantages. In again canvassing the question on the present occasion, it was contended that, under the ridge system of cultivation, more weight of root and better quality were obtained; that they grew clearer and were less fanged, and can be removed from off the land with less injury. The system was also believed to possess greater facilities for cultivation; it was, however, allowed that the land required to be in a good state of pulverization, and it is also most essential that the operations of ridging and drilling be performed with the greatest exactness, by which means horse-hoeing can then be done more effectually; and in order to test each system satisfactorily, the same proportion of manure should be applied to one as the other, which principle, it was observed, had not generally been acted upon with regard to ridging.

The principal objections to the system were, that on heavy lands, in a dry time, there is more difficulty in obtaining a plant, particularly on poor tenacious soils; as they can seldom be brought into a sufficiently pulverized condition for the reception of the seed; and that such lands were generally found in an unfavourable state at the time of getting off the crop. This latter objection, as regards ploughing afterwards, it was stated, may, in a great measure, be obviated at a trifling expense, by drawing the land out wide, and spreading the furrow slice about the stetch, thus preventing the necessity of any further ploughing when not desirable.

The majority of members present being of opinion, "that on all descriptions of land, where a sufficient degree of pulverization exists, the ridge system is to be preferred;" a resolution to that effect was accordingly adopted.

The discussion on this question led to sweepstakes being entered into for competition on both principles of cultivation, which it will be seen were decided at the proper season.

The next question before the club was, "The effect of growing tares on heavy land, and the advantage or disadvantage resulting therefrom."

It was remarked that, from observation, the cultivation of tares on heavy lands, appeared to have the effect of producing an abundant crop of barley, but was injurious to the layer, which followed, and consequently, in some measure, to the succeeding wheat crop; although it was believed the growing of tares did not prevent the obtaining a plant of clover, but that it materially interfered with its growth afterwards. The meeting was, however, of opinion that the growth of tares on lands of the above description, was, in many respects, highly desirable; and in order to provide a remedy for the evil complained of, it was generally agreed, that they may be advantageously cultivated to a moderate extent—not exceeding

one half of the fallow—provided peas or beans are grown in lieu of clover the following course; thus taking a layer but once in eight years, and it is considered very essential that the greater proportion of the tares be fed off on the land by sheep.

This system was believed to be decidedly preferable to growing turnips extensively on heavy lands; and in order to carry it out effectually, it is necessary that the tares should be sown at intervals, although at no period so late as to preclude the opportunity of making a clean summer-land.

"The effect produced by different kinds of roots upon the after-green crops," occupied the attention of a subsequent meeting.

On this question there was a diversity of opinion with regard to the effects of beet and Swedes on the following crops, as in some cases the former, and in others the latter root, was considered as productive of the most benefit: but on heavy lands it would appear that, generally, the after-grain crops were the best where beet had been taken; while, on other soils, Swedes were believed to have produced this effect. In most cases, on light lands, better barley was obtained after common turnips, than from either beet or Swedes; and where the turnips are fed off by sheep, it is but fair to assume that such would be the case. A few instances were noticed with regard to soils of this description, in which the layer that followed after beet was perceptibly better than from other roots.

The growth of carrots, as far as observation with regard to their cultivation extended, was not found to have a deteriorating tendency towards any of the succeeding crops.

Potatoes were allowed to be decidedly of a most exhausting nature; but as an abundant produce is generally obtained, something may fairly be allowed as a sort of deduction from the following crop of barley.

Upon the whole, it is inferred, that (with the exception of potatoes) where an impartial treatment has been given, or such treatment as is peculiar to each description of root, no material difference has been perceptible, further than the effect of seasons, or the particular time of sowing.

"The most approved treatment of lands tired of growing clover, or what is termed 'clover sick,' was the standing subject at another meeting.

The deficiency of the requisite quantity of gypsum, in such soils (which in others, favourable to the growth of clover, is found to exist naturally), was attributed as a principal cause of failure; and it was stated that in other localities, the use of gypsum had been found effectual in preserving the plant; but in this particular district its artificial application does not appear in any single instance, to have been attended with successful results. It was therefore recommended, that the best means to be used by way of precaution, in order to secure a plant, was to lay down the land but once in eight years with small seeds of any kind; and, as its failure is principally confined to poor heavy soils, the cultivation of peas or beans in alternate courses was considered in no way disadvantageous.

At the November meeting, the annual show of roots took place. The different sweepstakes previously entered into for growing fields of roots were decided as follow—the crops having been inspected by those gentlemen who had kindly consented to act as judges:—

Mr. Hingeston, a field of beet on the stetch, against Mr. Girling, on the ridge—awarded to Mr. Girling.

Mr. Riches, a field of beet on the stetch, against Mr. Girling, on the ridge—awarded to Mr. Girling.

Mr. Tallent, a field of beet on the stetch, against Mr. Girling, on the ridge—awarded to Mr. Girling.

Mr. Riches, a field of beet, against Mr. Wigg—awarded to Mr. Wigg.

General sweepstakes for the best field of beet, without restriction as to cultivation—awarded to Mr. L. O. Cottingham.

Ditto for the best field of Swedes—awarded to Mr. L. O. Cottingham.

Several Premiums from the Labourers' Fund, were also awarded to the occupiers of cottage allotments, for the production of vegetables, &c.

The subsequent part of the evening was occupied in a short discussion on "The utility of working pea and bean stubbles as a preparation for wheat."

The member who first spoke upon the question was of opinion that, on particular soils, breaking up pea and bean lands was desirable; not so much in reference to wheat, as regarded a preparation in some measure for the succeeding root crop; although he believed, that on lands subject to bind, crowsfoot, and weeds of a similar description, it was beneficial for wheat, as he had observed the crop to be less affected by them afterwards.

This system was, however, decidedly objected to; and satisfactorily proved, in many instances, to have been productive of the greatest injury, frequently causing the wheat to become root-fallen; and it is also generally found that more advantage will accrue to that crop by ploughing in all superfluous weeds, rather than, by breaking up the land, destroy the solidity so essential as a preparation for wheat; and, where lands are free from grass, the propriety of even discontinuing altogether our present system of ploughing up bean stubbles was urged: the previous crop under such circumstances having been manured for. Scarifying, in that case, was believed to be more desirable; and, as regarded cleaning the land, working it for that purpose, when a barley stubble, was considered preferable.

The opinion of the meeting being decidedly against the working of pea and bean stubbles for wheat, a resolution to that effect was agreed upon.

Your committee, in summing up this Report, while they are desirous of bearing testimony to the unanimity and good feeling which have at all times characterized the meeting of the Club, cannot but observe that the interest formerly evinced with regard to the prosperity of these institutions has, in some measure, subsided into a degree of apathy. They will not attribute this to any want of interest with regard to improvements in the management and cultivation of the soil; but while they could have desired that a larger measure of active support should have been afforded, in order to have arrived at more satisfactory conclusions on some questions, they would still trust that the object for which societies of this description were originally established has not been altogether futile; and, whatever may be the future intentions of members, your committee, in conclusion, would indulge in the agreeable reflection, that a spirit of inquiry has been set afloat, and a desire for improvement manifested, as some salutary effects resulting from their labours.

JAMES HINGESTON, Chairman.

Dec. 8th, 1843.

## REVIEWS.

## FAMILIAR LETTERS ON CHEMISTRY AND ITS RELATION TO COMMERCE, PHYSIOLOGY, AND AGRICULTURE.

By JUSTUS LIEBIG, M.D., PH.D., F.R.S.—Edited by JOHN GARDNER, M.D.

Taylor and Walton, 1843.

We have read the above interesting letters with unmixed pleasure; and as far as regards practical information and useful instruction, the author is most happy in this small volume. As the force and power of an agriculturist to produce good crops in great measure depend on the manures he can command, and as the way to derive the greatest benefit from his available resources is one of the most useful subjects to engage his attention, we insert Letter XIII. as a specimen of this useful work:—

"Having in my last letter spoken of the general principles upon which the science and art of agriculture must be based, let me now direct your attention to some of those particulars which will more forcibly exhibit the connection between chemistry and agriculture, and demonstrate the impossibility of perfecting the important art of rearing food for men and animals without a profound knowledge of our science.

"All plants cultivated as food require for their healthy sustenance the alkalies and alkaline earths, each in a certain proportion; and, in addition to these, the cerealia do not succeed in a soil destitute of silica in a soluble condition. The combinations of this substance found as natural productions—namely, the silicates—differ greatly in the degree of facility with which they undergo decomposition, in consequence of the unequal resistance opposed by their integral parts to the dissolving power of the atmospheric agencies. Thus the granite of Corsica degenerates into a powder in a time which scarcely suffices to deprive the polished granite of Heidelberg of its lustre.

"Some soils abound in silicates so readily decomposable, that, in every one or two years, as much silicate of potash becomes soluble and fitted for assimilation as is required by the leaves and straw of a crop of wheat. In Hungary extensive districts are not uncommon where wheat and tobacco have been grown alternately upon the same soil for centuries, the land never receiving back any of those mineral elements which were withdrawn in the grain and the straw. On the other hand, there are fields in which the necessary amount of soluble silicate of potash for a single crop of wheat is not separated from the insoluble masses in the soil in less than two, three, or even more years.

"The term *fallow* in agriculture designates that period in which the soil, left to the influence of the atmosphere, becomes enriched with those soluble mineral constituents. Fallow, however, does not generally imply an entire cessation of cultivation, but only an interval in the growth of the cerealia. That store of silicates and alkalies—which is the principal condition of their success—is obtained, if potatoes or turnips are grown upon the same fields, in the intermediate periods; since these crops do not abstract a particle of silica, and therefore leave the field equally fertile for the following crop of wheat.

"The preceding remarks will render it obvious to you that the mechanical working of the soil is the simplest and cheapest method of rendering the

elements of nutrition contained in it accessible to plants.

"But, it may be asked, "Are there not other means of decomposing the soil besides its mechanical subdivision? Are there not substances which, by their chemical operation, shall equally well or better render its constituents suitable for entering into vegetable organisms?" Yes: we certainly possess such substances; and one of them, namely, quicklime, has been employed for the last century past in England for this purpose. And it would be difficult to find a substance better adapted to this service, as it is simple, and in almost all localities cheap and easily accessible.

"In order to obtain correct views respecting the effect of quicklime upon the soil, let me remind you of the process employed by the chemist when he is desirous of analysing a mineral, and for this purpose wishes to bring its elements into a soluble state. Let the mineral to be examined be, for instance, felspar. This substance, taken alone, even when reduced to the finest powder, requires for its solution to be treated with an acid for weeks or months; but if we first mix it with quicklime, and expose the mixture to a moderately strong heat, the lime enters into chemical combination with certain elements of the felspar, and its alkali (potass) is set free. And now the acid, even without heat, dissolves not only the lime, but also so much of the silica of the felspar as to form a transparent jelly. The same effect which the lime in this process, with the aid of heat, exerts upon the felspar, it produces when it is mixed with the alkaline argillaceous silicates, and they are for a long time kept together in a moist state.

"Common potter's clay, or pipe-clay, diffused through water, and added to milk of chalk, thickens immediately upon mixing; and if the mixture is kept for some months, and then treated with acid, the clay becomes gelatinous, which it would not have done without the admixture with the lime. The lime in combining with the elements of the clay liquifies it; and, what is more remarkable, liberates the greater part of its alkalies.

"These interesting facts were first observed by Fuchs, at Munich. They have not only led to a more intimate knowledge of the nature and properties of the hydraulic cement; but, what is far more important, they explain the effects of caustic lime upon the soil, and guide the agriculturist in the application of an invaluable means of opening it, and setting free its alkalies—substances so important, nay, so indispensable to his crops.

"In the month of October the fields of Yorkshire and Oxfordshire look as if they were covered with snow. Whole square miles are seen whitened over with quicklime; which, during the moist winter months, exercises its beneficial influence upon the stiff clayey soil of those counties.

"According to the humus theory, quicklime ought to exert the most noxious influence upon the soil; because all organic matters contained in it are destroyed by it, and rendered incapable of yielding their humus to a new vegetation. The facts are, indeed, directly contrary to this now abandoned theory: the fertility of the soil is increased by the lime. The cerealia require the alkalies and alkaline silicates, which the action of the lime renders fit for assimilation by the plants. If, in addition to these, there is any decaying organic matter present in the soil supplying carbonic acid, it may facilitate their development, but it is not essential to their growth. If we furnish the soil with ammonia, and the phosphates, which are indispensable to the cerealia, with the alkaline silicates, we have

all the conditions necessary to insure an abundant harvest; the atmosphere is an inexhaustible source of carbonic acid.

"A no less favourable influence than that of lime is exercised upon the soil of peaty land by the mere act of burning it: this greatly enhances its fertility. We have not long been acquainted with the remarkable change which the properties of clay undergo by burning. The observation was first made in the process of analysing the clay silicates. Many of these, in their natural state, are not acted on by acids, but they become perfectly soluble if heated to redness before the application of the acid. This property belongs to potters' clay, pipe-clay, loam, and many different modifications of clay in soils. In their natural state they may be boiled in concentrated sulphuric acid without sensible change; but if feebly burned, as is done with the pipe-clay in many alum manufactories, they dissolve in the acid with the greatest facility, the contained silica being separated like a jelly in a soluble state. Potters' clay belongs to the most sterile kinds of soil, and yet it contains within itself all the constituent elements essential to a most luxurious growth of plants; but their mere presence is insufficient to secure this end. The soil must be accessible to the atmosphere, to its oxygen, to its carbonic acid—these must penetrate it, in order to secure the conditions necessary to a happy and vigorous development of the roots. The elements present must be brought into that peculiar state of combination which will enable them to enter into plants. Plastic clay is wanting in these properties, but they are imparted to it by a feeble calcination.

"At Hardwicke Court, near Gloucester, I have seen a garden (Mr. Baker's) consisting of stiff clay, which was perfectly sterile, become, by mere burning, extremely fertile. The operation was extended to a depth of three feet; this was an expensive process, certainly, but it was effectual.

"The great difference in the properties of burnt and unburnt clay is illustrated by what is seen in brick houses, built in moist situations. In the towns of Flanders, for instance, where most buildings are of brick, efflorescences of salts cover the surfaces of the walls, like a white nap, within a few days after they are erected. If this saline incrustation is washed away by the rain, it soon re-appears; and this is even observed on walls which, like the gateway of Lisle, have been erected for centuries. These saline incrustations consist of carbonates and sulphates, with alkaline bases, and it is well known these act an important part in vegetation. The influence of lime in their production is manifested by their appearing first at the place where the mortar and brick come into contact.

"It will now be obvious to you that in a mixture of clay with lime, all the conditions exist for the solution of the silicated clay, and the solubility of the alkaline silicates. The lime gradually dissolving in water charged with carbonic acid, acts like milk of chalk upon the clay: this explains, also, the favourable influence which *marl* (by which term all those varieties of clay rich in chalk are designated) exerts upon most kinds of soil. There are marly soils which surpass all others in fertility for all kinds of plants; but I believe marl in a burnt state must be far more effective, as well as other materials possessing a similar composition; as, for instance, those species of limestone which are adapted to the preparation of hydraulic cements, for these carry to the soil not only the alkaline bases useful to plants, but also silica in a state capable of assimilation.

"The ashes of coals and lignite are also excellent

means of ameliorating the soil, and they are used in many places for this purpose. The most suitable may be readily known by their property of forming a gelatinous mass when treated with acids; or by becoming, when mixed with cream of chalk, solid and hard as stone.

"I have now, I trust, explained to your satisfaction, that the mechanical operations of agriculture—the application of lime and chalk to lands, and the burning of clay—depend upon one and the same scientific principle; they are means of accelerating the decomposition of the alkaline clay silicates, in order to provide plants at the beginning of a new vegetation, with certain inorganic matters indispensable for their nutrition."

Want of space prevents us from giving further extracts from this excellent little work, but we particularly recommend the perusal of the three concluding chapters.

#### SOME REMARKS ON LANCASHIRE FARMING, and on various subjects connected with the Agriculture of the Country: with a few suggestions for remedying some of its defects.

By LAW. RAWSTORNE, Esq.

London: Longman and Co. 1843.

This is another of those useful and practical works we would wish to see in the hands of every farmer. It is completely free from all superfluous matter, and comes at once to the way in which farming should be profitably pursued. We cannot refrain from making the following short extract, which shows plainly in what good farming is comprised:—

"In the attainment of excellence of any kind, the first thing to know is what to do, the next to practise what we know; although hard and persevering labour may go a great way to the attainment of an object, and large sums expended may contribute to forward it, yet even, though an entire failure may not ensue, the advantage derived will not be so great as it should be, unless proper means are directed to a proper end. It is on this account that it should be well weighed and considered, first—What the objects to be aimed at, are, in the improvement of land? and next—What is the best method of carrying them out with the fairest prospect of success, and with the least loss of time, labour, and expense? Now, it may be laid down as a standing rule, and as a guide to direct our exertions, that all good farming—the whole of that process by which bad land is to be converted into good, or land naturally good and productive is to be continued in that state—is comprised in the three following operations of husbandry:—

"1. To carry off all stagnant and superfluous water by means of judicious draining.

"2. To return, through the medium of manure, the strength and fertility which has been extracted from the land by cropping.

"3. To eradicate all weeds, that the strength of the manure may be thrown into the crops, and not into the weeds.

"1. Draining is the basis and groundwork of every agricultural improvement. Of this there are two kinds; the one for carrying off spring water from the land, the other surface water. Each of them is distinct in its nature and effects, the first of the two being partial, the other universal. The former is chiefly confined to billy countries, or, at all events, to those where there is a considerable variation in the rise and fall of the land; for though water will, under certain circumstances, find its own level, yet springs are rarely to be met with, unless there is more elevated

ground above them. The principle on which they act is clear: the wet penetrating through the upper light soil, and being caught by a more retentive one beneath, will be conveyed along that until it finds an outlet on the side of a declivity. Lodging there, it forms a swamp; the only way of removing this is to cut a trench through the higher part of the swampy place, and thus, the source of the spring being reached, its contents are discharged in a new direction. A deep cutting is generally required, and this through a soft spongy stratum. Nothing can serve so effectually the uses of a conduit as a hollow drain of stones, which on the top should be filled up with pebbles, gravel, brushwood, turf, or some light material. This will keep the drain open for any number of years, and will give a perfect firmness and solidity to the ground below. The other kind of draining is of a more general character, and it is from the want of it that so large a portion of this kingdom has so long lain in a barren and unprofitable condition. All land, with the exception, perhaps, of the blowing sands of Norfolk, and some other peculiar soils, such as chalky ones, will be improved by draining, and without it the common operations of husbandry cannot be carried on with any certainty of success. Crops of corn or grass may, doubtless, be raised by the plentiful application of manure alone; but it is also certain that an increase of produce by equal means, or the same produce with inferior means, viz., with less manure, may be effected, if the land be laid first thoroughly dry, rather than being drenched with stagnant water. As this subject will be treated more in detail in the sequel of this, it is unnecessary to say more in a general way at present.

"2. But however well the land may be drained, all this will be of little avail unless attention be paid afterwards for renewing it with such manures as are within the reach of the occupier. The first rule in making a good dung-heap, is to let nothing be wasted. Let all such materials be collected as may serve to increase the quantity, to cause it to ferment, and to enrich it in such a manner, as, when used, may contribute to restore the soil to the fertility it possessed before it was cropped. With this view, if bog or sea slush be within reasonable distance, these should be carted up in the summer time, when the teams might else be lying idle. These should be placed at the bottom of the farm-yard, for the dung to lie upon in winter; or they should be formed into a large heap ready to be mixed with lime, or with stable manure, when this has been sufficiently heated and decomposed from its original dry state. Thus the real quantity of this restorative compound will be much augmented, and a valuable compost be obtained; which will go much farther towards keeping the whole farm, both grass and ploughed land, in good heart.

"3. As to the eradication of weeds, common sense points out the advantage, and even necessity of removing or destroying these noxious intruders, which often cause more exhaustion of the land than the best crops, and which, if allowed to remain and run wild, will much prevent any crop arriving at its proper maturity. One year's seed is said to be six years' weed. If the weeds are well-rooted up, and turned over with the harrow as soon as they appear, they are easily eradicated; but if allowed to get a-head, and particularly to seed, the labour required to get rid of them is immense—double and treble what it would otherwise have been. Mr. Coke, of Norfolk, afterwards Earl of Leicester (to whom the agriculture of the country is perhaps more indebted than to any other person), having visited the celebrated Mr. Roscow, and being asked what he thought

of Lancashire farming, replied "that he had not seen any *clean farming*." Now, if anything can describe our style of farming it is precisely this. The potato culture has all along been excellent; but, with this exception, no attempt had been made to use the drill husbandry until this method was applied to the turnip crop to a large extent, which is quite a late introduction, and is a great improvement. It was not uncommon to grow what we call blendings, which were a compound of a few beans, a sprinkling of peas, more vetches, still more weeds, and all sorts of rubbish. Farmers, who have no lengthened or certain interest in their possessions, want forethought; they only look to present advantage, and therefore will not give themselves the trouble or expense to do what is only to bring in a return at a more distant period. But if a tenant has a sufficiently long term in his farm, he should lay out his money in good time, so that in the end he may reap the fruits of his labour. He would then see that by growing the crop broad-cast, he might possibly raise as heavy a bulk of some sort of produce as if he had adopted the drill system; but he would likewise find that by doing so he would make his land foul, and thus injure it for a succeeding year. By the crop being in drills, the sun and air would penetrate more freely; it would be brought forward to a better growth from its receiving the benefit of the whole strength of the manure; and by its being put at the top of the ridge it would be kept comparatively dry, even if the land were not drained, as by all means it should be. Further, by the ground being well stirred and earthed up with the drill plough, it would be kept perfectly clean; the crop thus grown would become what is called an ameliorating crop, and it would be used as a substitute for a fallow. In really good, clean farming there should be no occasion for a fallow, or, if at all, it should be had recourse to only about once in seven years. Land under any management is liable to become dirty; and then it is perhaps the easiest and cheapest mode of cleaning it again, to begin with a fallow, and to follow with a regular rotation of crops. In this country, however, we have not yet approached so near to perfection, as to be able to do without a fallow; and as it may take some time before we recover from the evils of former mismanagement, it will probably long continue an inherent part of our system."

From this extract will be seen the admirable and easy style this small pamphlet is written in.

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THE APPLICATION OF GEOLOGY TO AGRICULTURE, and the Improvement and Valuation of Land, with the Nature and Properties of Soils, and the Principles of Cultivation.

By NICHOLAS WHITLEY.

Longman and Co., London.

The work before us, while it is to the geologist most interesting, must be also to the farmer most instructive, by explaining to him the nature and capabilities as well as the properties of the soil he cultivates. In it are some admirable extracts to carry out his views, from the works of Mr. John Morton, Sir Humphrey Davy, and Professors Johnston and Liebig; and, in fact, for one determined to make the most of his farm, this work is admirably adapted. There are also instructions to the land surveyor, which, from the author's perfect acquaintance with that branch of science, will be found most useful.

"The object of the farmer," says the author, "is

to raise the greatest amount of valuable produce at the least possible expense, and in such a manner as will not impoverish the soil. In order to effect this, all the natural properties of the soil should be called into action, and every aid which experience and science can furnish should be adopted as valuable auxiliaries.

"The principles of cultivation may be divided into those which relate to—1st, The management of the soil; 2nd, The application of manures; 3rd, The rotation of crops; 4th, The plants cultivated.

"1. *The management of the soil*.—The state of tilth in which a soil is kept and prepared for the reception of the seed is of the utmost importance. The land should be well ploughed and worked, so that there remain no hard masses, impenetrable to the roots of vegetables; and be brought into such a state, that a circulation of air and moisture may take place in it. The soil should not be cut, but as much bruised as possible by agricultural operations.

"Crops tilled in the autumn require more compactness in the soil than those sown in the spring, in order that the plant may be firmly rooted against the storms of winter, and that the surface of the land may not be washed by rain. On the return of spring, however, the growth of the plant would be greatly assisted if the face of the soil were lightly broken, and thus rendered permeable by the genial warmth and moisture of that season. It cannot be too generally known that when the surface of the land is worked, the soil participates in the benefit to its full depth, by the access thus given to atmospheric agency.

"The crops which are put in in spring, and which require a rapid growth, must have a well worked soil, in order that the humus may be more rapidly prepared, and fitted for the purpose of assimilation. No fermentation or decay takes place in the manure deposited in the soil, until air be admitted; the opening of the soil may therefore be considered as the means by which its nutritious properties are called into activity.

"The manner in which land, whence turnips have been drawn, is often left until the sun has dried and hardened it, is very injurious to the succeeding crop of barley. The surface should have been worked and the weeds destroyed long before the last ploughing was given which prepared it for the seed.

"In general, the soil should be rendered as open ("bruisy") as the season of the year or the peculiar liking of the plant will permit.

"2. *The right application of manure* is one of the most difficult and important duties of the farmer. Where it is constantly required, the profits of farming will be much affected by an indiscriminate or a judicious application.

"All soils do not require the same manure. That which is beneficial on one, would be useless, or even detrimental on another. This observation especially applies to mineral manures; but it is also applicable to decayed vegetable matter, which will produce little or no effect in instances where the soil is already rich in humus; or on peaty soils, where alkalies or alkaline earths do not exist in sufficient quantities to render the humus soluble.

"Decayed animal and vegetable matter (*humus*) is of the first importance in manuring. Without its presence in the soil, the application of mineral manure will be of little service. If it does not exist naturally in the soil from the decay of vegetation, it must be supplied artificially.

"Humus is particularly necessary in the early stages of vegetable growth, in order to nourish the plant

until its leaves be sufficiently expanded to enable it to procure a portion of its food from the air. It should therefore be well fermented before it is applied; but as vegetable matter gives off much of its fertilizing properties during fermentation, it should be mixed with a sufficient quantity of earth by which its virtue would be imbibed and preserved.

"It appears that three-fourths of the substance of the plants usually cultivated is derived from the air; and it is on this fact that the principle of green manuring is founded. *If a crop of clover be grown, and ploughed in when it begins to flower, it will give to the soil four times the quantity of humus it extracted from it.* Land which is rich in the inorganic food of plants, may in this manner readily be furnished with a proper quantity of humus. It is manifest, that all the organic matter taken from the soil is not again returned to it; and therefore without the supply of vegetable food in the gaseous form from the atmosphere, all lands would become gradually impoverished and eventually sterile.

"The vegetable fibres in a soil prepared for tillage are much more valuable when rotted than when burnt. In the former case they are converted into humus; in the latter, the organic portions are driven off into the air, and only the salts and earth remain. Burning should therefore be adopted only where vegetable matter is in excess, or where weeds cannot otherwise be extirpated.

"All organic manures act by yielding carbonic acid and nitrogen in the form of ammonia, and their relative value is nearly in proportion to the quantity of nitrogen which they contain. Animal substances contain a large quantity of nitrogen, whilst only small portions of it exist in vegetables. The flesh of horses and other animals not used for food can occasionally be obtained; and when these are mixed with a large quantity of earth, and suffered to decay, they form a very rich and stimulating compost. The carcass of a horse is equal to at least ten times its weight of farm-yard manure; and would prove much more valuable to the farmer, if converted into a compost, than if sold for the kennel.

"The least valuable digested manure is that supplied by animals fed on green crops or roots; those fed on grain yield a much stronger manure; and the dung of carnivorous animals is still more efficacious.

"The following is a comparative experiment made with potatoes and different kinds of manure: exhibiting the quantity of the manure per acre, and the produce of the crops on a poor gravelly loam. The results show the superiority of nitrogenous manure:—

Manure.	First year's crop in Bushels.	Second year's crop in Bushels.
1. No manure .....	120	140
2. Night-soil, 10 waggon-loads, each 96 bushels.....	600	640
3. Night-soil, 6 loads .....	650	500
4. Do. 2 do. ....	500	300
5. Hog-dung, 60 1-horse cartloads	480	300
6. Do. 30 do.	430	160
7. Yard compost, 120 do.	480	240
8. Do. 60 do.	300	240
9. Do. 30 do.	140	140

—Nicholson's Dictionary of Chemistry.

"When a soil is well supplied with humus, the attention of the agriculturist should be directed to the inorganic constituents necessary to render the humus soluble, and which in themselves also constitute part of the food which plants require. Of these, the most important are the alkalies, potash and soda, and the alkaline earths, lime and magnesia. These exist in such minute quantities in some soils, that the abstraction of the alkalies by a few successive corn crops has a manifest deteriorating effect on the land; in so much that it becomes necessary to let it rest for two or three years, until the alkalies be again set free, and rendered soluble by atmospheric agency; or the deficiency may be supplied by artificial means, and this is the subject we now propose to consider.

"The principle by which the application of mineral manures should be directed, is generally to supply the soil with those constituents which plants require for their perfection. If any such mineral substances be wanting, *that* is the most appropriate manure which can be applied; but more particularly we should give 'to one plant such substances as are necessary for its development, but spare those which are not requisite for the production of other plants which require them.' (*Liebig*.)

"The soil which rests on the slate is very deficient in lime: hence its application has been attended with the most beneficial results; but when a proper quantity has been added, it will produce no further effect than it would on a chalk soil.

"The wheat plant requires more potash and soda for its growth than either barley or oats; the nitrates of potash and soda are therefore most advantageously applied to the wheat crop.

"Liebig has shown that the same plant, cultivated on different soils, contains invariably the same general amount of alkaline bases; and that, in some plants, one basis is capable of being substituted for another. Thus, 'when lime exists in the ashes in large proportion, the quantity of magnesia is diminished; and in like manner, according as the latter increases the lime or potash decreases.' 'Experiments have not been sufficiently multiplied so as to enable us to point out in what plants potash or soda may be replaced by lime or magnesia; we are only warranted in affirming that such substitutions are in many cases common.' It is probably owing to this circumstance that the almost general application of lime has been attended with such beneficial results; we will therefore consider its properties and operation more in detail.

"Lime in its caustic state powerfully promotes the fermentation and decay of vegetable matter; it thus causes the humus more rapidly to evolve carbonic acid and ammonia, and the plants thereby obtain a greater supply of food. When 'hot' it also acts on several of the constituents of the soil, releasing the potash locked up in the felspar and minerals (particularly clay), and rendering it soluble.

"Lime, in its mild state of a carbonate, not only improves the texture of the soil, but furnishes food for the plant; it enters into combination with humus, and forms humate of lime (the most soluble of all the humates), in which state it is absorbed by the roots. It appears, therefore, that lime as a manure, directly furnishes vegetable food; while it also calls into active operation the fertilizing properties of the soil. From its mode of action, we may deduce the rules by which its application should be regulated: the following are the most important:—

"Lime is most beneficial when applied to soils well

supplied with humus, as those which have been for a long period manured with dung, or to peaty soils.

"A continual application of lime to the same soil, without dung, will more rapidly exhaust the humus which it contains.

"Lime is especially serviceable after green manuring."

"A soil is kept in the most active state of fertility, when it is alternately manured with lime and dung.

"In corn crops, humus principally supplies food to produce a strong and healthy plant; whilst lime strengthens the stalk, and gives a well filled ear.

"3. *The rotation of crops.*—It has been shewn that while all plants require humus for their growth, they differ as to the mineral constituents which they abstract from the soil. If therefore, the same plant be successively cultivated, the soil rapidly becomes exhausted of that particular kind of food which it requires. This is one of the circumstances on which the necessity for a rotation of crops is founded; and it points out the rule by which that rotation should be regulated: viz., those plants should be cultivated in succession, which extract different kinds of inorganic food from the soil; and the rotation should be so ordered that all the various fertilizing properties of the soil should, by the change of crops, be successively called into requisition.

"We find from experience that some plants are prejudicial to the growth of others, and that they will not both thrive together, nor if cultivated on the same soil in successive years. "Wheat will not grow on a soil which has produced wormwood, and *vice versa*, wormwood does not thrive where wheat has been grown, because they are mutually prejudicial by appropriating the alkalies of the soil. It is evident that two plants growing beside each other will mutually injure one another, if they withdraw the same kind of inorganic food from the soil. Hence, it is not surprising that the wild chamomile and Scotch broom impede the growth of corn, when it is considered that both yield from 7 to 7.43 per cent. of ashes, which contain  $\frac{1}{10}$  of carbonate of potash. The dandelion and fleabane blossom and bear fruit at the same time as corn; so that when growing, mingled with it, they will partake of the component parts of the soil; and in proportion to the vigour of their growth, that of the corn must decrease; for what one receives, the others are deprived of." (*Liebig.*)

"Some plants especially require alkalies for their growth, another species require phosphate of lime, another phosphate of magnesia, and several do not thrive without carbonate of lime.

"Most plants extract alkalies from the soil, but in very variable quantities. The wheat crop withdraws most of the silicate of potash, which is in a soluble state; and the land requires to be rested and exposed to the action of the weather, in order that a further quantity of potash may be released. This is the chief benefit resulting from fallowing, and is the principle on which it is grounded.

"But it is found, that if plants which require only small quantities of potash are cultivated after wheat, and the soil well pulverized and exposed, the benefit of fallowing is to a great extent obtained, and a valuable crop raised in addition. Thus turnips, potatoes, rye, buck-wheat, clover, lucerne, and sainfoin, require very little inorganic food, as they contain very minute portions of soluble salts. These may, therefore, be cultivated, instead of allowing the land to lie fallow. Nor will they exercise any influence detrimental to the corn which is grown immediately

after them on a soil rich in humus, because they do not exhaust the alkalies which the corn plants require. Turnips also require very little inorganic food, and may advantageously be grown in rotation with corn; whilst the soil, at the same time, can be pulverized and cleaned.

"There is another circumstance from which the necessity of a rotation of crops is deduced. It has been shown that while plants absorb all soluble substances within reach of their roots, they retain only the particular constituents which form their natural food, the remainder being returned to the soil as excrements.

"When the same crop is successively grown, the matter thus expelled accumulates round the root, clogs the fibres, and partly excludes or replaces that life-giving aliment which the plant seeks to obtain. The excrements of a plant, if again taken up by the root, impede its growth; but the rejected matter of one plant is not injurious, and may be even favourable, to the growth of another of a different species.

"These excrements are compounds produced in consequence of the transformations of the food, and of the new forms which it assumes by entering into the composition of the various organs; and they are either of an acid or resinous, or of a mild and gummy nature. Until these substances are dissolved and washed out of the soil, the crop which produced them cannot be cultivated with the same success; and the time required to produce this effect will be proportionate to the capabilities of the soil, resulting from its texture, to admit the air necessary for their decomposition and decay. Quicklime, by decomposing the excrements, is a great sweetener of the soil, which it thus prepares for an earlier re-cultivation of the crop which produced those excrements. These are the principles on which the theory of a rotation of crops is founded. Analyses of the ashes of different crops would shew the nature and quantity of the food which they severally require, and point out the rotation which it would be most beneficial to adopt.

"4. *The plants cultivated.*—On a well-constituted soil, all plants suited to the climate may be successfully raised; but as some soils contain a greater portion of one kind of inorganic food than others, and as there is a great difference in their texture, it becomes evident that the most advantageous mode of cultivation is to raise *principally* those plants which, from the food they require, are best adapted to the peculiar nature of the soil.

"The analyses of different crops, compared with the constituents of a particular soil, would show what plant it is capable of sustaining. Upon this knowledge depends the most profitable application of the fertilizing properties of the soil; for by it the capabilities of the soil are made known, and its most productive energies may be called into action, and directed into the channel in which they act most effectively.

"The texture of a soil should also much influence a farmer in his choice of a crop. Some plants require a firm soil, as wheat and beans; others one that is warm and open, as barley, turnips, and potatoes. The expense of cultivating some heavy lands must also be considered. The lias and Oxford clays contain all the elements necessary to produce wheat in abundance; but the difficulty and expense of tillage is so great, that the peculiar qualities of the soils are not available; and the most profitable mode of culture is to allow them to remain in old pasture. If the texture of these soils were improved by thorough-draining, they would, for a long time, prove most productive in wheat."

## LECTURES ON AGRICULTURAL CHEMISTRY AND GEOLOGY.

By J. P. W. JOHNSTON, M.A., F.R.S.S. L. &amp; E.

Blackwood and Sons, Edinburgh and London.

We extract the following from the number for November, 1843, which is entirely devoted to the consideration of "Milk and its Products," and will be found invaluable in hints to the dairyman:—

*Separation of Cream.*—The fatty part of the milk which exists in the cream, and which forms the butter, is merely mixed with and held in suspension by the water, of which the milk chiefly consists. In the udder of the cow it is in some measure separated from and floats on the surface of the milk, the later drawn portions being always the richest in cream. During the milking, the rich and poor portions are usually mixed intimately together again, and thus the after-separation is rendered slower, more difficult, and less complete. That this is really so is proved by two facts—first, that if milk be well shaken or stirred, so as to mix its parts intimately together before it is set aside, the cream will be considerably longer in rising to the surface; and second, that more cream is obtained by keeping the milk in separate portions as it is drawn, and setting these aside to throw up cream in separate vessels, than when the whole milking is mixed together. When the collection of cream, therefore, is the principal object, economy suggests that the first, second, third, and last drawn portions of the milk should be kept apart from each other. Even in large dairies this could easily be effected by having three or four pails, in one of which the first, in another the second milk, and so on, might be collected.

"Cream does not readily rise through any considerable depth of milk; it is usual, therefore, to set it aside in broad, shallow vessels, in which the milk stands at a depth of not more than two or three inches. By this means the cream can be more effectually separated within a given time.

"But the temperature of the surrounding air materially affects the quantity of cream which milk will yield, or the rapidity with which it rises to the surface and can be separated. Thus it is said that from the same milk an equal quantity of cream may be extracted in a much shorter time during warm than during cold weather; that, for example, milk may be perfectly creamed in

Hours.	Deg., Fah.
35 when the temperature of the air is ..	50
24 do.	55
18 to 20 do.	68
10 to 12 do.	77

While at a temperature of 54° to 37° F., milk may be kept for three weeks without throwing up any notable quantity of cream (*Sprengel*).

"The reason of this is, that the fatty matter of the milk becomes partly solidified in cold weather, and is thus unable to rise to the surface of the milk so readily as it does when in a warm and perfectly fluid state.

"The above remarks apply to milk of ordinary quality and consistency. In very thin or poor milk, in which little cheesy matter is contained, the cream will rise more quickly."

## ON THE AGRICULTURAL IMPROVEMENTS OF LINCOLNSHIRE.

By PR. PUSEY, M.P.

*(From the Journal of the Royal Agricultural Society of England.)*

On a sunny morning in November, 1842, Mr. Handley having undertaken to show me Lincolnshire farming, we passed through Sleaford on our road to Lincoln, and soon entered upon a high but level tract, presenting a cultivated exuberance such as I had never seen before. Farm succeeded farm, each appearing to be cultivated by the owner for example—not, as was really the case, by a tenant for profit; and so for miles we passed on through fields of turnips without a blank or a weed, on which thousands after thousands of long-woolled sheep were feeding in netted folds; and so large as well as regular were the turnips in the narrow rows, that the lower halves which remained in the ground when the upper part had been consumed, seemed to pave these sheep folds. Every stubble field was clean and bright; all the hedges kept low, and neatly trimmed; every farm-house well built, with spacious courts, and surrounded by such rows of high, long, saddle-backed ricks, as showed that the land did not forget to return in August what it had received from the fold in December, since the number of these farm-houses, which might always be seen at one view, proved that the size of the farms would not account for the extent of the rick-yards. Yet this land, so loaded with roots and with corn, showed no mark of natural fertility. On the contrary, it is a fawn-coloured sand, about six inches deep, lying on a dry, thirsty waling stone. At length, as we journeyed on, Mr. Handley pointed out to me, standing by the side of the road, a column seventy feet high. It was a land lighthouse, but no longer since than the middle of the last century, as a nightly guide for travellers over the dreary waste, which still retains the name of Lincoln Heath, but is now converted into a pattern of farming. This Dunston Pillar, lighted no longer time back for so singular a purpose, did appear to me a striking witness of the spirit and industry which in our own days have reared the thriving homesteads around it, and spread a mantle of teeming vegetation to its very base; and it was certainly surprising to discover at once the finest farming I had ever seen, and the only land lighthouse that was ever raised. Now that the pillar has ceased to cheer the wayfarer, it may serve not only as a monument of past exertions, but as a beacon to encourage other landowners in converting their dreary moors into similar scenes of thriving industry; within living memory it was by no means useless, for Lincoln Heath was not only without culture, but without even a road. When the late Lady Robert Manners wished to visit Lincoln from her residence at Bloxholm, a groom was sent forward previously, who examined some track, and returned to report one that was found practicable. Another family from Blankney was lost on this heath twice in one night, in returning from a ball at Lincoln, and was obliged to remain upon the waste until morning.

Passing Dunston Pillar, the road continues due north for four miles along the level hill-top, through the same beautiful farms, until it dips to cross the narrow breach or valley in which Lincoln city is placed, and through which the western streams find their way to the sea, but immediately rising, passes by the lofty cathedral through a Roman arch, and

stretches along the ancient Roman way (Ermine-street) for nearly twenty miles, in a perfectly straight line northwards, upon North Lincoln Heath, over the same shallow sandy soil, but among the same neat enclosures, heavy turnip crops, numerous flocks, spacious farm buildings, surrounded by the same lofty and crowded corn ricks. Thus, in travelling due north for forty miles from Sleaford to Brigg, you traverse the raised platform of the South and North Heath, as may be seen by reference to Arthur Young's map; and during the whole time you pass through the best farming upon very moderate land, recently enclosed, as the fences themselves show; and, what struck me particularly, you not only see generally very high farming, but you see in forty miles hardly any bad farming—scarcely two or three slovenly fields. The standard of cultivation is evidently very high, and to raise this standard is of course the great means of improving the farming of any district.

During the whole day we saw to our right, on the horizon, a high range of hills stretching parallel to the heath from south to north. These were the wolds of Lincolnshire, being a continuation of the chalk hills, and it was to the northern extremity of this range that we crossed; and here, on a subsequent day, in looking over the farm of Mr. Upperby and Mr. Graburn, at Wootton, and the farms of Lord Yarborough, constituting alone 30,000 acres, I found on the chalk also the same peculiar features of high farming as upon the opposite range of the heath; again also it was in every farmer's mouth that this vast tract of hill had been redeemed, like the heath, from nearly equal desolation, within living memory, and they had certainly been brought to a state of which, having always lived upon chalk hills or near them, I could not but see the superiority. Here, then, there is a still larger range, estimated at 230,000 acres (nearly the extent of Bedfordshire), added in our own times to the corn land of England.

It being the wish of our President that in each English county an inquiry should be made into the present state of its farming, compared with the Reports made to the Board of Agriculture during the war, in the hope of fulfilling this object I have twice returned into Lincolnshire; and in order to be assured of not having ignorantly over estimated the excellence of Lincolnshire farming, have carefully examined, during the last autumn, Northumberland and the south of Scotland.

It is not until you reach the further part of Northumberland that superior farming is found. There, indeed, around Belford you find it excellent, and on the land of Lord Grey and of Greenwich Hospital,\* again, too, in following the banks of the Till, down to the Tweed: yet even between these two fine districts a moorland tract must be crossed, neglected indeed, but not barren. So again in Scotland, thirty miles beyond Berwick, arriving at Dunbar, you find, along the sea coast, some of the famous farms of East Lothian. It is an extraordinary soil, for which the tenants, farming admirably, pay the well-known rents of 4*l.* or 5*l.* the acre, which some suppose to be the common rents of East Lothian. But ride two or three miles only inland, and you find, first, land well farmed at 2*l.* per acre; then land at 1*l.* per acre—some of it very ill-farmed, foul, and out of condition; then the Lanmermoor Hills,

which are not farmed at all, but are in the same state as Lincoln Heath when the Dunston beacon was lighted nightly. Onwards again to Edinburgh, for thirty miles through the Lothians, you will see good land most excellently farmed, but sometimes also moderate land in a very slovenly state. If from thence you travel along the mail-coach road to Carlisle, on losing sight of Edinburgh Castle, you pass for seventy miles through the heart of South Scotland, over moors covered with a rank grass, which shows that they might bear something better, or among scanty corn crops, which prove that nature has been little assisted by art. I cannot, therefore, place the general farming of southern Scotland or of Northumberland on a level with the farming of our southern counties, such as Buckinghamshire, but rather with that of North Devon; nor the general farming of East Lothian on a level with the general farming of Lincolnshire, nor the best farming of East Lothian on a level with the best farming of Lincolnshire, because it is the best land only of East Lothian on which such noble examples of farming are given, while in Lincolnshire the barren heath and wold have been taught nearly equal luxuriance.

Being thus satisfied, by a journey in the north of our island, that the discovery which I owed to Mr. Haudley last year was not imaginary, but that Lincolnshire affords a very high example of farming, I had wished to lay before our Society, in detail, the various modes of management by which that excellence has been attained, but I have not enough mastered the subject. As the fullest description of a system, however, would not enable a farmer to follow that system, which he must see before he can imitate, and as my own experience had led me to the opinion expressed by Sir Robert Peel at the Lichfield meeting, that the young farmer, like the German craftsman, should enlarge his views by travelling in well-farmed districts, I will shortly state what are the objects of agricultural interest which Lincolnshire presents to such a visitor, attempting also to trace the history of its former and its recent improvements.

This great county is marked by the two ranges of hill, the heath and the wold, stretching side by side from south to north, separated by a wide level plain, which widens southwards into a district of fen containing about 350,000 acres, and forming part of the great morass that extended formerly, for seventy miles, from Cambridge to Lincoln, and was inhabited, as Camden tells us, in Elizabeth's time, by *feunen*—"a kind of people, according to the nature of the place where they dwell, who, walking high upon stilts, apply their minds to grazing, fishing, or fowling. The whole region," he adds, "in the winter, and sometimes most parts of the year, is overflowed by the rivers; but again, when their streams are retired, it is so plenteous of a certain fat grass and full hay, which they call '*Lid*,' that when they have mowen down as much of the better as will serve their turns, they set fire on the rest in November, at which time a man may see this fenny and moist tract on a light, flaming fire all over everywhere, and wonder thereat." Soon after the writing of this account, great efforts were made, amid much opposition from the *feunen*, to redeem the Lincolnshire fens by cutting new courses for the rivers, and digging main drains (or canals rather they should be called for their width), such as the North and South Forty-foot; but though the body of stagnant water was greatly reduced, still it was not subdued, so that the fen-land was worth little

\* I may mention also the farm of Mr. Nairn at Warne Mills, near Belford, and that of Mr. Jobson, of Chillingham.

even when George the Third came to the throne : I mean the true fen-land in the interior : the ground rises towards the sea, which has thrown down upon it an excellent soil of fine sand and mud. Then, however, as the main water-courses, after the labour of two centuries, were still insufficient for delivering the waters into the sea, different districts began to seek their own remedy by surrounding themselves with embankments, which excluded the rising floods ; while the rain which fell within these embankments, or downfall water as it is called, was pumped up by windmills into these chief rivers and cuts.

Mr. Young's report, which was made soon afterwards, in 1799, gives us some insight into the former, as well as into the improved state of the fens thus embanked. "In that long reach of fen," he says, "which extends from Tattershall to Lincoln, a great improvement, by embanking and draining, has been ten years effecting. This is a vast work, which in the whole has drained, enclosed, built, and cultivated between 20 and 30 square miles of country. Its produce before was very small ; letting for not more than 1s. 6d. an acre, but now from 11s. to 17s. an acre." Of another fen, Mr. Young says—"Deeping Fen, which extends most of the eleven miles from that town to Spalding, is another capital improvement by draining. Twenty years ago the lands sold for about 3l. an acre ; some was then let at 7s. or 8s. an acre, and a great deal more was in such a state that nobody would rent it : now it is in general worth 20s. an acre, and sells for 20l. an acre." After mentioning other operations, he says—"These, when carried to such an extent, are great works, and reflect the highest credit on the good sense and energy of the proprietors. Without going back to very remote periods, there cannot have been less than 150,000 acres drained and improved, on an average, from 5s. an acre to 25s." Still, however much the last generation may have exerted themselves in these marshes, there remained enough to be done by our own ; for Mr. Stone, in the year following the Report to the Board of Agriculture, writes thus :—"There are upwards of 300,000 acres at this time (1800) in Lincolnshire, suffering at least, on an average, 300,000l. a year for want of an efficient drainage, which might be carried into effect for one or two years' improved value ; and upon the borders of the county nearly the same quantity, connected with it, capable of the same improvement by similar means." This statement was certainly well calculated to stimulate the men of Lincolnshire ; and I believe that it has been well responded to by them in the forty years which have since passed. I cannot say to what extent, but must mention some of the leading improvements. The first attack was made upon a track of 40,000 acres, containing the Wildmoor, the west and east fens ; the last of which had been thus described by Mr. Young :—"Sir Joseph Banks had the goodness to order a boat, and accompanied me into the heart of this fen, which in this wet season had the appearance of a chain of lakes, bordered by great crops of reed. It is in general from three to four feet deep in water, and in one place—a channel between two lakes—five to six ; the bottom a blue clay under a loose black mud, two to two and a half feet deep." The description was certainly not very inviting, but these difficulties were overcome by the late Mr. Rennie ; the water was drawn off, the loose black mud settled down into fertile soil, the boat disappeared, the plough took its place ; and, though the expenses had been estimated at 100,000l., or 10l. an

acre, such was the land produced, that, after being pared and burnt, it yielded two or even three crops of oats in succession, of not less than ten quarters an acre, and its value was rated at 2,000,000l., leaving a profit of 1,600,000l. to the proprietors. It was in this work that Mr. Rennie established the principle of separating the downfall from the upland waters, which may be thus explained :—The whole district is so nearly on a level with the sea, that when the tide is up, there is not fall enough in the drains, or, as I would rather term them, canals, to carry the water seawards : hence their mouths are furnished with gates, which, opening from within, allow the drainage water to pass when the sea is low, but are closed by the rising tide. Mr. Rennie, however, observed that these fens were drowned not only by the rain which fell upon them, but also by the surplus of the rain falling on a large tract of higher ground, which flowed down upon them ; and it occurred to him that if, by a catchwater drain cut round the base of the rising slope along the whole margin of the fen, he could intercept these upland waters, they might be carried across the fen by a separate channel, and, having a greater fall, would discharge themselves in a higher state of the tide ; so that the lowlands, being henceforth encumbered with their own share of rain only, this *downfall* water would more easily be discharged while their sea-gates could be left open. Another recent improvement has been the general use of steam, instead of wind, for pumping the water out of embanked districts. Justly as Mr. Young had praised what had been done in Deeping Fen, this wide tract, while dependent on wind for its emersion, was sometimes reduced, we are told, in calm weather, to a deplorable state. These 30,000 acres, however, are now entirely emancipated by two steam-engines—one of forty, the other of sixty-horse power—set up at Podes-hole. These drive a large water-wheel, which, acting not by but against the fall of the water, forces it upwards into the main channel that over-rides the district ; and so this great fen is dried at all seasons. A steam-engine, however, cannot always be set up ; for, while it frees its own, it of course swells the flood which drowns other districts. But another field of improvement has been entered on, which, if carried to its full extent, will render embankment unnecessary, and also pumping, whether by wind or by stream, keeping the rivers always below the level of the adjacent lands—the improvement of their outfalls into the sea. All these fen-rivers fall into the great bay called the Wash, shallow and full of shifting mud-banks, through which at low tide they wind their shifting course into deep water. At the mouth of the Welland, this difficulty will be overcome by carrying the river itself out to sea. Here, as Dr. Buckland informs me, no wall is built, but two rows of bush-faggots are laid for perhaps 50 yards in advance on the mud, at low water, on each side of the mouth. After a few tides, these faggot-heaps are found full of a substance called warp, a mixture of fine sand and mud, which renders them in some degree solid. Another tier of faggots is then laid upon the first, and is again embodied with them by the warp. Thus the growing embankment at last rises above high-water level ; and the Welland, being now confined by its new banks, digs itself out a new channel through the yielding bottom. A fresh advance of faggots is then made, and a similar addition to the double embankment ensues. In this way has the engineer advanced three

miles into the sea, compelling the waves to cement the frail materials of their own subjugation; and by these means all the rivers of the Great Wash might be carried forward to a common outfall, so that the fen district would acquire a perfect and natural drainage. Nor is the benefit of these outfalls confined to drainage and navigation; for when the new river-banks are completed they are connected with the shore by cross embankments, and the portions of sea thus cut off are gradually filled up by warp, and become excellent land. Before we leave the south fens of Lincolnshire, I must mention a great work about to be undertaken in the neighbouring county of Cambridge—a new main channel or river, passing for more than 30 miles upwards from Lynn, through the heart of the Bedford Level, to Whittlesea Meer, in Huntingdonshire—one of the two only lakes which, as we learnt in our books of geography, belonged to the south of England. Ramsey Meer, its Cambridgeshire neighbour, has already disappeared, and fine crops of wheat are growing upon the bottom; and I rejoice to hear that, by means of Mr. Walker's new cut, Whittlesea Meer will shortly be likewise blotted out of our maps.

Leaving now the south of Lincolnshire, we find that the great central valley, as it inclines towards the north also, soon becomes a fen district; and we find too another great work of drainage—the new Ancholme River, cut towards the end of the last century, a wide canal running in a straight line for 20 miles to the Humber, laying dry 17,000 acres. Of this level Arthur Young says—"Before the draining it was worth but from 1s. to 3s. 6d., now it is from 10s. to 30s." These redeemed meadows, or carrs, as they are called, I found to consist of an unctuous peat, which derive its richness from a mixture of sediment thrown down by the former floods while the peat was deposited.

There is still one other lowland tract of which, having visited it in the summer, I wish to say a few words. It lies on the west of the western hills, partly in Yorkshire, the level of Hatfield Chase. When you ride across this vast plain, through endless corn-fields, with the distant uplands of Yorkshire and Lincolnshire for its opposite boundaries, you see a single hill which, rearing itself midway from the dead flat between them, was formerly an island, and is still named the Isle of Axholme. A great part of this fertile plain was once sea, as it would now be again if its embankments were neglected, being mostly below high-water mark. In early times the island was a strong post: thus it was occupied by a Lord Mowbray, under Henry II., but was taken by the men of Lincolnshire, who attacked it in boats. It was a refuge for some of the barons after the battle of Evesham. In the time of Charles I. the waters were drawn off by a colony of Dutchmen under Vermuyden; but during the civil war, the Parliamentary committee of Lincolnshire, fearing an attack from the Yorkshire Royalists, cut the dyke, and again interposed the sea between the two hostile counties. This great level is now generally well drained by a system of canals and side-vents, but the farmers of Axholme have not forgotten that their forefathers attended Doncaster market in boats. Having mentioned these farmers, I ought not to omit what Young says of their condition:—

"As to property, I know nothing more singular than its great division in the Isle of Axholme. In most of the towns there, for it is not quite general, there is much resemblance of some rich parts of

France and Flanders. The inhabitants are collected in villages and hamlets, and almost every house you see (except very poor cottages on the borders of commons) is inhabited by a farmer, the proprietor of his farm of from 4 or 5, or even fewer, to 20, 40, and more acres, scattered about the open fields, and cultivated with all those minutiae of care and anxiety by the hands of the family which are found abroad in the countries mentioned. They are very poor respecting money, but very happy respecting their mode of existence. They have, generally speaking, no fallows, but an endless succession of corn, potatoes, hemp, flax, beans, &c. They do nearly all their work themselves, and are passionately fond of buying a bit of land."

Such are some of the great Lincolnshire drainages, most imperfectly described. I will only add that the example might well be followed elsewhere. In the Bridgewater Level during last May, many thousand acres of young corn were deeply flooded; and nightly struggles took place, with discharge of fire-arms, between the labourers on one side of a dyke endeavouring to cut it through for the discharge of the waters, and those of the opposite district resisting the inundation. Whatever may have been already done, more might be evidently effected if those who possess the course of the water to the Bristol Channel could be brought into concert with their less fortunate neighbours. There are numberless districts also, throughout England, where the ditches are now stagnant throughout the winter, and all improvement of the land thus prevented—the remedy lying in some inexpensive cutting of a paltry brook, on which neighbouring landowners, however, cannot agree: whence these sound lands are drowned for half the year, though Deeping Fen is kept dry and firm by its steam-engines. We ought to act at last on the declaration of King James, that he would not suffer any longer the land to be abandoned to the will of the waters.

But before leaving the neighbourhood of Axholme I must mention the practice of warping, known in no other part of the world. We have seen that in the southern part of the county the sea casts down a fine mud or silt, which obstructs the mouths of the rivers, and fills up any shallows that are partially enclosed from the waves. The Humber, where it mixes with the sea, contains in dry seasons so much of this silt or warp, that if a glass tube be filled with it to the height of 15 inches, an inch of sediment, we are told, may sometimes be seen at the bottom. About seventy years ago it occurred to a landowner at Rawcliffe, that if this water were laid upon his land the sediment would be secured; and his success established the system, of which I saw an example near Axholme. The water is brought up from the Humber by a canal, chiefly made for the purpose, the level of which at high tide is much above the adjoining land. Two adjoining fields, of perhaps 50 acres, had been surrounded by a temporary bank about 6 feet high, which confined the water when admitted from the canal by a cut through its side. The tide, when I saw these fields, was retiring, and they had the appearance of a muddy harbour covered partly with water, partly with slime, but in part showing the original herbage which was not yet buried. This marine appearance was striking in an inland field, 10 miles distant from the Upper end of the Humber; still it was only the commencement of the operation, for the object of warping is not to improve the existing soil by a slight covering of mud, but to create an entirely new soil. As Mr. Young observes:—

"What the land is, intended to be warped, is not of the smallest consequence—a bog, clay, sand, or a barn-floor, all one—as the warp raises it in one summer from 6 to 16 inches thick, and in hollows or low places 2, 3, or 4 feet, so as to leave the whole piece level. Thus a soil of any depth you please is formed, which consists of mud of vast fertility, though containing not much besides sand, but a sand unique."

The owners of the canal charged in this case 15*l.* per acre for the use of the water, but the benefit corresponds with the price; for this new soil will sometimes bear wheat and beans alternately, with an occasional naked fallow, for twelve or thirteen years without any manure; and the crop, Mr. Young says, should be 30 or 36 bushels of wheat, 60 of beans. An acre was once measured to produce 99 bushels of beans. Yet, even for such an improvement, there is great enterprise in the landowner who expends 15*l.* per acre; and great confidence in that landowner's spirit must also have been entertained by the adventurers who risked their capital on a canal with the hope of selling the water, or rather the future land, at such a price. This practice is now imitated in the same neighbourhood, by a process which, until it was shown me by Mr. Childers, I could not believe to be practicable. The site is over the borders in Yorkshire, but the operation ought to be put on our Society's records. Mr. Gossip having purchased, about Hatfield Chase, 4,000 acres of worthless, deep, quaking bog, devoid of any mineral matter, for a trifling sum, found that near it, in the bed of a river which had been abandoned when a straight cut was made for draining the level, he possessed a deep and extensive bed of warp with which the deserted water-course had been silted up during the temporary return of the waters when the works were destroyed; and he conceived the plan of spreading this deposit over his barren waste. On visiting the spot we found a quarry of several acres excavated to the depth of 30 feet in the bed of warp—the loaded earth-waggons being drawn up an inclined plane by a steam-engine fixed at the quarry's mouth, travelling thence along a railroad over the moor, and depositing their loads, in a regular coat 8 inches deep, upon its surface. When they had thus covered the bog on each side of the railway, as far as it reached, an enormous but manageable machine proceeds to the extremity, takes up each piece of the railway as an elephant might with his trunk, and deposits them in a fresh line upon the uncovered morass. Thus you see the thick sheet of firm and fruitful soil steadily spreading over the hopeless quagmire; and you pass, at a single step, from the Bog of Allen to the Vale of Aylesbury or of Whitehorse; for you not only see oats sown in March upon land made in February, but beans, the surest sign of a good staple, upon the new soil of the former year.

The expense is about 15*l.* per acre, the first cost of the land was 3*l.*; and it is now well worth 25*s.* to rent. This is not, however, an example which can be followed; for scarcely could such a mine of soil, capable of supporting vegetation at once, be worked elsewhere to such a depth, though Mr. Everett informed me of one such deposit found in the United States. Nor, indeed, could water-warping itself be generally adopted, though along the banks of the Trent, Air, Dun, and other streams of the Humber, it has been followed up with great spirit since Mr. Young's time, to the extent of 50,000 acres, if I am rightly informed; and the tide has been thus set to work upon land near Gainsborough, which is 20 miles up the Trent, and 60 miles distant from the

open sea. It is by simpler processes, however, that farmers generally must be contented to work; and in the fens of southern Lincolnshire may be seen an excellent example of changing the soil, not indeed by laying down another upon it, but by tempering the surface anew with a material which nature has hidden beneath it. I mean the claying of peat, which has been described in our Journal, but must not be omitted from the great improvements of Lincolnshire; its effect may be conveniently seen in the Digby, the Dorrington, and other fens, not far north of Sleaford. Mr. Cooke, of Digby, has given a plain and practical account\* of the process to this effect. The peat of that neighbourhood is poor and hollow, producing naturally not more than 5 quarters of light oats, worth 20*s.*; and 20 bushels of very light wheat, fit only for seel, worth at the time 50*s.* per quarter. Beneath this peat, however, is found, at a depth of 4 feet, a blue soapy clay. Trenches, then, are dug down to this clay, at the interval of 11 yards across the field, and a large quantity of the clay thrown out from their bottom upon the surface, after which they are filled in. The operation costs only 54*s.* per acre; but henceforth the land produces 30 bushels of good wheat, worth more by 8*s.* per quarter, so that very bad land is changed into very good land for less than 3*l.* This cheap transformation of soil has been carried out with great spirit in the Lincolnshire fens, since Mr. Young's report; and as he does not speak of the process, the whole credit of it is due, I suppose, to the present generation of farmers. Another transformation of the same character has been executed, with equal vigour, by the employment of chalk; and as this process takes us out of the marshes where we have so long lingered, and leads us upon the high wolds, I will now endeavour, in discharge of my task, to trace the farming history of these hills, examining what had been done by the last generation when Mr. Young wrote, and how much the farmers of this century have improved upon what they had received from their predecessors.

Of this high range, equal in extent, as I have said, to the county of Bedford, and now a pattern of neat fences and good farming, Young says, in 1799, "Forty years ago it was all warren for 30 miles, from Spilsby to beyond Caistor" (indeed the present Lord Yarborough remembers when, in riding from Spilsby, the southern point of the wolds, to his own seat at Brocklesby, many miles beyond Caistor, and in sight of the Humber, he met but two fences); "and by means of turnips and seeds, there are now at least twenty sheep kept to one there before." Having visited these hills in 1760, Mr. Young is an unimpeachable witness as to their former condition. Great improvements, it appears, had taken place between his two visits, for elsewhere he says,

"Remembering as I do this county, about forty years ago, no circumstance in it surprised me more than the astonishing change effected in respect to the turnip crop. At that time there was scarcely a turnip to be seen where now thousands of acres flourish; and the few sown in the whole county were unhoed, except by here and there a gentleman. This has been a most meritorious progress, closely attending *that first of improvements, enclosing heaths and wastes.* The crop is not yet perfect in the hands of all farmers; but immense tracts are very well managed, and, by many persons, in as capital a style as any in Norfolk."

After all these improvements, however, there still

\* See Journal, vol. ii., p. 406.

remained many wide wastes, as we find in gathering the state of these hills from the scattered remarks of Mr. Young, in 1799. Thus he says in one place, "From Louth to Caistor, 18 miles, 10 of it are warrens, chiefly silvers" (that is, the rabbits); "rent 2s. an acre."

Again, "The wold land about Louth, to the west and south-west, is good; very generally a dry, friable, loamy sand, on a flinty loam, and under that chalk everywhere: this is the soil on the warrens between Gayton and Tathwell, which I passed, and I was much hurt at seeing such land so applied. I exclaimed to Mr. Clough on seeing it; he replied, 'Oh, it is good for nothing but rabbits; what would you do with such poor land, two or three miles from the farms?' When men have long been accustomed to see rabbits on such deserts, and hear only that they are good for nothing else, they come to think with their neighbours, let the absurdity be what it may."

Turning from the south of Louth towards the north, Mr. Young says again,—

"The tract of wold north of Louth, by Elkington, Ormesby, Wyham, Binbrook, Swinhop, Thoresby, &c., exhibits a great variety of excellent soil—all calcareous, friable, sandy loams, on a chalk bottom—dry enough to feed turnips, and much good enough for wheat. The red chalks are particularly good, being almost without exception excellent for turnips and barley. At Thoresby Warren the vales are red, and nettles are among the spontaneous growth. Nettles and rabbits together!"

These warrens have all disappeared; but let it not be imagined that we have no similar waste of land in our own days. Often, I must say, on the shooting moors of Somersetshire and Derbyshire, and Scotland, have I also wondered at seeing such land so applied, and passing among bright fern that tufted the strong heather, could have exclaimed, "Fern and blackcocks together!" But on those moors I will venture to make a few remarks presently, and will only quote one more passage, which I met with in Mr. Young's report, describing the Lincolnshire chalk-hills in 1799, towards their northern extremity:—

"Near Brocklesby, &c., there are large tracts of excellent land under gorse; and at Caburn and Swallow I passed through the same for miles. It is a beautiful plant to a fox-hunter. Lord Yarborough keeps a pack of hounds: if he has a fall, I hope it will be into a furze-bush; he is too good to be hurt much, but a decent pricking might be beneficial to the country."

I must say that when Mr. Handley pointed out to me this estate in 1842, then entirely unknown, its fine farm-buildings, on which 150,000*l.* have been expended, surrounded by lofty ricks, its 30,000 acres of good turnip-land, divided by clipped hedges of thorn, where Mr. Young saw miles of gorse, and of course thousands of rabbits, I thought I had made the discovery of a domain equal in the spirit, magnitude, and rapidity of its improvement to the well-known estate of Holkham; and having seen it again last October—though, in consequence I suppose of the weather, the turnips did not look so well as before—I think so still. Mr. Young was informed by the late Lord Yarborough, that his wold-land then let for 5s. an acre. I may state that, tithe free, it is now worth five times that amount; and great as is the change on the Brocklesby estate, it is not greater than the general change of these chalk-hills. The first step was of course grubbing the furze, paring and burning the rough peaty grass; the latter

costing a guinea per acre. Then there was brought a heavy dressing of chalk, 80 cubic yards to the acre, costing at the time 66s.; last followed 60 bushels of bones, for bones were cheap in those days, and a bushel cost but 1s. 3d., making another item of nearly 4*l.* I am told that the wolds have been chalked twice over; and that, without chalking, the turnips are destroyed by the excrescence called "fingers and toes;" but even the first outlay of the tenant amounted to more than 8*l.* per acre—a great sum for the individual farmer, and a very large amount upon the acreage of the whole district. And here, though I would by no means argue against the granting of leases, but think, on the contrary, that when a tenant is ready to sink his money upon a farm, he is entitled to that security, if he desire it; I must state in fairness that this large sum of 8*l.* per acre, or 8,000*l.* on a farm of 1,000 acres, has been expended on the farms of Brocklesby (according to the practice of Lincolnshire) only through well-merited confidence in the owner; and I must also mention, that whereas in East Lothian, where leases run in general for nineteen years, the lease and the tenancy are often ended together; here, on the other hand, the farm, though on a yearly tenure, passes almost as a matter of course from father to son; in one case, when a farmer dying left a son three years old only, two neighbouring tenants undertook, and were allowed by the landlord, to manage the farm for the infant, in trust until his majority. Nor has the spirited outlay on the part of the farmers been without its return. The parish of Limber, 4,000 acres, was formerly let to four tenants, at 125*l.* each, or 2s. 6d. an acre, and all four became bankrupts. It has been enclosed, is now well farmed, excepting what has been planted, and at the present rent the tenants are doing well. In some instances considerable fortunes even have been made. I may cite the case of Mr. R. Dawson, well known in the county, who occupied the entire parish of Withcall, 2,600 acres of ploughed ground, with one barn at the homestead. He was one of the first who ventured a heavy outlay upon his land; his yearly bill for bones alone was from 1,500*l.* to 1,800*l.* A friend, who staid at his house for three days about 1835, tells me that he thought Mr. Dawson's management the perfection of farming; and you might see a single field of 350 acres in turnips. He died a few years since, and left a large fortune. Such instances, of course, are uncommon; but I believe that what Arthur Young observes, in his "Six Months' Tour," is perfectly true, namely, that large fortunes can only be made in farming by the spirited cultivation of land which had been previously ill-farmed, or of absolute waste. The three points of ordinary chalk-farming in Lincolnshire are—first, thorough chalking of the land, repeated when the first covering of chalk is worn out; secondly, boning the whole of the turnip crop, at 12 or 16 bushels per acre, to which farmers are often bound by their agreements; thirdly, keeping always in winter a large number of horned cattle in the yards, which being fed on oil-cake, convert the straw into excellent dung. This practice, though almost unknown in the south of England, is common in the eastern counties and in the Lothians, but with an important difference. In the eastern counties the beasts receive turnips drawn from the land, and in the Lothians are fed mainly on turnips, which in the North growing more slowly are more nutritious than in the South. But on the light lands of Lincolnshire the farmers say that their weak soil cannot spare the turnips—that is, cannot spare the manure which the sheep

would make from those roots upon the land where they grow. Instead, therefore, of drawing home their turnips, they purchase large quantities of oil-cake (80 tons perhaps, upon a large farm costing 600*l.*), by the aid of which their beasts thrive on the straw, and the manure is at the same time enriched. This peculiar practice appears to me so important that I inquired into its details. The cattle are bought in November, and kept loose in separate yards, 10 or 15 together; and such is the abundance of straw, that I have seen a gate hung between two of these yards nearly three feet high, that it might have room for opening at the close of the winter. The number of beasts thus wintered upon a farm of 1,000 acres varies from 70 to 100, or more. There are two kinds of beasts purchased, and hence two kinds of management. Generally young beasts, two year olds, are bought in for about 8*l.* a-head—no small outlay of capital in addition to the ordinary stock of a farm; and without of course attempting to fatten them, the farmers give to each about four pounds of linseed cake daily. They are thus kept growing, perhaps slightly improving, through the winter; and when they are sold in the spring, the increase in their value is expected just to clear the cost of the cake they have eaten, though it has been also stated to me that if the beasts repay half the cake they have eaten, the farmer still thinks himself well rewarded. Another method is to buy in three-year-old beasts, to give them first eight pounds, then twelve pounds, at last as much as sixteen pounds daily; so that when these beasts are sold out in the spring, also, they are three quarters fat, and ready to be finished elsewhere at grass. These, however, like the others, only pay I suppose at most the bill for oil-cake, and are what the Lincolnshire farmers call them, machines for converting the straw into dung. But it is oil-cake dung, not the litter trampled by a few horses or pigs, and turned by the rains into the semblance of dung, which we frequently see in the south: and as the third horse is cast off from the plough upon our light land, southern dung, if it can so be called, will become weaker. We feed our sheep, indeed, sometimes more rapidly, and so recompense our land in some degree; but in the manufacture of dung I must admit that we are distanced. It also strikes me that this Lincolnshire process might be applied to a kind of soil for which so little new help has yet been struck out—I mean the cold, heavy, almost hopeless, clays. Drain them as we may, there are many tracts of such land on which roots cannot be grown; or if roots be forced to grow, the injury done to the land if folded by sheep, or by carting the roots away, more than counterbalances the advantage, as Mr. Handley informs me that he and other farmers have found by experience. How then is good dung to be made upon such a farm? I should say by transferring to it the Lincolnshire method. It is true that the straw is usually short and thin on such land; but I do think, and I hope the suggestion will not appear theoretical, that if on such a farm, after draining and dressing it with burnt clay, the bulk of straw were increased, by applying guano, for instance, to the oat crop,\* and if that straw thus increased were

\* It is proposed to apply the guano to the oat rather than to the wheat-crop, because the slightest excess of stimulating manure applied to wheat brings the risk of mildew. Where guano has been drilled with wheat on a cold clay I have seen injury produced to the crop on the crown of the ridge, while the effect near the furrow was good. On the same farm the tenant

used by cattle with oil-cake,\* a new face might be given to its cultivation. The method would then be equally important for soil which is so light that the turnips grown on it cannot be drawn without weakening the succeeding crop, and for land which is so heavy that turnips cannot be grown on it, or, if grown, cannot be removed without trampling it into a state of clay. There is no doubt, at all events, that the practice answers upon the wolds, where a farmer would as little think of holding his farm without sheep on his turnips, as without beasts in his yard. It is equally general upon the opposite range of Lincoln Heath, where, if the reader will now cross the great central plain of the county, we may close our survey of Lincolnshire farming.

This range, which I have already endeavoured to describe as it was shown me by Mr. Handley, had lost none of its agricultural beauty in last October; but I need not, as on the wolds, establish by evidence its former barrenness, since of that the Dunstan Pillar is still a visible witness. One passage of Mr. Young's report, in 1799, will be therefore enough:—

"The vast benefit of enclosing can, upon inferior soils, be rarely seen in a more advantageous light than upon Lincoln Heath. I found a large range which formerly was covered with heath, gorse, &c., and yielding, in fact, little or no produce, converted by enclosure to profitable arable farms, let on an average at 10*s.* an acre, and a very extensive country, all studded with new farm-houses, barns, offices, and every appearance of thriving industry; nor is the extent small, for these heaths extend near seventy miles, and the progress is so great in twenty years that very little remains to do. The effect of these enclosures has been very great; for while rents have risen on the heath from nothing in most instances, and next to nothing in the rest, to 8*s.* or 10*s.* an acre, the farmers are in much better circumstances, a great produce is created, cattle and sheep increased, and the poor employed."

This is indeed a bright picture of wide and rapid improvement drawn at the close of the last century; and Mr. Young might well say that little remained to do. But has nothing been done? Under another head of his report, "Amount of Crops," I find the following entry—"In the enclosures from the heath—crop of barley, three quarters; oats, four; no wheat." And in my own note-book, taken on the same heath in the present year:—"barley, six quarters; oats, none—since they are too poor a grain for such farms; wheat, four quarters, sometimes five,"—a warning that in farming as in other pursuits, we should not say "very little remains to do." This latter amount of crops, too, was noted upon a farm which is thus spoken of by Mr. Young, even in 1799, when the general enclosure of Lincoln Heath had been carried out; it is under the head "Wastes." At Blankney and its vicinity Mr. Chaplin has 3,000 or 4,000 acres of warrens let at the highest at 3*s.* 6*d.* an acre, some at 2*s.*" This very land was enclosed by

had used guano with advantage on wheat by hand-sowing it in March on the parts near the furrow, and afterwards hoeing it in. The result of the guano so applied was very favourable.

\* I do not mean that cattle so wintered must necessarily be kept on oil-cake. There is no doubt that the farmer might use spring-corn grown upon his own fields. Mr. Graburn informs me that the oil-cake imported into and produced last year at Hull amounted to more than 30,000 tons, which must have cost the farmers of Yorkshire, Lincolnshire, and Nottinghamshire, as much as 160,000 quarters of barley.

the present Mr. Chaplin as lately as the year 1823, a year of the lowest depression for agricultural prices and spirits, so that his undertaking was spoken of as an act of absurdity; but Mr. Chaplin was not disturbed nor discouraged. On one of these farms which he then established at Temple Bruer, his tenant, Mr. Frankish, a practical farmer, now advanced in years, has been steadily pursuing a system of farming, so admirable that I must state the details, though its merits, I fear, can only be appreciated by other farmers. The soil is a yellowish sand, about six inches deep only, and on a dry walling-stone rock. The extent of the farm is about 700 acres, of the same light shallow soil, all under the plough. The rotation is the common four-course one—turnips, barley, clover or grass seeds, and wheat.

The peculiarity is in the number of dressings purchased and successively applied to these crops. The ordinary number of dressings varies in other districts where this four-course system prevails. Thus on one farm of my own, the land during the four years' rotation only received a little poor dung, or rather rotten straw, at wheat-sowing. The turnips, if any turnips grew, were fed off by breeding ewes, who sometimes obtained rough hay, and who in one season, as I found, obtaining only mouldy pease-straw, had lost one-half of their sucking lambs, which they could not sustain. Such starvation of land, and far worse of animals, is, one must hope, extraordinary also. A better treatment is to give dung to some of the turnips, and to buy woollen rags for part of the wheat. A further step would be to fatten off the young sheep when they are a year old, giving them corn with their turnips; and this could not be called bad farming, if the soil had any depth or natural strength; but the farm at Temple Bruer has neither depth nor natural strength, and I will state how these two defects are supplied by its tenant beginning with the turnip crop as the foundation. This crop is sown with 16 bushels of bones, and it is fed off upon the land by sheep receiving oil-cake, which may be regarded as a dressing for the following barley crop. In the next year, after the barley is mown, follows a dressing which will surprise many farmers. The dung of the whole year, which I saw in a vast mass, cleared out of the yard in October, enriched with oil-cake that had been purchased for sixty beasts wintered there, is laid at Christmas upon the barley stubble for the benefit of the artificial grasses which follow. Of these grasses or seeds, as they are called (among which two pounds of parsley are sown, a common Lincolnshire practice), only one-third is made into hay and carried off, two-thirds are depastured and return again to the ground. Observing too that troughs were set out upon these seeds last October, I found on enquiry that they contained oil-cake for fattening ewes; and that this is a growing practice, the ewes receiving each a pound of cake daily. Last follows the wheat-sowing; and not content with having spread the whole of his oil-cake dung upon the seeds at the previous Christmas, or with having fed off two-thirds of these seeds upon it in the summer, and so restored to the ground what it had brought forth, or even with having given oil-cake to his ewes in October upon it; this practical farmer buys rape-cake, which he throws on his land at the rate of 4 cwt. to the acre, when he has ploughed the ground and pressed it for wheat sowing. Thus in the four years' course the turnips obtain bones, purchased; the barley obtains oil-cake eaten by the sheep, purchased; the seeds obtain the dung made with oil-cake that has been purchased; and the

wheat obtains two-thirds of the seeds fed on the land; oil-cake for the fattening ewes purchased, and rape-cake at its own seed-time also purchased. This repetition of dressings is, I should think, quite unexamined. The result is noble crops upon land for which a few years since the rent was paid by two rabbits an acre. The yearly outlay, indeed, on manures may well amount to a second rent; but the tenant (who occupies other farms also) is regarded as a prosperous man. Another farm of 1,000 acres, enclosed at the same time by Mr. Chaplin from the same warren, is held by a tenant who last year kept 110 beasts in his straw-yard, and bought 80 tons of oil-cake. The beasts could not have cost less than £1,000, nor the oil-cake less than £640. This expenditure, it should be observed, is not in diminution of the investment in sheep, the ordinary stock of such land. Indeed it appeared to me, on the contrary, that the flocks of sheep were unusually numerous, and the following statement seems to bear out that impression:—A farm of 500 acres, having 125 acres of turnips, is said to winter from 10 to 12 sheep per acre, that is from 1,250 to 1,500 sheep. The breed, too, is the improved Lincoln, which, though very inferior to the Down sheep in quality, exceed them in weight, and consequently in their demand for food, in the proportion of 5 to 4; and these sheep are in addition to 40 or 50 beasts in the straw-yard. Such is Lincoln Heath, lately a warren; now on a bright frosty day in December like a sheep market. It remains only to show how far the example of Lincolnshire farmers may be imitated in other parts of the country; but first I ought to mention some points in which I think their own farming might be improved.

Their ploughs, though drawn by two horses, excepting on heavy land, where three are employed, are heavy swing-ploughs, for which the new light wheel-ploughs ought to be substituted. In some points too, East Lothian has surpassed them. The Lincolnshire horses are slow; the Clydesdales quick, stout, and in higher condition. The Lincolnshire waggons are very ponderous masses of timber. In the north, light one-horse carts only are used: and here, as the question of carts or waggons is an important one, I will mention an experiment lately made at my request by three Berkshire farmers living near Farringdon. Mr. Edmunds, who has lately introduced one-horse carts, and Mr. Brookes, who employs the light Berkshire waggon, agreed to compare the quantity of wheat carried by them from two fields of similar crop, along the same kind of road, to their homesteads. The result appears in the following table:

MR. BROOKES—3 WAGGONS.				
Driving lads.	Time. h. m.	Distance in Furlongs.	Horses.	Acres of Wheat cleared
2	4 50	5	7	5
MR. EDMUNDS—4 CARTS.				
3	5 0	4 $\frac{2}{3}$	4	9

The crop carried with waggons was a little thicker upon the land than the other, but not so much so as to make much difference in the trial. It was necessary also to try the one-horse system in the other branch of farm-carriage, the carting of dung. This was done by Mr. Harris, of Hinton. One day he led the dung with his own three-horse carts; the next day he led it to the same field with the one-horse carts of Mr. Edmunds. The strength employed was as follows:—

	Carts.	Driving lads.	Horses.
Three-horse carts	4	3	10
One horse carts	5	4	5

Though the horses on the first day doubled those on the second in number, Mr. Harris carried nearly or quite as much dung on the second day as on the first. These two trials seem decisive in favour of one-horse-carts, which are used, not in the North alone, but in Bedfordshire and neighbouring districts; and as a cart with a moveable harvest-rail may be bought for £13., I have now no longer any doubt that, unless on very deep land, if a farmer will part with all his waggons and heavy dung-carts, buying a complete set of light one-horse carts in their room, he will be quickly repaid by the large immediate saving in horse-keep.

Again, though the farm buildings of Lincolnshire are excellent, I was sorry in some of the yards to see the numerous cattle standing shelterless in the midst of a snow-storm. These yards should at once be furnished with sheds, for the beast's sake and his master's. One more improvement only I will beg to suggest. After passing through north Northumberland or East Lothian, one misses in Lincolnshire the high steam-engine chimney which in those districts towers over every farm-house, and though travelling steam-threshing machines are partially used in Lincolnshire, the large farms at least should, I think, have a fixed one. A steam-engine has been already set up on Mr. Uppleby's farm at Wootton, of which his relative, Mr. Graburn, gives the following account:—

"The disc-engine exceeds our expectation in every respect; it is easily managed without the employment of an educated engineer, and has hitherto required no repairs. At present we thresh and winnow grain by steam, cut chaff, grind and dress corn, flatten linseed or beans, and break cake. Bones we propose breaking, and also the steaming of chaff. We have not reduced our number of horses, having undertaken our own 'marling,' or chalk leading, which is generally contracted for; but we are convinced that four horses out of eighteen will eventually be saved by the use of steam."

The disc-engine, which from its simple form is the best I believe for farmers, was put up for Mr. Uppleby by our consulting engineer, Mr. Parkes. These improvements, if they be such, will doubtless be made by the farmers of this county, for the face of their fields shows that their minds have not been closed to enquiry. They have one advantage indeed in those fields which must not be passed over—their size I mean—which varies from 30 to 50 acres, and their clipped hedges uninjured by trees—an advantage which will be felt by farmers from the west side of England, whose 4 or 5 acre fields are half overshadowed by trees. One farmer indeed in Devonshire lately grew, I was assured, 100 acres of wheat in fifty different fields. The profit of the trees which grow in these fences cannot compensate for the land which they injure. I have seen turnip-fields in which one-third of the crop has been spoiled by the hedgerow timber, partly through the dripping from the leaves, but in great part by the roots, whose fine threads shoot up amongst the turnips into the freshly-ploughed ground, and sometimes clog the harrows in the following spring. It is clear that, though the landlord's trees may be permitted to stretch their roots through his own land, when that land, poor and starved, is left on the old system of farming to its own natural efforts, they cannot be entitled to forage upon manure bought at a heavy expense by the tenant; and though the forest-

like appearance of such small wooded enclosures is very beautiful, still, were the fences removed,\* one-fourth might often be gained to the land, while a few trees spared give to the open farm the appearance of an arable park. In Lincolnshire, however, perhaps the opposite fault of too bare exposure should be corrected by the plantation of screens, and the piercing winds of winter and spring be thus mitigated.

It remains only to inquire how far the methods of farming, so successful on light land in Lincolnshire, are applicable to other counties; and it so happens that the wolds of that county are but a part of the great range of chalk-hills which traverse the south of England. Now, one feature of chalk-farms in Lincolnshire is that they contain no waste ground. But on our southern chalk-hills, the forze-bushes, of which we only read on the wolds, have not disappeared. These should clearly be grubbed, and in proof that this may be done with success in the south also, I may cite a farm of 360 acres, at Kingswood, upon the Surrey chalk-hills, inclosed in 1815, grubbed, pared, and burnt, the ashes ploughed in very *thinly* and chalked, as the tenant informs his landlord, Mr. Alcock, and now worth 14s. an acre. "Near Kingswood," however, Mr. Alcock states, "there are Banstead and Walton commons, together between 2000 and 3000 acres of land. I should suppose," he adds, "that their annual value is not more than 3d. or 4d. per acre, but I do not hesitate to say that, if enclosed, they would be worth 14s. per acre." A larger portion of uncultivated surface on our southern chalk-hills is down-land, on which the sheep feed by day, but do not remain at night, so that, year by year, the natural strength of this land is thus carried away to more favoured fields. All these downs a Lincolnshire farmer would bring under the plough; and though, if downs

\*The improvement which may be produced by the removal of old fences is described in the following statement by Mr. Keeling, a Staffordshire farmer:—

"At the request of Lord Hatherton I send you the measurement of the two large fields at Yew-Tree Farm. The turnip field is 65 acres; it was two years back, at the time I entered upon the farm, in eight enclosures: I have taken up 1,944 yards of fences, and intend dividing it into three fields; it will take 800 yards of new fence. The field in which I was subsoling is 42 acres; it was in six enclosures. I took up 1,264 yards of fences. If I divide this field it will take 300 yards of new fence. The land Lord Hatherton mentioned on my Deanery Farm was originally in 27 enclosures, 91 acres. I took up 4,427 yards of fences; it will now lie in five fields, and will take 1,016 yards of new fence, a part of which are planted.

"I really cannot say what land is gained by the different operations, but some of the fences were from three to four yards or more wide, that the plough never touched; my new fences are upon the level without ditches; in the whole of the old fences there were a great number of ash-trees which are all stocked up, as well as a good part of the oak, only leaving a few for ornament and shelter. I think the greatest gain in land will be from getting rid of the trees.—*Conger, Nov. 30th, 1843.*"

Mr. Keeling, it will be remarked, after the extensive clearance by which he has thrown twenty-seven fields into one field of 92 acres, subdivides it again into five fields. My own tenants do not generally wish to have more than one ploughed field on a farm. Ph. P.

after ploughing, be first sown with two or three crops of corn in succession, then left to casual grass and the sheep, their last state would be worse than their former condition, there can be no doubt, on the other hand, that if they were handled as in Lincolnshire, with artificial manure, their value, as property, would soon greatly increase, and that this new field of employment would much encourage the labourer. It may be said that the soil is thin on our downs; but on these wolds, soil not five inches deep bears excellent corn. Subject, of course, to exceptions, our downs, I believe, should be broken up; and a tenant should be encouraged to do so, provided he undertook by agreement, as at Brocklesby, to bone the land in every rotation. Another feature of Lincolnshire farming is, that not only is the whole farm in fields, but that, however large the farm, all the fields are treated equally well: while on other parts of the chalk-hills, an outlying field may be used for twenty years without any manure, because it is too distant from the yard for the carriage of dung, and lighter manures are not bought for it. The third point is, that not only are all the fields of a farm formed by an equal standard, but that the standard of the district is a very high one. On every part of the southern chalk-hills there may be individual farms as highly manured as the Lincolnshire Wolds, but I know of no part where so heavy an outlay on manure is the universal rule of the country.

The Yorkshire Wolds, I may add, have been treated almost in the same manner, and this outlay appears to answer in the hands of one Yorkshire and of two Lincolnshire farmers, who have settled upon our southern chalk-hills. A lesson from these wolds might thus be read, I should think, wherever the chalk stretches, even as far as Dorsetshire; but the example of Lincoln Heath is capable of an application far wider. In 1780 it was a tract of well-known desolation for nearly 70 miles, as Young informs us. Within twenty years nearly the whole of it was enclosed and studded with buildings; now it is a pattern of farming. Might other ranges of heath, as yet equally dreary, be rendered in the next twenty years, not less cheerful or fertile? I believe that they might; and as heath-land forms a large portion of our improveable wastes, which, in England, amount to 4,000,000, and in Scotland to 6,000,000 of acres—as whoever recommends an improvement, is bound to show the means of its execution—and as I should not presume to recommend this change without having examined many heaths for the purpose, I may be permitted to enter into some detail on the improvement of heaths.

Since it is better to speak of individual cases than to deal with a matter vaguely, I will mention first an extensive tract of heath which fills the western end of Somersetshire. These moorlands occupy a wide range of hills, or rather low mountains, interrupted only by deep, narrow, and beautiful glens; of which the sides, almost too steep to be climbed, are feathered with oak coppice; while the bottom is occupied by streams which dash along rocky beds, sometimes in a continuous waterfall. The wild stag has not yet disappeared, and is often followed in a straight course of 20 miles across these western highlands. On returning to the Exmoor country in 1841, I was surprised to find that moors which had formerly appeared to be fitted only for the pursuit of the blackcock and the deer, consist in great part of sound land—not in my own opinion merely, but in that of the farmers, one of whom said to me, "Here was land enough idle to employ the surplus population of England." The expression, I now believe, would be literally true if applied to the

country at large. On the Exmoor wastes you find the heath growing knee-high—a proof that the land has strength; you frequently find tall ferns mixing their bright green or yellow fans with these purple bushes: yet fern is an unfailing sign that the land has depth as well as goodness, and wherever ferns grow, unless indeed the elevation be too great, wheat might be reaped. But in that neighbourhood there is a wonderful indifference in the owners to the use of their land; which struck me the more, because I had not yet observed it elsewhere. These moors are divided into large sheep-walks for neighbouring farms. The sheep, a dwindled breed, are kept for their wool, and are sometimes left to die on the hills, of old age, in the snow. The rent may be 1s., or perhaps 2s., an acre. Sometimes you find a large piece of the best land enclosed with a high fence, and you hope that the owner is about to begin tilling his freehold. On the contrary, the object of this improvement is to keep out the only sign of farming, the sheep, and to preserve the best of the land (because where the land is best the covert is highest) an undisturbed realm for the blackcock. Every blackcock killed by an owner of these moors has cost more, I was convinced, than a full-fed ox; though, indeed, it is nothing new that sporting should impede farming. The New Forest was made for the deer, and Henry I. afforested 70,000 acres of fens, "doing," as Dugdale says, "for the pleasure of hunting, much harm to the commonwealth." In later times, when it was proposed to lay the fens dry, the farmers opposed the scheme obstinately, and their main argument (as I found in a curious old pamphlet) was the destruction that would fall on the wild-ducks and other water-fowl. In the last generation we have seen how rabbits resisted the long-wooled sheep; and now blackcocks and grouse, I believe, are the main impediment to the extension of cultivation. On the Somersetshire moors the sheep are indeed generally admitted, but the rent of the land, as I have said, is 1s. or 2s. an acre—quite sufficient for such food as the animals find. Yet there is land so let, for which I know that in Berkshire 30l. an acre would be a fair price; and if the landlords in Somersetshire sold some of their moors at a rate calculated on the present rental, that land I found, on riding over it, would be as cheap as any that can be obtained in the backwoods of Canada—not only as cheap, but more easily cultivated, near a much better market, and, above all, at home. Nor is this goodness of moorland confined to Somersetshire, as I have since ascertained. I may mention Tansley Moor, near Matlock, in Derbyshire, covered with heath, but also with fern. It seemed to me to require nothing but the plough to become an excellent farm. A great deal of worse moor, indeed, has been already enclosed: and a farmer informed me that, if he were allowed a field even of that inferior quality for one year rent-free, he would be content thenceforward to pay for it 10s. an acre—an important statement, as proving how trifling, in his judgment, is the outlay required for bringing this waste into a state of production; and this is a point which makes the neglect of our moors the more extraordinary.

It is about Matlock that the great central chain of moors begins which, running northward through Yorkshire and Lancashire, spreads into Scotland. I have not examined this chain, as I had hoped to do: but near Bakewell, 10 miles beyond Matlock, Mr. Greaves, an excellent farmer, showed me land which he had himself enclosed from the moor, bearing crops which would be good upon any old arable land, and that without having been drained; for though even draining is no longer formidable, now that the mat-

rials are reduced from 90s. to 21s. per 1,000 feet, Mr. Greaves's farm, like much other moor-land, was by nature perfectly sound. Between Bakewell and Chesterfield you cross the main ridge, now lying as shooting-moor, and see fern in the heather. At the summit, however, is a newly inclosed farm, of the Duke of Portland's, in a fair state of cultivation. Northwards, again, towards Sheffield, the shooting-moors occupy, I am told, good land; and at their summit, also, a single but very productive farm is to be found. In Northumberland, north of Alnwick, there is a long ridge of good moor: but beyond the borders, from a high hill near Abbotsford, between Selkirk and Hawick, you look down upon a large part of South Scotland, and east, west, north, and south, you see nothing but one ridge of moor-land rising behind another—all, I believe, reclaimable land: though these Scotch moors seem to require draining, and so far expensive. But the most extraordinary piece of waste ground is one I have just visited in England, Cannock Chase, a low ridge of 13,000 acres, in Staffordshire. The greater part has fern in the heath. A piece which was ploughed up for examination seemed a reddish, warm loam; and a gentleman who had surveyed the whole moor, told me that this was by no means the best part of it, that little of it required draining—that he should put the whole, if ploughed, at from 10s. to 15s. an acre—and that there were 500 acres, every one of which was well worth 2l. to rent if it were broken up. Yet the only stock on this moor are a few starving sheep; though I saw grouse in abundance. Now this fertile wilderness looks down on one side upon the Potteries, and on the other side you may see the fires of the Dudley iron district, where vacant hands cannot have been wanting of late for its cultivation. It must be almost within view, too, of Lincoln Heath, where no ferns can have grown. But though many of these moors might easily be brought into the state of that heath, if they were treated with Lincolnshire energy, the treatment would not be precisely the same, because most of them are towards the west, and though no precise line can be drawn, there is a natural distinction in farming between the western and the eastern sides of our island. The eastern side may be called the corn side of England, because the drying east wind produces, on that side, grain of finer quality: the western is the grass side, because the moist and soft south-western brings up grass spontaneously, as in Ireland, upon naked land; whence has arisen the old practice of keeping land for four or five years in corn, and alternately for as many in grass. Another distinction between the two coasts consists in the use of lime, an unusual manure towards the south-east, because, on that side, the soils either contain lime or have chalk generally under or near them; while the western soils, being usually devoid of it, the cartage of lime for periodical dressings becomes one of the farmer's principal troubles. In the Exmoor country, a hill farmer may set out in the morning, riding one horse, and driving six others with paniers (for there are no passable roads); after travelling 18 miles to the sea-side and back, he may be seen in the evening bringing home 9 bushels of lime, which will dress one quarter of an acre. That wild highland tract is also under the disadvantage of great elevation, so that harvest is tardy; and it may be objected, I know, that, however good the land, the climate is a bar to its culture. On Brendon Hill, however, is a farm which proves that elevation may be overcome. It stands 1000 feet above the sea; and has been re-

claimed from the surrounding moor by Mr. Roales, who settled there, among the clouds, in 1816, in a house built for him by the late Lord Carnarvon. In November, 1811, I went over every field of it, and found excellent crops of oats, about 60 bushels per acre; though the average produce of oats grown on the old land in the parish is said to be not more than 30. Wheat he certainly could not grow at that height: but, on 20 acres of seeds, he had folded 100 large sheep, the grass growing in summer as fast as it was fed off; and had sold them, fat, at 12s. advance per head, or 3l. profit per acre. Behind his house was a field, in which I have myself followed black game; it had been broken up only two years, yet had been brought into excellent grass, though the heath had been short, and without fern. Mr. Roales first pared and burnt, and next lined it with 60 bushels an acre. He did not plough it at all, because he had one inch of clear soil only, all below being rubble; but he stirred it a foot deep with a scarifier. The ashes of the heath secured him turnips, which he fed off on the land. Even then he did not take a corn crop, but laid down his new enclosure to grass, which was so good that many farmers had ridden over to view it. After twenty-four years of conflict with this high moor and its climate, Mr. Roales was ready to convert another hundred acres of heath, provided a boundary fence were put up for him: for fencing, not draining, is the chief expense in taming these moors. The fence is raised against a special enemy, the Atlantic gales, which sweep this whole western coast. It is a broad bank of earth, 5 feet high, supported on each side by walling, and planted along its summit with beech, forming a hedge 20 feet high. This is called succour; without it stock does not thrive; and even corn crops, on these heights, are better by one-fourth for being well sheltered. The growth of the trees on these earth-walls must arise from the moist air of the country: in South Devon vigorous oak timber may be seen upon them. Such is Mr. Roales's experience of moor-land at the height of 1000 feet. On the opposite side of the moor, 20 miles from this place, Sir Thomas Acland's farm of Clotsham has been gained from the waste on a ledge of Dunkerry, which rises boldly from the Bristol Channel to the height of 1670 feet. The elevation of the farm itself is 1100 feet. Yet, on this crest of Clotsham, hanging almost precipitously over the low valley of Holnicote and the sea, I saw not only excellent oats and turnips, but good water-meadows, on the very brow. Strange as the situation would elsewhere be thought for water-meadow, in West Somerset it is not uncommon; and as the plan of these meadows is peculiar, and may be widely applicable to the improvement of heaths, I will endeavour to describe their formation. Along the Lambourn, in Berkshire, and more extensively by the streams of Hampshire and Wilts, water-meadows have long since been formed. The water, it is well known, is thrown over them in winter, and produces a fine growth of grass in spring, while the other pastures are brown. But as it must trickle over, not stagnate upon the surface, these fields must generally be thrown up with the spade into high ridges, that the water may flow along their crowns and escape in their furrows. Hence arises an outlay of from 10l. to 20l. on an acre in their formation; and hence I doubt whether, now that sheep can be fed in spring on late-kept roots, such an outlay is generally expedient; though, as water-meadow is worth a rent of 4l. or 5l. an acre, if the money can be spared from other objects, the

cost will be repaid. These water-meadows may be seen sometimes by the rivers in West Somerset; but on the slopes of the narrow glens, you see what is much more important, the catch-meadow. In forming a catch-meadow the ground is not reshaped, but shallow gutters are carried at a level round the slopes of the sheltering field, tier above tier; and no separate channel is required for carrying the water off, because, after flowing over from one carrier it is caught in the one below; from which circumstance the name is derived. As you follow the small but rapid rivers, you frequently see, along the sides of the valley which rise steeply above, clear spaces opened in the high bank of oak-coppice covered with grass of emerald-green by the hill torrents, which have thus been guided and distributed along the slope. The ease with which these catch-meadows are formed is remarkable. A hill-farmer at Winsford showed me a field so steep that one could not climb it without the aid of the hands. It had been rough ground, worth 5s. an acre; he had limed it, and allowed his labourers to break it up and take potatoes for two years; after which time they returned it to him, with the water-gutters traced along the slope; so that, instead of waste at 5s. he obtained, almost for nothing, a field bearing perpetual grass, worth certainly 40s. an acre. Great as the change is, and strange as it appears, the practice is a part of every-day farming in this hilly district, and these catch-meadows meet you at every turn; indeed the word meadow here means only watered grass land. Mr. Roales has formed them from the moor on Brendon Hill, and Sir Thomas Acland near Dunkerry Beacon. Mr. Blake, of Upton, has brought less than 400 acres, which had not let for 1*l.* an acre, to produce him 1,200*l.* a-year, chiefly by catch-meadows, which he formed out of moorland, and lets each year as summering ground to the low-land farmers. There are some beautiful catch-meadows at Cutcombe Pass, on very high ground, south of Dunster Castle. In Devonshire, too, Mr. Hoare, at Lusecombe, near Dawlish, has made them from very poor lands, on which he turns the water, first in the winter to feed, then to mow, and then three times afterwards in the summer to feed off the herbage in the course of each year. I saw some also at Mr. Turner's, of Barton, near Exeter; and the late Mr. Bulted made them, I believe, largely near Plymouth. On one farm at King's Brompton, near Exmoor, the tenant had drained a piece of moorland, collected the runnings into a reservoir, which the present Lord Carnarvon had built for him, and used the water which had been poison above, as food for the field below. For it is remarkable that water which has flowed over a bog is injurious, but brought by under-drains from the same bog is nutritious. I do not mean that these catch-meadows were all made without expense; but where the land is preciously dry, 2*l.* or 3*l.* per acre would be a fair estimate of the cost; and in order to show what improvement may be effected by catch-meadows, I will only mention one case, pointed out to me by a farmer at Winsford, as perfectly easy to be carried out upon a neighbouring farm. That hill-farm consists of 232 acres, and is let for only 75*l.*; but as the farmer observed, 100 acres are a steep slope, covered with rough grass and short furze, worth about 5s. an acre. Now there are two copious springs gushing forth near the brow which might be turned along the wild land, and thus, for 2*l.* or 3*l.* an acre, the worthless slope would be converted into catch-meadows, which elsewhere would be worth 60s., and even in that secluded spot, 40s. an acre; so that the

value of this farm might be raised, for 300*l.*, from 75*l.* to 250*l.* yearly. This is a farmer's plan, and a moderate estimate. There are several practices of English farmers changing the nature of land at a moderate cost—transformations of soil, which I have brought before the society; the application of chalk; the use of marl on sand, which was the foundation of the improvements of Holkham; the use of clay upon peat in the fens, which makes hollow land close and good; there is the old English practice of thorough draining, on which all are agreed; but no discovery has surprised me so much as the marvellous effect of hill-side irrigation—for while under-draining, after great labour, may add 10s. to the value of an acre, in West Somerset a mere rill is made to produce on the barren flank of a moor more abundant herbage than the old grazing land of Northamptonshire yields. The method seemed to me capable of wide application, as it requires but trifling outlay, a rapid stream untainted with peat, or even a bog capable of drainage, and moderately sloping ground, however poor. There is no doubt that it might be widely extended in its native district round Exmoor, and I should think also in Wales. There are many tracts in the north of England, and I have seen many valleys in Scotland, which if they were in Somersetshire, I could not doubt would be covered with catch-meadows; but the climate of the north may counteract irrigation. I have not seen it farther north than at Teddesley, in Staffordshire, where 80 acres of catch-meadow have been formed for 224*l.*, or about 50s. an acre, and 40s. added thereby to the yearly value, a return on the outlay of 80 per cent. This place embodies all the principles of moorland improvement. When Lord Hatherton came to reside there in 1820, his house was surrounded by heaths and by alder-bogs. Of these he has under-drained 500 acres, at the moderate expense of about 3*l.* an acre, and upon them are fine Swedes and clean wheat-stubbles. All the water thus tapped from these bogs is conducted to the farm-yard, where it turns a wheel which thrashes the corn and does the other work of the barn. Thence this subterranean water issues forth in a full stream, and finally divided into slender rivulets, spreads verdure over the catch-meadows, carrying with it the liquid manure from more than a hundred beasts kept in the yard summer and winter. The beauty of this arrangement, which resembles the complicated functions of an animal body, is as striking as the practical benefit of changing a morass into a sound corn and stock farm, for the farm of 1250 acres carries 1,500 sheep, besides more than 200 head of cattle. I know of no farm which offers so perfect a model for the improvement of moorland lying towards the west side of England. But the importance of enclosing our wastes has led me too far. An objection, however, is made which carries us back for a moment to Lincolnshire. Enclosures, it is said, injure the poor. Now Lincolnshire is one new enclosure from Cambridgeshire up to the Humber: yet I know no county in which the labourer is better provided for. His wages vary from 10s. to 12s. and 15s. a-week: he obtains a great deal of taskwork,\* for more labour

\* The following remark is from a Lincolnshire agriculturist:—Whether "task" work be more in practice in Lincolnshire than elsewhere, I, from my retired habits, know not, but it is a practice highly beneficial both to the farmer and labourer: the one gets infinitely more work done, and the other more wages and better habits; for instance, in filling the carts with

is thus paid here than elsewhere—filling dung-carts, for instance, at 2d. per load, and the harvest wagg'n at 1s. per acre, which diffuses activity through the whole operation. Good hands are at this moment earning at task-work from 15s. to 18s. weekly. His cottage—unlike the hovels of Northumberland and of Scotland, where one room on the ground holds the family, however numerous, by day and by night—is neat and cheerful. Many labourers have allotments, and some even cows. So far from injury accruing to the labourer by enclosures, it is clear in theory, as it is proved by the practical contrast of Lincolnshire with Dorsetshire, or of Derbyshire with South Wales, that where the demand for labour is stationary, wages must be low, but that they will be raised wherever the plough breaks up new fields of employment. The Lincolnshire labourer living among new enclosures is well paid, clothed, lodged, and also, I should mention, well fed, sometimes with fresh meat. The consequence is that being better fed they are able to work harder than other labourers; and thus the farmers are repaid for their expenditure upon their men as well as upon their land. Indeed what Arthur Young said, five-and-forty years since, of the Lincolnshire farmers may be said now:—"I have not seen a set more liberal in any part of the kingdom: industrious, active, enlightened, free from all foolish and expensive show or pretence to emulate the gentry, they live comfortably and hospitably, as good farmers ought to live: and, in my opinion, are remarkably void of those rooted prejudices which sometimes are reasonably objected to in this race of men. I met with many who had mounted their nags, and quitted their homes purposely to examine other parts of the kingdom, and done it with enlarged views, and to the benefit of their own cultivation." They have visited other districts, and they have since so managed their own farms that these deserved to be viewed in return. Practical farmers may perceive defects which escaped my observation; but if they see Lincoln Heath, or the Wolds, either in harvest or later in winter, when the sheep are in the fold and the cattle in the yard, I do not think that they will be disappointed. They will see the result of great expenditure on the part of the landlord as of corresponding energy on that of the tenant; and if other owners of desolate places should be encouraged by the example to fit them for man's use in like manner, thereby enriching their families, multiplying farmers, strengthening and, one may say, enlarging their country, above all raising the weekly dole of the labourer, by the only means of raising it, namely, by ploughing up fresh land on which the labourer's arm will be wanted, I earnestly hope that on whatever moors their buildings may be reared or their fields be enclosed, they may be no worse seconded in their praiseworthy efforts to pioneer for posterity than Lord Yarborough and Mr. Chaplin at Brocklesby and at Temple Bruer.

manure by the day the labourer seldom fills more than 8 or 9 loads, whereas for days together, this year, I had 160 loads of manure, each load  $1\frac{3}{4}$  cubic yards, filled by 10 labourers, at  $1\frac{3}{4}$ d. per load, and spread upon the fallows with 9 carts, 9 horses, and 9 of my own men, and generally finished by 2, never later than 3 p.m., sharp work of course, but the labourers push everything else on, no creeping, and they thus earn 2s. 4d. a-day, and have ample time to do a little work in their own gardens in the evening.

## CHEPSTOW FARMERS' CLUB.

## SECOND ANNUAL REPORT.

In presenting their Second Annual Report of the Chepstow Farmers' Club to its members, the committee are happy in being able to announce the addition of many new members to their list of subscribers, as well as to state that several gentlemen have added their names as contributors to the separate fund for premiums to ploughmen, labourers, and servants.

The committee hope, that all the gentlemen residing in the neighbourhood, who have not yet become honorary members, will, when they are made aware of the beneficial objects, the attainment of which is so anxiously sought for by the society, step forward to its assistance; and, by increasing the funds, enable the club to publish a longer list of prizes for the year 1844, for competition among the labourers and servants,—a class whose encouragement the committee consider of primary importance.

The committee gratefully acknowledge the promise of a piece of plate, made them by the inhabitants of Chepstow for the ensuing year, to be awarded to the son of a member who shall plough half an acre of land in the best manner,—a promise which they consider as so much the more acceptable, because it exhibits a feeling of kindness and interest on their part towards their farmers' club which cannot be too much commended; for the committee have always considered, that the interests of commerce and agriculture should never be separated.

The committee have also to offer their most sincere thanks to J. B. Snead, Esq., for the handsome manner in which he has announced his intention of giving a silver cup, value five guineas, for the best four acres of Swedes, to be contended for by members of the club not farming more than 150 acres of land.

Your committee are sorry they have not more discussions to introduce into their report, which they fear will exhibit a paucity in this respect, when compared with that of the former year; but they hope that the members will in future remedy the defect in question, so as to render the next report more voluminous and instructive.

As the committee are in hopes that this report will pass into the hands of some scientific men,—should any of them, feeling sufficient interest in the welfare of the club, and having a little spare time at their disposal, be willing occasionally to take the trouble of explaining, either in the form of a lecture or paper, the elements of chemistry and geology as applicable to agriculture, they assure them, that in no way do the committee consider they can render greater service to the society.

To show the consequence of a little chemical and geological information, it will be sufficient to state a circumstance for the knowledge of which the committee are indebted to the kindness of the honorary secretary of a neighbouring club. On analyzing several specimens of limestone, all made use of in burning lime for manure, one was found to consist of nearly pure carbonate of lime, while the others had a quantity of magnesia in combination, varying from two-fifths to nearly one half the limestone. When it is taken into consideration that magnesian lime is generally acknowledged to be injurious to vegetation, at least in the quantity usually applied to land, the importance of some knowledge of the composition of soils, and the means of ascertaining the difference of substances often used indiscriminately as manure, must be admitted; particularly so, when to the casual observer no difference may be apparent.

Opinions have varied respecting the effects of magnesian lime when applied in moderate quantities; probably from the different kinds of soil on which it has been tried; but all the writers to whom your committee have had the opportunity of referring, agree in stating, that an over-dose of this substance will cause a temporary sterility. Dr. Ure says,—“The lime resulting from the calcination of magnesian limestone appears to have an injurious effect on vegetation, unless applied in quantities considerably less than common lime, when it is found to fertilize the soil. After two years its hurtful influence seems to become exhausted, even when used in undue quantity. Great quantities of it are annually brought from Sunderland to Scotland by the Fifehire farmers, and employed beneficially as a manure, in preference to other kinds of lime. It has been unfairly denounced by Mr. Tennent and Sir H. Davy, as a sterilizer.”

Geological writers affirm, that the magnesian limestone is often found beneath a fertile soil, generally of a light description; and this may well be the case, even though a quantity of the finer particles of the stone be blended with the soil; because the magnesia as a carbonate in the limestone is in an inactive or harmless state, but when the carbonic acid is expelled by heat, the magnesia becomes caustic, and, in quantity, is injurious to vegetation. It is probable that a larger proportion of magnesian lime may be advantageously applied to one soil than another; and the committee are rather of opinion, though without any precise data to come to a positive conclusion, that the greater the quantity of vegetable matter in the soil, the less likely will the application of magnesian lime be to prove injurious. The committee are rather inclined to go farther, and favour the opinion, that on peaty soils the magnesian lime would be found more fertilizing as a manure than any other kind.

The committee hope the members will excuse this digression from the main subject, to one of which they confess their incompetency to give a clear explanation, particularly as their sole object is to induce some gentlemen of liberal education to furnish the club with an occasional paper on scientific subjects of this nature.

At the January meeting a discussion took place on the “Best method of consuming Root Crops;” when Mr. G. Dowle stated, that the expense of looking after 500 sheep, when consuming turnips in the common way, was as follows:—

One man at 12s. per week,  
One woman at 3s. ditto docking up

15s.

The sheep to be in the following proportion:—

150 fat sheep  
150 young ditto  
200 ewes

500

The sheep to average 15lbs. per quarter, and they will consume 25 tons of Swedes a week.

Several members said they were convinced the profit arising from cutting turnips and consuming them in troughs was more than equivalent to the extra expenses, but they could not give any precise statement as to the amount of profit.

The question of petitioning the legislature for the abolition of the duty on malt was brought forward by Mr. G. Dowle, and seconded by Mr. T. Pride; when it was unanimously resolved, that the malt tax is highly injurious to the interest of the farmer.

At the February meeting, the discussion on the “Best

method of consuming Root Crops” was resumed; and it was unanimously resolved, that the most profitable mode of consumption with sheep is by cutting the roots and putting them in troughs.

Mr. John Matthews undertook to introduce as a subject of discussion at the next meeting—“The best manner of preparing the land, and sowing barley and seeds, including the best variety of barley and the most profitable kind of clover.”

The following books were ordered:—Hillyard on Farming—British Husbandry—Morton on Soils—Squarey's Agricultural Chemistry—Johnson on Guano—Johnson's Cottage Farmer's Assistant—Journal of R. A. Society.

At the March meeting, the discussion “On the best manner of preparing the land, and sowing barley and seeds, including the best variety of barley and the most profitable kinds of clover,” was introduced by Mr. J. Matthews, who said, the turnips should be cut and consumed on the ground by sheep; then the land to be ploughed across, dragged down, and worked as fine as possible; after which to be ploughed up in double cast ridges (8 yards wide), and the seed drilled in at 6 in. Where the land is in good condition, and the turnip crop heavy, he considered it advantageous to draw and cast off part of the crop for the cattle. The best time of sowing, from the last week in March to the middle of April. For barley soils, the Chevalier was the best variety, and four bushels the proper quantity of seed. He thought the best mixtures for light soil were, 10 lbs. white Dutch, 3 lbs. yellow trefoil, and 1 peck of rye grass; or 6 lbs. cow grass, 4 lbs. white Dutch, 4 lbs. yellow trefoil, and half a peck of rye grass per acre: while he concluded broad clover mixed with Dutch best for heavy land.

Mr. B. Phelps stated that last year he planted twelve acres with barley, six acres of which he cross-ploughed, worked down fine, ploughed up in ridges, and then drilled in the seed; the other six acres he never ploughed at all, but merely, after the turnips were fed off, scuffled the land three inches deep, dragged it, struck up the furrows, and then drilled it across the ridges. He grew better barley on the latter six acres than where he ploughed the land twice; and he is of opinion that, on light soils, provided the land be clean, it is a better plan than ploughing. The chairman recommended planting barley on dry soils earlier than the last week in March, should the season be favourable: instead of the last week in March he would suggest the second week in March. He always finds early sown barley of better quality. In every other respect he agreed with Mr. Matthews. Mr. G. Dowle said, that he would recommend a change in the seeds sown with barley; for instance, when Dutch clover and trefoil are sown in one rotation, broad clover and rye grass should be sown in the next course. By this plan he considered the broad clover would be more likely to stand, not being repeated so often.

Proposed by Mr. Wason, and unanimously resolved, to take into consideration the propriety of establishing at Chepstow, a pitch market for the sale of corn.

Recommended that the drainage of the town of Chepstow be collected in one spot, and sold as manure for the benefit of the inhabitants.

At a meeting in April, the discussion on “the best method of preparing the land, and sowing turnips,” was introduced by Mr. C. Blunt, who stated, that the land should be ploughed light as soon as possible after harvest, well worked, and any weeds that come to the surface burnt. Then the land should be

ploughed deep, and left rough for the winter. About March it should have a waste ploughing and be worked fine, when it will be ready to ridge up for the manure. He thought half Swedes and half common turnips were good proportions, but that would much depend upon circumstances. On light sandy land he strongly recommended to sow the land intended for common turnips with winter vetches soon after harvest, to be fed off early, and the turnips drilled in on the flat at one ploughing. He thought it advisable, when possible, to use fold manure for the vetches, but otherwise to drill some artificial manure with the seed. The drills for Swedes should be from 2 feet to 30 inches apart, any time from the last week in May to the middle of June. Common turnips to be consumed early may be sown from the end of May to the beginning of July. Turnips after vetches may be drilled on the flat or sown broadcast; the former was preferable; but as the turnips are not required so large for spring use, the drills should only be from a foot to 13 inches apart.

Unanimously resolved, that the permanent alteration of Chepstow Wool Fair be advertised in the following manner:—

Chepstow Wool Fair.—All who are interested in this fair are requested to take notice, that in future it will be held on the 22nd of June.

#### Chepstow Farmers' Club.

At the May meeting, a good deal of time was taken up in drawing up a circular to send to the gentlemen of the neighbourhood: and no regular discussion took place.

Mr. Proctor, of Bristol, called the attention of the farmer to the advantage to be derived from saving the drainage of fold-yards, &c.; also, to the importance of using the manure "fresh," *not rotted*: likewise to the benefit of using small quantities of gypsum in the stable to prevent the loss of the ammonia; and promised to forward a paper upon the subject.

At the June meeting, the attendance of members was rather thin, owing to many being much engaged with the hay harvest.

All present expressed great satisfaction at the success which had attended the change in the day for Chepstow Wool Fair; and the oldest members stated, that they had never seen so large a quantity of wool at any previous fair as had been brought to Chepstow on the 22nd instant. It was generally admitted, that all who were willing to sell at time's price had no occasion to take their wool home again.

The rest of the evening was occupied in arranging a list of prizes for October, which was ordered to be printed, and a copy sent to each member.

At the meeting in September, the time was entirely occupied in appointing the judges, receiving claims for the premiums, and other preparations for the ploughing match.

Unanimously resolved, to accept the offer of a field of clover lay for the ploughing match, made by Mr. R. Philpotts, of Hays Gate, and to return him the best thanks of the club. That the day for the ploughing match be altered to Wednesday the 18th October.

October 18th.—This being the day appointed to celebrate the second anniversary of this Club, by giving premiums to the best ploughmen, &c., was hailed with pleasure, not only by the members and candidates, but also by those who were at all interested in the agricultural proceedings of this district.

The ploughing match took place in a field occupied by Mr. R. Philpotts, of Hay's Gate, near St.

Pierre. As the day was beautifully fine, there was a large assemblage of spectators, among whom were Colonel Lewis, Chas. Lewis, Wm. Hollis, J. Baldwin, and Tho. King, Esqrs., with most of the members of the club. Twenty-five teams started to compete for the prizes, and the best judges of ploughing declared the whole of the work to be executed in a most masterly manner. The ground allotted to each competitor was about 12 perches more than half an acre, which was finished within four hours.

At the conclusion of the match the company repaired to the George Inn, where about 50 gentlemen sat down to an excellent dinner provided by Mr. and Mrs. Baker, and served in the best style. Mr. R. Philpotts, chairman for the year, presided, supported on the left by Colonel Lewis, and on the right by T. King, Esq., Mr. T. Pride being vice-chairman. On the removal of the cloth, the following toasts were given from the chair with due honours: "The Queen,"—"The Prince of Wales," "Prince Albert, a brother farmer,"—"The Royal Family,"—"Colonel Lewis." Mr. Jones proposed the health of "The Duke of Beaufort," and "The Members for the County," in two eloquent speeches. On the health of the Treasurer being given, J. L. Baldwin, Esq., said, "he could assure the chairman and company, that he was very grateful for the honour conferred upon him in drinking his health; that he much regretted not having a larger debtor and creditor account for the club in his hands; that he had not refused any light sovereigns lately, though he acknowledged with many thanks the receipt of two from Mr. R. Willey, as an annual subscription from Wm. Peel, Esq. He certainly had not applied to some gentlemen, who might possibly have become subscribers had the beneficial ends proposed by the society been explained to them, though he had expected they would have come forward unsolicited: but he now pledged himself to muster a little *brass*, if gentlemen would allow the expression, and persuade as many as possible to enter their names as honorary members of the Chepstow Farmers' Club; and he hoped in this manner to turn his newly acquired *brass* into *gold*, and thus succeed in making the debtor and creditor account for the ensuing year appear to greater advantage."

In returning thanks for "Success to the town and trade of Chepstow," Mr. T. Stephens said, he was authorized by many of the inhabitants to announce their intention of placing a piece of plate at the disposal of the committee, as a prize to be contended for in ploughing by farmers' sons at the next anniversary meeting.

The secretary was called upon to read the award of the judges, as follows:—

JUDGES FOR THE PLOUGHING.—Mr. M. Williams, Mr. Pearce, and Mr. A. Gardiner.

CLASS I.—1st prize, 2*l.*, George Hollister, owner Mr. J. Matthews; 2d prize, 1*l.* 10*s.*, William Hopkins, owner Mr. T. Perkins; 3d prize, 10*s.*, John Paine, owner Mr. C. Townsend. William Jones, owner, W. Hollis, Esq.; John Williams, owner, Mr. T. Pride; much commended.

CLASS II.—1st prize, 1*l.* 10*s.*, George Riddle, owner Mr. S. Matthews; 2d prize, 1*l.*, John Holmes, owner Mr. J. Matthews; 3d prize, 10*s.*, William Bird, owner Mr. Musgrove.

CLASS III.—1st prize, 2*l.*, Thomas Kilby, shepherd to Mr. Powles; 2d prize, 1*l.*, John Williams, shepherd to Mr. D. Baker.

CLASS IV.—1st prize, 1*l.* 10*s.*, William Lewis, master Mr. H. Williams; 2d prize, 1*l.*, William

Roberts, master Mr. Powles; 3d prize, 10s., Thomas Harry, master Mr. Musgrove.

FEMALE SERVANTS.—1st prize, 1*l.* 10s., Jane Abraham, master Mr. S. Matthews; 2d prize, 1*l.*, no claimant; 3d prize, 10s., no claimant.

JUDGE FOR THE COTTAGERS—Mr. J. Matthews.

COTTAGERS.—1st prize, 1*l.* 10s., Richard Broughton, master Mr. R. Willey; 2d prize, 1*l.*, Samuel Huntley, master Mr. R. Philpotts; 3d prize, 10s., James Davis, master Mr. R. Philpotts.

A collection was then made for the unsuccessful candidates.

At the meeting, October 30, it was resolved, that Mr. James Rymer, of Wibdon, and Mr. Patten, of C-phill, be appointed judges for Colonel Lewis's cup, and that the secretary should write to apprise them of the resolution, forwarding a list of the claimants, and requesting them to view the turnips before the next monthly meeting, so as to be able to make their award at that time.

That the unsuccessful candidates at the ploughing match be given 2s. 6d. each.

Much time was taken up in receiving the claims for the cup and paying the premiums, when no one being prepared with a subject for discussion, the meeting was adjourned.

At the November meeting it was resolved, that in consequence of Mr. Rymer having refused to act, Mr. John Sandford, of Mounton, Mr. John Powles, of Sroat, and Mr. Patten, of Cophill, be appointed judges for Colonel Lewis's cup for the best general crop of turnips and swedes, not less than one quarter of the arable land in each occupation, the quality of the land to be taken into consideration.

Mr. T. Stephens announced, that J. B. Sعاد, Esq., had come forward in the most handsome manner, and promised to give a cup, value five guineas, for the best four acres of swedes, to any member of the club not farming more than 150 acres of land.

A great deal of time was taken up in appointing the judges; and after some desultory conversation the meeting was adjourned.

At the December meeting, the officers were appointed for the ensuing year. The judges gave in the award for Colonel Lewis's cup, viz. to Mr. Thomas Perkins, of Matherne.

Resolved, that the Gardeners' Chronicle be ordered for the use of the club.

A vote of thanks was unanimously voted to Mr. R. Philpotts for his able services as chairman.

The accounts were passed; the report was read, and 200 copies ordered to be printed.

The committee having observed the advantage derived by other clubs from exhibiting specimens of the different kinds of grain and roots, recommend the members to strive to get up such exhibitions amongst themselves, and they do so the more anxiously, from being aware of the quantity of inferior corn grown in this district. They do not mean to insinuate that there is not a great deal of corn grown in this neighbourhood of a quality that would do credit to any county, but the committee wish not to see any exception to this, and they are sorry to be compelled to admit that at present this is far from being the case.

In concluding their address, the committee must again appeal to the members, requesting them to attend regularly at the monthly meetings, and never to let an evening pass over without bringing forward a subject for discussion, as they are convinced that by no other means can an equal portion of generally useful information be elicited.

For the Committee, ARTHUR HALL, Hon. Sec.

The following gentlemen were elected for 1844.—Chairman, Mr. Thomas Pride; Vice-Chairman, Mr. George Dowle; Treasurer, J. L. Baldwin, Esq.; Secretary, Mr. A. Hall; Librarian, Mr. R. Taylor.

COMMITTEE.—Mr. R. Philpotts, Mr. S. Matthews, Mr. R. Willey, Mr. John Matthews, Mr. Charles Townsend, Mr. John Sandford, Mr. Powles, Mr. Thomas Williams, Mr. D. Baker, Mr. Patten, Mr. C. Blunt.

## ON ARTIFICIAL AND OTHER MANURES.

A short abstract of Mr. Karkeek's report, read at the Annual Meeting of the Cornwall Agricultural Association on the 13th inst., and to which Sir C. Lemon's premium was awarded.

In this report, Mr. Karkeek commenced with some of the earliest experiments made with bone-dust, in the year 1835, by Mr. Trethewey, of Trewithan, on some waste lands adjoining Trelyon Common. The effect of the bone in this instance was very satisfactory, us it proved that its fertilizing principle was a permanent one, and lasting to the present time, in the author's opinion completely settling the question which is frequently agitated amongst farmers as to whether the manuring property of bone exists in the animal matter, which constitutes about  $\frac{1}{3}$  of its substance, or in the earthy matter constituting the remaining  $\frac{2}{3}$ , since it was almost impossible to suppose that any other than the earthy matters could have remained so long in the soil, the animal matters being probably decomposed in the first or second crop.

The next experiments that Mr. K. noticed were those made by Messrs. S. and R. Davey, of Redruth, on a part of St. Agnes Common, showing how by the use of bone dust and guano, a profit had been made on the two first crops, and leaving the land which previous to its cultivation was a poor barren waste, with scarcely turf enough to build the hedges, worth from 18s. to 20s. per acre. These experiments of Messrs. Davey's, were by far the most valuable part of the report, and proved, Mr. Karkeek said, that a large portion of the waste lands of Cornwall has dormant energies within it, which only require skill, enterprize, and a small outlay, to be brought into cultivation. In both the experiments of Mr. Trethewey, and the Messrs. Davey, a clear profit was realized almost immediately.

The next experiment was one made by Mr. George Mason of Kenwyn, between bone and Truro scavengers' dung, on turnips, in which the difference in the expense was so considerably in favour of bone, that Mr. Mason could have cultivated three acres with bone at the same expense as one with dung. The next was one between bone and guano, by Mr. C. W. Parks, of Michell, shewing a decided difference in favour of guano. The next were some experiments made on Trelowarren estate, by Sir R. R. Vyvyan, Bart., between bone dust, Peruvian guano, Potter's artificial guano, and bone and guano mixed, giving the advantage to the latter. The next experiments were some instituted by J. H. Tremayne, Esq., Heligan, between fish refuse, rich dung, bone dust, Poitevin's manure, ammoniacal compost, Lance's carbon, Clark's manure, and the urate of the London Manure Company, giving the advantage to the bone dust, next Lance's carbon, next Poitevin's manure. The next experiments were of a similar kind made by Mr. Doble of Barteliver, between bone and dung mixed, bone dust by itself, Lance's carbon, and

Clark's compost. In this experiment, the advantage was in favour of the bone and dung mixed.

The next experiments were made by Sir C. Lemon, on nitrate of soda, ammoniacal liquor, bone dust, and sulphate of ammonia, as a top dressing for grass land, shewing that where no manure was applied, there was the heaviest crop. Also the effect of nitrate of soda, sulphate of soda, guano, sulphate of ammonia, Scott's soluble manure, and waste from the farm yard as a dressing for wheat, giving the advantage in favour of guano, and the waste from the farm yard. There were a great many others on nitrate of soda, nitrate of potash, Daniel's patent manure, gypsum, &c. The whole of these experiments were made with reference to weight and measure, as well as the value of the crop, and of the different manures used. The whole forming a most valuable report; and as the names of the different parties who instituted the experiments are each known, it is a sufficient guarantee for their correctness and accuracy. We feel it unnecessary to give a longer abstract of this paper, as it is about to be published very shortly, at a low price. We understand that nearly 600 copies have already been subscribed for.

### AGRICULTURAL QUERIES.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—If quite convenient, an early introduction of the following question would oblige; and perhaps some readers of your valuable magazine may be sufficiently conversant with chemistry and agriculture to enlighten me, and possibly some others upon the article of gas lime, which may be procured reasonably at many gas works. Is it of value for application in agriculture, and in what mode and season to be applied, and to what crops in particular, and the reason thereof? for though you and I may both understand the natures of quicklime and hydrate, and carbonate, the man at the gas works could probably only tell us that the gas had been forced or passed through it which gives it that delectable odour.

It must be obvious that the correct knowledge of its chemical nature and properties as it lies ready for carting at gas works; and whether deteriorated or not in the gas-house must be one's guide in applying it either mixed or unmixed with other matters at the time of using it. I remain, Sir, &c.

W.

SIR,—I should feel particularly obliged if any correspondent to your valuable journal, can give me information as to the use of gas tar for tillage, and also the best way of applying the ammonia water for the same purpose. The writer is an extensive manufacturer, and his gas tar is either thrown away or burned, so that if information can be elicited to show what ingredients may be mixed with it to form a compost suitable for tillage, it will be of infinite service to many, who, like himself, have applied it to no useful purpose.

I am, your obedient servant,  
January 22nd. A SUBSCRIBER.

SIR,—In the report of a lecture given by Professor Johnston, in the November number of the *Farmer's Magazine*, 365 p., the professor refers to experiments made in Ayrshire and Renfrewshire with nitrate of soda and sulphate of soda, as manure for potatoes. He states that when these salts were used separately,

the result was a failure; when combined, the crop enormous. Can you or any of your correspondents give the detail of the experiment, or state where it is to be obtained, at what time, in what proportions, and how the manure was applied—potash and soda being so essential to the potato (see p. 59 of the *Farmer's Almanac*, "Analysis of Agricultural Produce"). The analysis of the soil on which the experiment succeeded would be a great public benefit. May not the want of these salts in the soil, from potatoes now being so largely cultivated, and forming one crop in a four or five course rotation, have something to do with the enormous losses sustained, in the present and late seasons, from decay both before the potatoes are got up and after they are stored? In these manufacturing districts the loss from the frost was from five to ten per cent., while the loss from stored potatoes, in many cases, from the rot was, rather is, from 20 up to, in extreme cases, 70 per cent. The distinction is this: the loss from frost is ascertained by the decay commencing at the "nose," or small end of the potato; the rot is ascertained by commencing at the large end, the end to which the fibre of the parent plant is attached, or by showing itself in the centre of the root. The loss in the field, before the crop was lifted, was some 10 per cent. of the finest potatoes, and we were obliged to send the remainder to market without storing them, in my own case.—I remain, sir, your obedient servant,

Macclesfield, Jan. 8.

A POTATO GROWER.

### ANSWERS TO AGRICULTURAL QUERIES.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR—In reply to the inquiries of your correspondent T. W. in your last number, who wishes to be informed "what is a good substitute for straw," I beg to state that I have found couch-grass to answer admirably for litter in the place of straw. My plan is to save all the couch-grass collected from my turnip-fallows in the spring, by carting it into a stack, which is made in a convenient situation to be conveyed to the fold-yards when wanted, taking care to have it made secure from penetrating rain, which would cause it to heat and decompose. I collect the couch-grass in as dry a state as possible, choosing fine weather for carrying it together, and always have the dirt well shaken out of it, after it is raked up into rows for carting off, which is done by a drag-rake drawn by a horse, a much more expeditious method than the slow process of hand-raking. By putting it together into a stack in this dry state it does not ferment, and therefore does not decrease in bulk, and when brought to the yards in winter, forms an excellent bedding for cattle and pigs, and makes an addition to the manure heap, quite equal in quality, if not superior, to that made from the beddings of straw. Of course care should be taken that it is sufficiently withered by the wind and sun previous to its being carted from the land. If located in a neighbourhood where fern grows in abundance, that also may be substituted with the same advantage. Your correspondent may also increase the quantity of his straw for litter by altering the rotation of his crops. If, instead of seeding down all his barley ground every year (which I suppose he does by the four-course system) he were to reserve a portion of it (say one field annually) for a crop of peas instead of clover, it would afford him a very considerable increase of bedding for his cattle. This system, while it would afford him more straw, would not interfere with, but rather improve the con-

dition of his land, providing the fields are taken in regular succession for the crop of peas, which should be drilled and well hoed, and the field manured for wheat afterwards. The increase of manure made by this system would be found ample for the crop of wheat. Should these hints be considered worthy a place in your useful publication (the Farmer's Magazine) I shall feel obliged by your inserting them.

I remain, Sir,

Your obedient servant,

January 8th, 1844.

A SUBSCRIBER.

Sir,—In answer to your "what is a good substitute for straw," I would recommend timber. The stalls should be floored with deal planks, having a dip from the head. At the hind feet of the cow, a trench should be made about 8 inches deep, and 12 wide, to receive all dung and water. Care should be taken that the cow stands at ease with her hind feet on the edge of this trench. Cows will be always dry and clean, and the wood floor warm enough—I speak from experience.

If the wheat had been sown, the cows would have done more good. Sheep driven over after sowing wheat, improves loose soils.

DIENEW.

December 22, 1843.

SIR,—“Enquirer” of the 6th of November, wishes for some information as to the best and most approved method of raising furze hedges. I have seen many different plans adopted, according to soil and situation, and I shall recommend one, I think, of the best. “Enquirer” must cast up a sod fence of three or four sods high, each from six to ten inches high on both sides of his fence, giving the base one yard, and carry it up very neatly, the same as a mason would do a stone wall, filling the inside with soil out of the ditch in each side from where the sods are taken; he must give his fence six inches batter on each side which will bring the extreme breadth at the top to two feet; level the top nicely and sow the seed in a straight small drill in the centre in the month of March; as they grow they should be kept clean, the top shoots levelled, and annually to bring the fence all regularly to the same height, the sides also kept trimmed with the shears until its height is two feet and its base tapers to the outside of the top of the fence: by keeping it regularly clipped it will form a fence almost impenetrable and very beautiful. When the stem or underwood gets too strong and becomes open at the bottom, which it will do in a few years, it must be cut close off by the top of the fence and sprung again, and so trimmed in the same way as before; all shoots from the side of the sod fence must be carefully cut off each year, once or twice, otherwise they will not only spoil the top growth, but the appearance of the fence.

If “Enquirer” will cut his small thistles, when they begin to show the flower, and then again in autumn, for two or three years running, he will soon get rid of them.

I am, Sir,

A NORTHUMBRIAN

IN THE WEST RIDING.

January 17th.

SIR,—“An Inquirer” wishes to know the best way of weaning calves, but I suppose he means rearing calves. With respect to the cows, I should prefer short-horns, of a good milking kind, if their produce are taken into account; I don't mean your over high bred short-horns, but good useful animals and good milkers, and plenty such there are: next,

I will state my plan of rearing calves for the last twenty years; and, like “Albus,” may say I have been very fortunate. I like to have my first calves dropped in the latter end of October or early in November: I give them new milk for a month, if I can spare it; if not, three weeks; then two parts new and one of old for a week or so, and so by degrees lessen the new and increase the old: I then boil for each calf a small tea-cup of linseed and give two or three quarts amongst either the new or old milk, as circumstances require, and according to the age of the calf; by the time they are six weeks old, if they have done well, they get no new milk, as their drink then consists entirely of linseed with a little old milk, until they are two months old, by which time they can eat sufficient turnips, nicely cut, with good sweet hay, to keep them in good growing condition to go to grass: a pound or two of cake each in the day will materially assist in getting them forward; by this means five good cows will rear twenty calves well. I prefer weaning calves through the winter, because, when you have turnips for them, and will attend properly to them, they require less milk, and when turned to grass in the spring are as good as year-olds; besides they are much easier wintered next winter. When your cows go to grass in the spring, they will increase in their milk and enable you to do better to your late calves, by giving them new milk longer, when your turnips and mangold are done, and so get them up to the older ones; but I differ with “Albus” in one point, for I would not keep a calf dropt later than May, and I never allow them to suck the cow. Great care must be taken in keeping their pens clean, dry, and well ventilated. I have sold my two-and-a-half year olds, fat, from £16 to £20 each, according to times.\*

I remain, Sir,

A NORTHUMBRIAN

IN THE WEST RIDING.

January 17th.

SIR,—In reply to “A Subscriber's” inquiries, in the *Mark Lane Express* of last week, I beg to inform him that the bean-meal, with a small portion of topplings, was mixed with water, but not sufficient to make it a liquid. The beans were very finely ground. The peas which I last year used were put whole into a wooden trough—and for all kinds of food I prefer flat bottomed ones. I am at present fattening some pigs upon boiled peas, and shall at a future period be happy to make known the results, if any service to “A Subscriber.” I remain, sir, your obedient servant,

AN AGRICULTURAL EXPERIMENTALIST.

Herts, Jan. 12.

SIR,—In your last *Express* “A Subscriber” asks for information respecting the destruction of slugs. I have adopted the following method for some years, and have never known it to fail. When I intend sowing bean-stubbles or clover-ley with wheat, two or three days before ploughing I dress them in this manner:—Having prepared as much quicklime as will allow five cwt. to the acre, or more if the slugs are numerous, I slake it the day previous to using, and have it carefully done as the whole may fall. Before daylight on the following morning this is spread on the land as evenly as possible, so that the whole be well dusted, in case the atmosphere is moist and mild; for if the wind be drying or frosty, the labour will be in vain, and the work must be delayed till the weather

\* I consider it better to rear twenty well than thirty badly.

suits. I send my men about two o'clock; for from that time to six I have found to be most destructive, the slugs being then on the surface; and they will all assuredly perish, for they cannot get free from the caustic lime by sloughing, it being every where present in their path.

From the mildness of the season this pest is very injurious to the wheat crop, yet from the precaution I have taken as above, I have not seen any on my bean-stubble or clover-ley wheats, nor do I perceive that they have suffered in the least from the slug. Some years back I used to delay the dressing till I saw whether the young plant was attacked; if it were, I then sowed the lime on the crop by the hand. This plan is equally fatal to the insect, but is a more tedious and difficult work for the men from the lime being hot, and must be carried by them and sown, instead of being spread by shovels out of carts, as they cannot be taken on the ground when the crop is sown; beside, the mischief will, in a great measure, be done before the blade of the wheat appears above ground; and it is much better to destroy the enemy before the ground be stirred, and so remain free from danger.

Your correspondent used salt, but this is not so efficacious as lime, and a little reflection will, I have no doubt, convince him of this. Salt forming into crystals, does not cover the surface of the land so perfectly as the dust of lime; and also being of a damp nature, and quickly dissolved when exposed to a similar atmosphere, is more easily sloughed off by the slug, and he finds means of escape to his hiding place; but the lime completely covering the ground, all means of escape is cut off, and from its drying and caustic nature, the creature soon dies.

Any person may be convinced of the different effects of these minerals: if he puts a lump of salt, as large as a horse-bean, upon his tongue, it will dissolve, and he may eject or swallow it without inconvenience; but let him try a similar quantity of quicklime, and he will find greater difficulty in getting quit of it in either one way or the other.—I am, your obedient servant,  
G. KILBY.

Queborough, Jan. 11.

SIR,—In answer to one of the questions asked in your valuable publication of 25th ult., by R., of Crondall, near Farnham, Surrey, I beg to say, from my experience in supplying drills for the purpose of depositing turnip seeds or mangel wurzel seed in ridges, &c., that there is no better method than depositing it with a drill of the following description, viz.: for two ridges of 27 inches apart, more or less; or for three rows on broad work of 18 inches apart, more or less; rolling the ridges before and after the seeds, or seeds and manure are deposited, being all done at the same time by the drill; the rolls are of a peculiar shape, and compass the ridge, and has the coulters attached to the rolls operating upon an axle, and guided by the ridges regularly or irregularly ploughed, and the coulters with certainty guided upon the centre of the same; the seeds and manure may be deposited by the same coulters, or by a separate one, dividing the seeds from the manure by a portion of soil; for strong, powerful manures, the last named method is essentially necessary, and is generally adopted. This drill being upon an improved construction, either system may be adopted on arrival at the field.

N. B. A drill, constructed for the above distances, viz., 18 or 27 inches, will admit of the cart-wheels passing directly in the middle between the rows.

I am, your obedient servant, JAMES SMYTH,  
Corn, Seed, and Manure Drill Manufacturer,  
Peasenhall, Suffolk.

SIR,—In reply to a query in your paper, respecting the best method of fixing ammonia in liquid manure, I beg to say that I was recommended by a friend to try muriate of lime for this purpose; and, as the ammonia therein exists in a state of carbonate, a double decomposition immediately takes place. The muriatic acid leaves the lime, and unites with the ammonia, forming muriate of ammonia, and the carbonic acid combines with the lime, and carbonate of lime, similar in its properties to chalk, results. The manner of using it is this:—I dissolve from one to five cwt. of muriate and lime in warm water, and when the water has taken up as much as it will do, I pour it into my liquid manure as long as any precipitation or cloudiness takes place, taking care to stir it all the time. The ammonia is then fixed, and a heat equal to boiling water, will not expel it.

I tried common salt for this purpose, but the result was not at all encouraging.

I am, Sir, your obedient servant,  
AN AGRICULTURIST, AND A DABBLER  
IN CHEMISTRY.

I find I purchased my muriate of lime of Bush and Co., Agricultural Chemists, Bow Common, near London. I paid 5s. 6d. per cwt. for it.

Govan, near Glasgow, Dec. 26.

SIR,—Observing in your valuable Journal of the 1st inst. a request made by a correspondent of Rectory Farm, Saxilby, desiring to be furnished with a receipt for the scab in horses, &c., I beg to suggest to him that the following prescription will, if properly applied, effect a safe and lasting cure. Take half a pound of gunpowder, put it into one gallon of cow's urine; to this add half an ounce of sulphur, one ounce of antimony, and one ounce of diapente; stir it well, and put it over a slow fire to heat; when warm, wash well the animal affected with the disease. This quantity will be sufficient for one horse only. Subsequent to this application the eruption will disappear; at which time take from the animal some blood; if a strong powerful horse, from three to four quarts should be taken away at least; take one pint of the same and drench the animal with it.

Should the inquirer think the above recipe, which is handed to him with all confidence, worth his attention, and will give it a trial, he will confer an obligation on the writer by informing him, through the same channel, the result.—Respectfully yours,

THE HAMPSHIRE FARMER.

Bishop's Sutton, Jan. 3.

SIR,—In answer to the query of an "Old Subscriber," in your *Express* of the 18th inst., I beg to state, in October, 1843, I tried an experiment with guano and rape dust, both drilled with the wheat the same day, at the same expence per acre: one-half the field with guano, at 17l. per ton; the other half with rape dust, at 6l. 15s. per ton. The wheat on that portion of the field where the guano was used, came up two or three days before the other part rape-dusted, stood the severe frost in February better than the rape-dust, and at harvest was six inches longer in straw, and had six bushels more wheat per acre.

Since then, I have tried guano for turnips, as well as corn crops, with similar success, and this autumn I have used it for all my wheat, except ten acres, which I intend to top-dress in the spring. Perhaps it would be well to say, I farm a sort of thin lime-stone soil, better adapted to guano than most lands.

I am, Sir, yours respectfully,

By Pontefract, A YORKSHIRE FARMER.

Dec. 22.

## AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR  
JANUARY.

Notwithstanding the mildness—extreme, in many instances, from the influence of westerly and south-westerly winds—which has characterised the weather of this month, the auspices of the period have been, in that particular, tolerably favourable to the interests of the agricultural body; still, it cannot be denied that, had the temperature proved colder than that experienced, a larger amount of benefit would have resulted to the land, as well as to the young wheat plants. The absence of frosts sufficiently severe to check the progress of the latter, as well as the ravages of the slug, has been much complained of in many quarters, especially in the southern and western counties, in parts of which it has been found necessary to re-sow the land, from the plants having been almost completely destroyed. Such complaints, however, cannot be considered general. Hence we are led to the conclusion that the present position of agriculture is, under all circumstances, quite as flattering—viz., for the future prospect of crops—as could be reasonably expected. More than the usual quantity of herbage has been observed on the pastures: indeed, it has proved nearly equal to that growing in some spring months; hence the stock has, with the assistance of a moderate amount of artificial and other food, fared extremely well. Although some severe losses have been again experienced in the flock districts, from the effects of the epidemic, it affords us much pleasure in being enabled to intimate that its virulence has considerably abated. With respect to the different medicinal preparations for arresting its progress, it appears to us that nature herself has done more towards it than the most skilful practitioner. There is one matter connected with the disease which requires the particular attention of our readers. For instance, we have observed that the disease has apparently originated, and been more destructive, amongst those beasts and sheep grazing on low damp meadows where couch and other rank herbage has been plentiful. We do not contend that exceptions have not been noticed to this circumstance: still, it must be evident to all connected with grazing that the more free from such pasturage, the less likely is the general health of the stock to be affected, and to receive injury from an epidemic. In the present and the approaching season, therefore, let every attention be paid to the stock in this particular; let the land be divested of noxious weeds, and we feel tolerably certain that good results will follow.

The progress which has now been made, throughout England, in thrashing out last year's crops of wheat has been, it cannot be denied, to that extent from which the growers are able to form an accurate judgment of the productive qualities of that description of grain. Of course—in the absence of statistical data respecting a matter of such moment to the community at large—it would be impossible for us to state what the actual deficiency is; still, we have the authority of the most extensive and best-informed agriculturists for stating that a decided deficiency is found to exist. This deficiency, however—arising from the abundant supplies which, from obvious reasons, have been on offer in the London as well as the leading provincial markets—

has, as yet, been without any material influence upon price. True it is, that consumption has, from the principal portion of the operatives finding good employment, been increasing; but the foreign wheat pressing forward has tended to prevent the quotations rising to that point which can be considered remunerative. Until, therefore, a large portion of the latter shall have been cleared off, it is evident, though the quantity free of duty does not exceed 600,000 quarters, that prices cannot rise much above their present level; yet from the comparatively small supplies now in the hands of the home growers, we are quite of opinion that the rates have seen their lowest. We need, we presume, scarcely intimate that the efforts—efforts formidable in their character, subversive of the best interests of the country in their tendency—which are now making, by a faction, to obtain an abrogation of the corn laws, are creating the serious attention of our agriculturists, and that the approaching parliamentary session is looked forward to with considerable anxiety. Although we are of opinion Sir Robert Peel will not venture to suggest any further alteration in those laws, even by way of experiment, it is gratifying to find that the farmers of England are showing a boldness and determination not to allow themselves to be trampled upon by the iron hoof of the League, which cannot fail to be gratifying to every well-wisher to his country. The millocracy have raised large sums to carry on their nefarious designs; but the farming body is likewise raising an amount which, if properly and judiciously applied, will, we have no hesitation in affirming, by conviction and honesty of purpose, stem the torrent of free-trade. Now, it is evident—it is certain, that the League, from the locality and concentration of its members, have advantages over the farmers of England, by the readiness of their appliances to disseminate their poison; besides which they are principally men of talent, though comparatively of little standing in society, and enjoy the means of strict direction. These, then, are matters—matters which cannot be gainsayed—which should have their due weight with the tillers of our soil. To those gentlemen, therefore, we recommend the necessity of their measures being principally worked in some central situation, say the metropolis, for instance; for we are fully convinced that, unless energy and perseverance be immediately adopted, the sliding-scale will be doomed.

The demand for wheat, particularly for the finest parcels, has somewhat improved in the course of the month, and that improvement has resulted in a slight advance in price. In its early part a good business was doing in barley at advanced rates; but the supplies towards the latter end of the period proving considerably more than equal to meet the wants of the dealers, the demand fell off, and currencies suffered a downward tendency. Malt has come forward somewhat freely, but not much progress has been made in effecting sales, and prices have ruled without material alteration. The supplies of oats have been about adequate to the demand, and the prices of that grain, as well as of beans, peas, and flour, have been about stationary.

However much we may regret to notice the working of any measure inimical to the interests of home producers, we cannot refrain from alluding to the working of the tariff. It has been asserted, over and

over again, that that legislative enactment would not depress the value, or, at least, to any material extent, of articles of home produce. It does not, however, require a philosopher to demonstrate that, when a superabundance exists, then must prices fall. Extending, as does our famous tariff, its influence to such a variety of articles, it was only reasonable to expect large supplies of foreign productions in our markets: that the extent of these supplies has, in the aggregate, already exceeded the previously-formed expectations of many parties, is unquestionable. The only exception we can notice in this particular is that of the limited importations of live stock which have as yet taken place. This, however, cannot be a matter of surprise, seeing that the quality and condition of the foreign stock are so much inferior to our own; yet we are fully assured that, from the exertions now making to improve the breeds in Germany, Holland, Belgium, France, and Spain, by large imports of our best animals; in process of time our graziers will have formidable rivals in those of the countries above alluded to. If we regard the foreign provision trade, and the immense exertions which are making in America to supply us with salted beef and pork, with bacon, lard, cheese, and other commodities; if, moreover, we consider the vast quantities and the improved quality which have already found their way into consumption here, we are led to the conclusion that this measure is fraught with injustice and requires repealing.

The early lambing season has, we find, been productive of a fine fall of strong and healthy lambs; and, comparatively speaking, few losses have been sustained, arising chiefly from the mildness of the temperature.

Our advices from Scotland, in relation to agriculture, are favourable. As the thrashing of wheat and other grain has been proceeded with, the produce is represented as amounting to nearly or quite a fair average, while the quality is good. The corn trade has ruled slow, yet no material depression can be noticed in the quotations.

The shipments of corn from Ireland to London and Liverpool have been again extensive, but the supplies on offer in the various markets have fallen off; owing to which, the trade has ruled steady at fully previous rates. The produce of the crops is but moderately represented.

The following is our usual monthly statement of the supplies and prices of fat stock exhibited and sold in Smithfield Cattle Market. In comparing the former with those of the corresponding period of 1843, we find the numbers stand thus:—

	Jan., 1843.	Jan., 1844.
Beasts .....	13,500	12,220
Sheep .....	124,000	122,000
Calves .....	1,100	899
Pigs .....	2,600	2,700

The prices in the past month have ruled as follows:—Beef, from 2s. 8d. to 4s.; Mutton, 2s. 10d. to 4s. 4d.; Veal, 3s. 10d. to 5s.; and Pork, 3s. to 4s. 2d. per 8lbs., to sink the offal.

Considering the moderate supplies of stock which have been on shew, the trade must be considered as much depressed, and prices—if we except those of veal having somewhat improved—have had a downward tendency. This state of the demand, however, may be chiefly attributed to the large arrivals of slaughtered meat up to Newgate and Leadenhall markets, which have been disposed of at miserably low figures. In the latter markets the general demand has ruled very dull, on the following terms:—

—Beef, from 2s. 4d. to 3s. 4d.; Mutton, 2s. 8d. to 3s. 6d.; Veal, 3s. 10d. to 4s. 10d., and Pork, 2s. 10d. to 4s. per 8lbs., by the carcass.

A STATEMENT AND COMPARISON OF THE SUPPLIES AND PRICES OF FAT STOCK, exhibited and sold in SMITHFIELD CATTLE MARKET, on Monday, January 30, 1843, and Monday, Jan. 29, 1844.

	Jan. 30, 1843.		Jan. 29, 1844.	
	s. d.	s. d.	s. d.	s. d.
Coarse and inferior Beasts.....	2	10 to 3 0	..	2 8 to 2 10
Second quality do .....	3	2 3 4	..	3 0 3 4
Prime large Oxen.....	3	6 3 10	..	3 6 3 8
Prime Scots, &c.....	4	0 4 2	..	3 10 4 0
Coarse and Inferior Sheep.....	2	10 3 0	..	2 10 3 0
Second quality do.....	3	2 3 4	..	3 0 3 6
Prime coarse woolled do.....	3	6 3 8	..	3 8 3 10
Prime Southdown do.....	3	10 4 2	..	4 0 4 4
Large coarse Calves.....	4	2 4 10	..	4 0 4 8
Prime small do.....	5	0 5 4	..	4 10 5 0
Large Hogs.....	3	10 4 4	..	3 0 3 8
Neat small Porkers.....	4	6 4 8	..	3 10 4 2

SUPPLIES.

	Jan. 30, 1843.	Jan. 29, 1844.
Beasts .....	2,517	2,744
Sheep .....	25,450	26,170
Calves.....	1 71	83
Pigs .....	361	270

The season must claim our first attention, because it is almost without a precedent. December, as was stated and noticed in all quarters, was remarkable for the amazing and consistent height of the mercury. Never did we register such an altitude, and that for about thirty successive days: no rain fell, and yet a more foggy month of gloom we never saw. However, so far from floods, the lands were brought into admirable condition; and, at the end of the year, the young wheats were fine—green, but not gay. On the 31st the weather changed: brisk wind succeeded torpid calm; a profusion of snow fell on the 2nd of January, and was succeeded by one day, or rather morning, of a frost so intense, that it did the work of a winter. We saw ice by cart-loads brought to an ice-house, nearly two inches thick, all the work of the few hours comprised between 10 P.M. of the 2nd and 8 A.M. of the 3rd day!

The frost went and the snow vanished almost with magical celerity, and since then but two gentle frosts have occurred, but no more snow.

The crops have the same healthful appearance, and strange it is to say that, with much sun and an average temperature of about 40° for three weeks, the plant retains the same healthful, unspiriting character. In 1842, the wheat was rich, tall, and thick on the ground. Now, though still too close on the whole (which it ever must be while seed-corn is scattered at random), it bears more the appearance of that described by Mr. John Morton, when he says—"Land that is in good condition always produces the best crop when the plant appears *thin* in the spring.

The *dibbling* system adopted in land suitable to it can alone insure the spaces required for perfect tillering, consistently with strict economy of seed; and we hope to see these brought about by adequate machinery.

*Turnips* seem to hold out capitally, and sheep are thriving upon them. Some *clover* is close and fine, but we hear of it being patchy. If so, why? And herein we require the analytic chemist, who, by burning a fine specimen in proper vessels, would ascertain correctly the quality of the ashes. By comparative experiments with inferior clover, and the soils of both, the manures required would be pretty well seen. Now, if it be the absence of gypsum (*sulphate of lime*), that salt, even where the *native* could not be procured, would be easily attainable by sprinkling powdered

chalk with diluted sulphuric acid. A small quantity would go far, as may be said of nitrate of soda, sulphate of ammonia, &c., &c.; and thus, by comparative experiments duly noted, would science be justified and its utility confirmed.

What shall we say to the announcement concerning the wonderful efficacy of *saline steeps*, which has been made in the "Transactions of the Highland Society?" (*Journal of Agriculture*, No. 111., new series, pp. 155-8). Correct and unquestionable trials only can answer the question; but the statement is so clear, and the effect produced so evident, that no one ought to reject them as false or delusive.

In a word, the spirit of the times becomes more and more manifest. Science has broken ground, is making rapid strides, and, unless impeded in its march by some unforeseen obstacle, must soon place in the back-ground the squabbling of opposing parties. What we really want is unanimity, and a powerful appeal to those energies which can bring about a total melioration of the practice of agriculture.

### CALENDAR OF HORTICULTURE FOR FEBRUARY.

*Retrospect of the Weather.*—In our last, page 91, we were enabled to report of the weather to Christmas, and then alluded to the singular altitude of the barometer, indicative of great atmospheric pressure. We have now to add that, till the last day of the old year, that phenomenon continued to exist, and with it a persistent state of clouds and gloom, with no cheering ray. A change, however, occurred on the 31st ult.; and then, for the first time during a period of thirty-three successive days, the glass receded below 30 inches (*i. e.*, below the point usually marked "Fair"), and a little rain followed.

It was natural to expect frost after so high a glass, but none occurred till January 2, when, after a fall of six inches of snow, on the morning of the 3rd, our thermometer marked 9 degrees of Fahrenheit—equivalent to 23 degrees of actual frost. With us the consequences were a destruction of more than half of the finest broccoli, and the utter decomposition of all the foliage of the artichoke (*Cynara*). But this severity was local; even three miles distant the mercury stood 8 or 9 degrees higher, and near London we read of 14 to 21 degrees of Fahrenheit. Subsequently, the weather has generally been cool, bracing, and cheerful, with one day of continuous rain, and two of seasonable frost; and hereupon we must observe that the north and north-east winds have brought no severity—a wonderful circumstance, and another peculiarity of this singular winter. The intense cold of the 3rd came with a westerly wind, which veered to the south-east.

To the third week, inclusive, January was altogether propitious, in so far that there was a sufficiency of solar light—that great agent of vegetable action, which was cursorily noticed in our last calendar. By it, and a frequent lively state of air, the ground also was brought into a state fit for any tool.

The earth or soil is the agent which will now claim attention, because it is the direct medium by and through which plants are supported and nourished.

The analysis of soils, to be duly effected, requires the skill and assiduity of the philosophical chemist. We shall not press the subject, because we are aware that no working man can undertake the operation; and again, because it is known to every one who has

tried experiments in any locality, that a difference, to no slight extent, does exist in earths, the plots of which may not be five yards asunder, to say nothing of the upper and lower strata. We believe that either in constructing or re-modelling a garden, the true upper soil should be dug through, its depth and quality as a loam generally determined, and those of the subsoil equally ascertained to the depth of a full spade. But we see no reason for that deep, laborious trenching which was insisted on. In an old garden it may happen that the spit below the surface should be brought up; but generally it will be wise to blend the two gradually.

A good loam—the staple of all fine vegetation—consists of a major part, say two-thirds, of soft siliceous sand, with but little coarse grit, still fewer stones; one-third or better of clay (aluminous earth), tinted pale, or rich brown, or ochrous, with some oxide of iron, and the whole containing a few hundredth parts of carbonate of lime (chalk). The only chemical agent required to determine the presence of chalk, will be a few drops of muriatic acid; which, if it excite hissing upon being added to a quarter of an ounce of the earth made liquid by rain-water, will prove that some chalk exists.

If a subsoil retains stagnant water, it must be drained; if it be gravelly, water will pass off too freely, and some clay in trenching, or a six-inch layer of chalk, if at hand, laid on the gravel, would be an essential improvement. And this remark furnishes the just inference that a pure natural chalk bottom, if 18 inches below a good soil, is a benign foundation; for not only does it secure drainage, but it obviates drought in the hottest seasons, and tends to render the roots of fruit-trees healthy.

The texture of a loam can be ascertained by attending to the simple process of the late Mr. Rham; or, still more easily, by drying a sample at the heat of boiling water, powdering an ounce of it, and, by repeated friction on a stone-ware mortar, with fresh additions of water, washing off the very fine substances which float, till only the rough grit remains. By drying these two portions at boiling heat, the weight of each will determine the proportion in which they are united, and, also pretty accurately, the quantity of soluble matter taken up by the water.

Earth, or loam, is very slightly soluble; in itself, therefore, it contains but a very small quantity of matter that can contribute to the nourishment of any plant. A trace of potassa is occasionally present, and this may combine with definite quantities of alimentary decomposable substances added as manure; or, in all probability, it passes with the water of the soil into the cellular substance of the roots. But though simple earth may not nourish, it assuredly supports the plant—affording it a bed or matrix, wherein its roots can ramify in search of aliment. Moreover, it is the medium of terrene electricity, the voltaic apparatus in which—connected with the air by the channels of the plant—these mysterious electrolysations are effected that laborate the raw materials into sap, and conduct it into the roots.

In the aptness of a soil to the organization of each individual vegetable, we find the necessity of studying the texture of any earth in connection with the natural character and figure of the roots; and thus we discover the means by which appropriately to meliorate any earth, according to the object we desire to effect.

Further remarks must be deferred till we come to the consideration of manure.

## VEGETABLE DEPARTMENT.—WEEKLY OPERATIONS.

The weather has been so dry, that it is reasonable to expect a good deal of rain, sleet, and perhaps snow; therefore advantage must be taken of every seasonable opportunity.

1st week.—Excite a sowing of peas in boxes, pots, or in turves reversed, placed in some gentle forcing-house, or under glass frames: seed and time are thus husbanded.

The Lancashire early kidney potato will not force well, but if the tubers be laid in a warm-house till the eyes push, time will be gained; and being then planted in warm borders, five inches deep, covered with long litter, the crop will become early. In Lancashire they think it late if they do not dig by the middle of May.

Sow celery on a warm bed of leaves, covered with a frame or lights; onions, likewise, for transplanting; radish, of sorts, under glass. No erection is more advantageous than a range of low pits, even if built of turf, provided they be excavated to a foot below the surface; in such pits salads and early vegetables of most kinds can be raised, and effectually protected by the glasses covered with mats.

2nd and 4th week.—Sow beans, either long-pod or green-seeded Windsor, spinach, salad—each two crops.

In the latter week—cabbage, the York, Vanack, &c., and a sprinkling of the red.

3rd week.—About this time, if the weather suit, transplant cabbage from nursery-beds, and therewith also fill up the blanks of the autumn transplantings.

Plant slips or rooted off-sets of the sweet pot-herbs.

In digging plots for planting, always work backward, and plant as the work advances, to avoid treading on the moved ground.

4th week. *The rotation of cropping* must be somewhat dependent upon convenience; but, as a good general rule, cabbage in all its varieties or species (*brassica*) succeeds well after potatoes, and with it the manuring of a plot should take place. *Potatoes* do well after brassica on plot so enriched. *Peas* may follow broccoli or celery. *Beans* after spinach. *Legumes* should generally have an intermediate crop, for they fill the land with peculiar remains, which are not propitious to plants of the same family, especially in shallow loams over chalk.

## FRUIT DEPARTMENT.

*Current-bushes* must now be pruned: first cut clean out all the crossing and superfluous wood that is too close, for the figure ought to be pretty regular, the branches rising from a single stem. Then cut back to the fruit-buds all the small last year's shoots, and shorten the leaders to about four or six eyes; thus the bush will consist of main shoots, furnished from end to end with short stubbles or spurs.

*Gooseberries*.—Treat the same as regards redundant old branches, but avoid systematic spurring. Spurs are required in some varieties, because, it will be seen in pruning, that at the very base of their short twigs one or two plump fruit-eyes are formed. Retain a fine healthy young shoot from the central stem, here and there, in lieu of an old branch, which may be cut away. Remove suckers from the base of the stems.

*Raspberries*.—At the end of the month cut away crowding, superabundant canes; and shorten the rest to a bud, seated just below the part where the canes are weaker, and take a bend. These prunings finished, remove any weeds; lay some nice manure over the roots; then turn the soil by raising thin slices

with a sharp spade—this will make the plot neat, without injuring the roots. Never dig the ground—only so far as with a fork, to remove carefully any wandering suckers.

*Strawberries* may remain till March, and so may espalier apple and pear trees.

*Fruit-trees* are, we suspect, scanty of fruit this year; for so severe and unexpected were the frosts of October, that many trees must have had all the young fruit destroyed—at least it is so with us.

*Apricot, Peach, and Nectarine trees*.—When the season is so far in advance as to show an enlargement of the buds, pruning should be completed. Lay in the main branches orderly, and only so near as to permit the regular distribution of the young bearing wood; then shorten that to a well-placed growing or leaf-bud, a little above the fruitful eyes. In some shoots, all the eyes have bloom only; in that case, if the shoot be small, it will be better to retain it at full length.

Persons sacrifice much to figure; otherwise, a tree bent and crossed, as it were irregularly, is frequently most fruitful. The observant amateur, who is at liberty to please himself, should study the habits of his trees, and treat them according to their own indications.

As to cropping fruit-tree borders, we do not advise it within a yard or four feet of the trees, because it implies digging; but a row of dwarf peas, lettuce, or strawberries, further off in front, can do no harm.

## ORNAMENTAL GROUNDS.

Avoid digging at present; many bulbs and herbaceous plants are not visible yet, and would be injured. Leaves upon the surface will gradually decay, and may be further covered with old cow manure, or even some of the new composts, as they shall be found suitable by experience; and in a month or six weeks all the quarters may be forked and trimmed. A little pruning of shrubs should be attempted, always in conformity with the habit of each tree and shrub, so as to retain bloom; otherwise, cut back to a bud. Observe figure in every attempt, and by no means reduce shrubs to a mass of ill-placed twigs. Every man who manages a garden ought to know his plants, and this he can do by watching their early developments.

Keep the lawns swept and rolled, the walks free from weeds and litter.

Sow annual seeds in pans of light earth, with gentle heat.

## FORCING GROUNDS.

Observe generally the directions of last month (see p. 92); but, with the manifest increase of light, give additional stimulus of heat. The vinery, by fire or hot water, may, in cloudy weather, be raised to 65 or 70 degrees, when the vines are flowering. The state of moisture is an ambiguous question. With earthen water-pipes and the new "tank system" some genial moisture is certain; but very able growers, who court flavour of fruit, never raise any vapour. The acarus, or red spider, is said to be banished by the new water improvements. Bottom heat, by tanks covered with mould, powdered charcoal, or sand, is an improvement of real consequence; for all fermentating materials—tan, leaves, moss, sawdust—decay, fail in heat, and breed oniscus (wood-lice). Where the heat by water is at command, and the plunging-bed can be kept at one uniform depth, and in a state free from grubs, &c., a mixture of half sand, half charcoal, we suspect would be found a most desirable medium.—January 22.

# STALLIONS FOR THE SEASON.

" Nobilitatis virtus et stemma character. "  
 " His dam won that sweepstakes, his sire won that race. "

Name.	Colour.	Age.	Pedigree.	Performances.	Principal Performance.	No. of Winners out by.	Sire of.	Standing at.	Apply to.	Price.
Alphens	Chestnut.	14	By Sultan, out of Archissa, by Quiz.	Started 4, won 2	—	2	Evenus	Newmarket	—	10 sovs., h. b. 3 sovs.
Auckland	Brown.	5	By Touchstone, out of Maid of Honor, by Champion	Started 9, won 5	Won the Derby	Untried.	—	Ecclestone, Chester	Mr. Hartshorn	10 gs.
Bay Middleton.	Bay	11	By Sultan, out of Colweh, by Planton	Started 7, won 8	Won the Drawing Room	26	Gaper	Boncaster	Mr. Cunningham	10 sovs.
Bisram	Chestnut.	15	By Sultan, out of Miss Candley, by Stamford.	Started 17, won 8	—	7	Albion	Burghley, Stamford	—	10 sovs.
Bentley	Chestnut.	13	By Buzzard, out of Miss Wentworth, by Curvantes	Started 10, won 5	Won the Clearwell	2	Chumny	Newmarket	Mr. Lifford	10 gs.
Buzzard	Bay	23	By Blacklock, out of Miss Newton, by Delphi	Started 16, w. 10	Won Fitzwilliam	17	Rattan	Newmarket	Mr. Lifford	15 gs. (20 subs.)
Bran	Chestnut.	18	By Humphry Clinker, out of Velvet, by Oiseau	Started 8, won 6	Won the Swallow	18	Our Nell	Stratford-on-Avon	Mr. Bradshaw	10 gs.
Belgrade.	Chestnut.	15	By Belshazzar, out of Alice, by Langat.	Started 20, won 8	Won Brighton Stakes.	Untried.	—	Stockwell, Surrey	Mr. Lowry	5 gs.
Cesar	Bay	8	By Sultan, out of Colweh, by Planton	Started 6, won 3	Won Riddlesworth	Untried.	—	Hampton Court	Mr. Worley	10 sovs.
Camel	Brown.	22	By Whitebone, dam by Selin	Started 8, won 5	—	74	Touchstone	Stockwell, Surrey	Mr. Lowry	25 gs. (30 subs.)
Charles XII.	Brown.	8	By Voltaire, dam by Selin	Started 34, w. 19	Won St. Leger	Untried.	—	Sheffield	Mr. Croft	12 gs.
Colwick	Bay	16	By Fillo da Puta, out of Stella, by Sir Minister.	Started 25, won 9	Won Chester Cup	4	Atlia	Bonehill, Tamworth	—	10 gs.
Coronation	Bay	6	By Sir Hercules, out of Ruby, by Rubens	Started 7, won 6	Won the Derby	Untried.	—	Chipping Norton	Mr. Painton	20 gs.
The Colonel	Chestnut.	19	By Whisker, dam by Delphi	Started 16, won 9	Won St. Leger	40	D'Egville	Willenden Paddock	Mr. Tattersall	10 gs.
Commodore	Bay	8	By Liverpool, out of Fancy, by Osmond	Started 4, won 4	—	Untried.	—	Riddlesworth, Theford.	Mr. Tyler	10 gs.
Clarion	Bay	8	By Sultan, out of Clara, by Fillo da Puta	Started 30, w. 11	Won the Cesarewitch	Untried.	—	Astley, Shrewsbury	I. B. Minor, Esq	5 gs. (winners and dams of winners of 100 <i>gratias</i> .)
Calmack	Bay	11	By Zinganes, dam by Rubens	Started 27, w. 12	Won Gorthumbury Stake	Untried.	—	Stockwell, Surrey	Mr. Lowry	10 gs., h. b. 4 gs.
Carew	Brown.	11	By Orville	Started 5, won 2	Won Goodwood Cup	Untried.	—	Sutton, Surrey	Mr. Balchin	15 sovs.
Don John	Bay	9	By Trump, or Waverley, dam by Comus	Started 10, won 9	Won St. Leger	Untried.	—	Bredy Park	Mr. Taylor	10 gs.
Delancey	Bay	20	By Whitebone, out of De-fiance, by Rubens	Started 1.	—	52	Deception	Stockbridge	Mr. Sadler	10 gs.
The Doctor	Black	10	By Dr. Syntax, dam by Lottery	Started 44, w. 29	—	Untried.	—	Newmarket	Mr. P. Scott	10 gs.
Eris	Chestnut	11	By Langat, out of Olympia, by Sir Oliver	Started 15, w. 10	Won St. Leger	12	Lucy Banks	Willenden Paddock	Mr. Tattersall	10 gs.
Erffing	Bay	24	By Orville, out of Emily, by Stamford	Started 11, won 8	Won Derby	133	Prism	Riddlesworth, Theford.	Mr. Tyler	50 sovs.
Euclid	Chestnut	8	By Emulus, out of Maria, by Whisker	Started 17, w. 11	Ran a dead heat for St. Leger	Untried.	—	Riddlesworth, Theford.	Mr. Tyler	10 gs.
Erasmus	Bay	17	By Moses, out of Eliza Leeds, by Comus	Started 15, w. 4	Won Drawing Room	Untried.	—	Riddlesworth, Theford.	Mr. Tyler	10 gs., h. b. 24, 12s., 60.
Ervey	Chestnut	5	By Plenipotentiary, out of Avshia, by Sultan	Started 6, w. 3	Won Drawing Room	Untried.	—	Maresfield, Sussex	I. V. Shelley, Esq.	7 gs.
Epruis	Chestnut	7	By Langat, out of Olympia, by Sir Oliver	Started 31, w. 12	Won Copeland Handicap	Untried.	—	Pitfold, Northampton	Mr. Poterion	10 gs.
The Extralite.	Grey	18	By Whitebone, out of Fair Ellen, by the Wellesley grey Arab	Started 5.	Ran second for Derby	1	—	Stockwell, Surrey	Mr. Lowry	5 gs.
Gladiator	Chestnut.	11	By Partisan, out of Pauline, by Moses	Started 1.	Ran second for Derby	8	Prizefighter	Athorpe, Northampton	Mr. Elliott	20 sovs. (40 subs.)
Givanni	Brown.	16	By Fillo da Puta, dam by Don Juan	Started 1.	Won Manchester Cup	3	Lothario	Burghley, Stamford	Mr. Hassall	15 sovs.
Glycon	Brown.	7	By Physiclan, dam by Soodisayer	Started 59, w. 23	—	Untried.	—	Hadley, Whitechurh.	—	—
Harkaway.	Chestnut.	10	By Economist, dam by Comus	Started 38, w. 23	Won Goodwood Cup (2)	Untried.	—	Rosmore, Kildare	T. Ferguson, Esq.	10 gs.
Hedman-Paloff	Bay	8	By Brantford, dam by Nabokhish	Started 10, won 6	Won Northumberland Pl.	Untried.	—	Koerberhan, York	—	16 sovs.
Heron	Brown.	11	By Bustard, dam by Orville	Started 41, w. 17	Won Liverpool Cup	Untried.	—	Erdington, Birmingham	Mr. I. Sheppard	5 gs., h. b. 2 gs.

Jon .....	9	By Cain, out of Margaret, by Edmond.	Started 6, won 1	Won the Clearwell.	2	Untried.	Hampton Court .....	Mr. Worley .....	15 sovs.
Inferior .....	13	By Lottery, out of Handmaid, by Wallon.	Started 36, w. 20	Won Liverpool Cup (2).	2	Untried.	Best of the Three .....	Mr. Spedding .....	7 gs.
Johnny Boy .....	8	By Jerry, dam by Ardrossan.	Started 4.	Untried.	Untried.	Untried.	Nottingham .....	Mr. A. Cluiter .....	10 gs., h. b. 3 gs.
Jerry .....	23	By Smoleusk, out of Louisa, by Orville.	Started 10, won 2	Won St. Leger.	52	Untried.	Eiden, Thetford .....	Mr. Brown .....	15 gs.
Jenny .....	10	By Sultan, out of My Lady, by Cornus.	Started 20, w. 16	Won the Ascot Cup.	10	Untried.	Dean's Hill, Stafford .....	Mr. Kirby .....	15 gs.
Lanercost .....	17	By Liverpool, out of Ots, by Bustard.	Started 49, w. 27	Untried.	Untried.	Untried.	Marton, York .....	6 sovs.	
Little Red Rover .....	9	By Trump, out of Miss Syntax, by Paynter.	Started 27, w. 12	Won the Ascot Cup.	27	Untried.	Odham, York .....	10 sovs., h. b. 6 gs.	
Laurel .....	10	By Blacklock, dam by Prime Minister.	Started 35, w. 17	Won the Port.	26	Untried.	Stockwell, Surrey .....	Mr. Lowry .....	20 gs., h. b. 5 gs.
Laverpool .....	20	By Trump, dam by Whisker.	Started 18, won 9	Won 8 Gold Cups.	25	Untried.	Stowwell, Birmingham .....	Mr. Gibson .....	10 gs., h. b. 4 gs.
Melbourne .....	11	By Humphrey Clinker, dam by Courvantes.	Started 42, w. 17	Won Orleans Cup.	Untried.	Untried.	Dringhouses, York .....	Mr. G. Foster .....	10 sovs.
Mus .....	5	By Bizarre, out of Dido, by Whisker.	Started 24, w. 10	Won 2,000 gs. S.	Untried.	Untried.	Goodwood Park .....	Mr. Kent .....	5 gs., h. b. 2 gs.
Montreal .....	8	By Velopede, out of Dido, by Whisker.	Started 24, w. 10	Won the Port.	Untried.	Untried.	Angel, Carterick .....	Mr. Spedding .....	6 sovs.
Moutral .....	14	By Muley, out of Nancy, by Dick Andrews.	Started 17, w. 11	Won the Port.	43	Untried.	Euston, Suffolk .....	Mr. Tweed .....	30 gs.
Mutley Moloch .....	20	By Casrel, out of Idalia, by Peruvian.	Started 7, w. 6	Won Riddlesworth.	29	Untried.	Stockwell, Surrey .....	Mr. Lowry .....	30 gs.
Pantaloen .....	13	By Buzzard, out of Cobweb, by Phantom.	Started 4, won 2	Won the Derby.	23	Untried.	Harker, Carlisle .....	Mr. Blunre .....	10 gs.
Phenix .....	8	By Enthus, out of Harriet, by Peniles.	Started 14, won 8	Untried.	Untried.	Newmarket .....	Mr. Bagnie .....	15 gs.	
Phenipentary .....	10	By Gadhand, out of Zartim, by Morisee.	Started 10, won 5	Untried.	Untried.	Heckenford .....	Mr. Bagnie .....	10 sovs.	
Phon .....	8	By The Saddler, out of Robecca, by Lottery.	Started 14, won 8	Untried.	Untried.	Carterick .....	Mr. Tweed .....	8 sovs.	
Provest .....	11	By Sandbeck, out of Johanna, by Solin.	Started 81, w. 19	Untried.	Untried.	Euston, Suffolk .....	Mr. Tweed .....	10 gs., h. b. 5 gs.	
Redshank .....	14	By Langer, out of Ruhna, by Blar-Klock.	Started 65, w. 25	Won Cleveland Cup.	1	Untried.	Whitson Paddock .....	Mr. Tattersall .....	10 gs., h. b. 5 gs.
Rat Catcher .....	9	By St. Patrick, out of Surprise, by Scud.	Started 49, w. 28	Won Ascot Cup.	18	Untried.	Newmarket .....	Mr. Pettit .....	10 gs.
Rat .....	1	By Royal Oak, dam by Orville.	Started 22, won 9	Won Waterloo Shield.	18	Untried.	Hampton Court .....	Mr. Worley .....	10 sovs.
Slane .....	7	By Sultan, out of Velvet, by Oiseau.	Started 19, won 7	Won Newmarket S.	58	Untried.	Whitshed .....	Mr. Tattersall .....	20 sovs.
Soutari .....	18	By Whalshone, out of Peet, by Winderer.	Started 7, won 3	Untried.	Untried.	Whitshed .....	Mr. Tattersall .....	20 gs.	
Sir Hercules .....	13	By Gamed, out of Arnelme, by Fillo da Pita.	Started 25, won 9	Won Doncaster Cup.	21	Untried.	Yardley, Birmingham .....	Mr. Holloway .....	10 gs., h. b. 3 gs.
Sir Issue .....	16	By Waverley, out of Castrellina, by Casrel.	Started 4, won 3	Won Portland Handicap.	17	Untried.	Ebbwston, York .....	10 gs.	
The Saddler .....	6	By Lottery, out of Morglana, by Muley.	Started 2, won 1	Untried.	Untried.	Clowdle, Stockport .....	Mr. Wood .....	10 gs., h. b. 10 gs.	
Sheer Anchor .....	10	By Tomboy, out of Bessy Bedlam, by Fillo da Pita.	Started 16, won 4	Won the Column.	Untried.	Untried.	Burgh, Stamford .....	10 sovs.	
Toby Boy .....	13	By Priam, out of Green Manne, by Sultan.	Started 21, w. 10	Won St. Leger.	Untried.	Untried.	Eaton, Chester .....	40 gs. (subse. full.)	
Troilus .....	7	By Gamed, out of Banner, by Master Henry.	Started 61, won 3	Untried.	Untried.	Bilton .....	Mr. Blucker .....	5 gs., h. b. 2 gs.	
Tonchstone .....	13	By Enthus, out of Warlo, by Whisker.	Started 21, w. 10	Untried.	Untried.	Untried.	Untried.	10 sovs., h. b. 2 gs.	
Theon .....	13	By Wamba, out of Young Chryseis, by Dick Andrews.	Started 3, won 1	Untried.	Untried.	Untried.	Untried.	10 sovs., h. b. 2 gs.	
The Tulip .....	13	By St. Patrick, out of Turquoise, by Selin.	Started 7, won 3	Untried.	Untried.	Untried.	Untried.	10 sovs., h. b. 2 gs.	
Ulick .....	19	By Blacklock, dam by Junipo.	Started 10, won 2	Won Liverpool Cup.	25	Untried.	Bletsoe, Bedford .....	Mr. Bennet .....	10 sovs., h. b. 2 gs.
Velopede .....	11	By Partisan, out of Fawn, by Smoleusk.	Started 82, w. 162	Won Parthand Handicap.	3	Untried.	Yuscalwin Swansa .....	Mr. Whitefoot .....	5 gs., h. b. 5 gs.
Venison .....	18	By Blacklock, dam by Phantom.	Started 6, won 3	Won Doncaster Cup.	48	Untried.	Northcliffe .....	Mr. Burden .....	15 gs. (50 subs.)
Voltaire .....	10	By Caiad, out of Monimia, by Muley.	Started 4, won 3	Untried.	Untried.	Untried.	Stockbridge .....	Mr. Sadler .....	20 gs.
Whitman .....	10	By Caiad, out of Monimia, by Muley.	Started 4, won 3	Untried.	Untried.	Untried.	Middlethorpe, York .....	Mr. Smallwood .....	15 gs.

We have spared neither trouble nor expense (*i. e.* our arms or eyes), in endeavouring to make the above complete and correct; and we flatter ourselves it will be found to contain every available particular concerning the high-mettled steeds at present engaged in keeping up the breed of the English race-horse. More it would be almost impossible to add; and, after consulting this catalogue, we must refer the breeder to the animal himself, or his proprietor, for further information: suffice it that there is plenty of choice—all sorts, all sizes, and all prices"—from Emilins, at fifty guineas each, to Clarion, at next to nothing at all; or, from Bay Middleton, standing something like seventeen hands—in peripentular, down to that little nag, Little Red Rover. Some few horses in our List, not having been advertised when we made it out, we give at the same price and place as last season; except in cases where we have reason to think a change is contemplated. The groom's fee is often included in the number of winners, or, if not, varies from half-a-grown to a guinea, never exceeding the latter. Neither the Colonel's German, nor Sir Hercules' Irish stock, are included in their number of winners, as we were unable to procure a correct return under that head.

## REVIEW OF THE CORN TRADE DURING THE MONTH OF JANUARY.

Another month has been concluded, and no improvement in the prospects of agriculture has occurred during its progress. In the value of wheat, instead of that advance which, when the corn trade is in a sound and healthy state, naturally takes place after the turn of the year, the farmers' weekly supplies in all the great markets of consumption, although by no means abundant, have been generally sold at drooping prices since our last publication, and thus have our wheat producers been subjected to even heavier pecuniary losses than they could have anticipated two or three months ago. Confidence in the eventual profitable results of farming operations is, for a season, entirely gone; nor can it be again restored without the determined interference of the legislature in favour of agricultural property, and of agricultural science and industry. If, however, that portion of the public press which is considered to be ministerial has latterly expressed the opinions of her Majesty's present ministers on this all-important subject, we can hold out to our agricultural readers not the slightest hope of assistance being given to them from this quarter, during the ensuing session of parliament. These ministerial journals have been, during the whole of last month, most loud in their praises of all the late measures of the advisers of the crown. A flourishing revenue, and a flourishing commerce undoubtedly they have most just reasons to boast of; but we in vain look around to discover the grounds on which they assert that neither land nor agricultural property has been subjected to any farther decline in value, since the gathering of the last harvest was completed. In looking at the mean value of British grown wheat in August last, we find the price quoted in the *London Gazette* to be some pence above 56s. per quarter; and, during the same month, we find eight hundred thousand quarters of German and of Polish wheats entered for consumption in the United Kingdom, on the payment of not half of the duty to which the British producer is subjected by the payment of direct and indirect taxation alone. With the *Gazette* average price of wheat in the course of last month at 49s. 6d., and with these large reductions in rents, we really cannot conceive anything more perfectly impudent and contemptible, than is the assertion, made deliberately too, in a portion of the public press wishing to be considered as the organs of the present government, that land has not declined in value during the last half-year. The present prime minister has, with great truth, fixed the mean price at which wheat can be, without loss to the farmer, produced in the United Kingdom at 56s. to 58s. per quarter; and yet the would-be supporters of Sir Robert Peel's late system of reducing the legislative protection previously held out to native industry, have now made the notable discovery that the Essex and Kentish farmers can sell their wheats at the average price of 49s. 6d. per quarter, without depreciating, in the slightest manner, the value of land. Be these, however, the sentiments of the ministers or not, still public confidence is at present withdrawn from those gentlemen who were placed in the House of Commons by the power of the agricultural interest, and who must eventually depend on the same power for the retention of the elevated positions which

several of them now hold in society; and unless the friends of agriculture in the Lords and in the Commons make a determined effort, during the ensuing session of parliament, for the protection of agricultural property, and of native industry of every description, whether it be applied to manufactures, to field labour, to mineral pursuits, or to the fisheries and naval affairs generally, we are morally persuaded the time will have passed away when prosperity might have been easily restored to the pursuits of the British people in all departments of productive labour. The farmer's friends in the legislature, and those who take under their protection the wages of honest industry, have at present a wide sea and open ocean to navigate in the pursuit of their most patriotic and humane objects. With many millions of acres of land now in a perfect state of unproductiveness, but eminently calculated to be converted into green or yellow fields; with many millions sterling of unemployed capital; with a highly intelligent, industrious, and, unfortunately, only partially employed population; and with boundless public credit, they can have no difficulty whatever in bringing sound principles again into action in our internal polity, and in placing an effectual remedy to the many evils which at present affect our social system. By the cultivation of our at present useless lands, and by the immense improvements which may be still made in even our best cultivated fields, most excellent employment may at present be given to the entire population, and the foundation may be laid for most abundantly supporting, by home-grown agricultural produce, all the inhabitants of the United Kingdom before another quarter of a century can elapse, were they triple their present numbers. But the importation of foreign agricultural produce, and of foreign manufactured goods, cannot, under any circumstances, be attended by any advantages to the industrial classes in these kingdoms. Indeed, it is contrary to the nature of things that it should be so, for it is the bounden duty of every well-ordered community to give most effective protection to native industry, in whatever channel it may receive employment. It is not by employing foreign workmen to perform that labour which can be done at home, that the real wealth of nations can be promoted, so long as a productively employed people constitutes real public riches. The complaint now is that, in consequence of the superabundance of agricultural labourers, the wages of that description of labour are most ruinously depressed at the present moment. It is a strange way certainly for raising the wages of our agricultural labourers to employ those of the continents of Europe and of America, in the production of agricultural produce for the consumption of the British people, which we are perfectly able to grow at home, and the profits arising from which, would most comfortably maintain many thousands of industrious families at present reduced to distress. This is a new system of philosophy, which no doubt the master manufacturers and many of the cotton lords perfectly understand, although by common minds it cannot be easily comprehended. The object of the members of the Anti-Corn-Law League cannot, however, be misunderstood, for it has repeatedly been declared by them at their public meet-

ings, although for the present it has answered their purposes to change their arguments. The reduction of the wages of their labourers, and the recovery of their losses occasioned by the over production of goods, are the points at which they aim; but in the agricultural property alone, can the necessary means be found for the gratification of their most unjust desires. By reducing the price of food most unnaturally, these conspirators against agricultural property most correctly imagine that the wages of their workmen can be alone reduced, and then they know that foreign manufacturers cannot any longer compete in foreign markets with goods produced chiefly by steam machinery in the United Kingdom. To obtain this, the highest object of their ambition, the reduction of two millions of agricultural labourers to poverty or to the union house, gives them not one hour's uneasiness; and the only advantage which they promise to the country for this sacrifice, is the increase of steam-engine labour and of their private fortunes; for the employment of additional manufacturing workmen comes not into their contemplation. These gloomy prospects are beginning already to regulate the operations of the farmers throughout the United Kingdom. The quantity of winter wheats planted this season is less than usual; and until there be some certainty of wheat prices becoming equal to the expenses of production, the cultivation of all descriptions of grain must yearly become less. Although the winter season has been unusually mild and open, still the young wheat plants are not too forward, yet they have generally assumed the appearance of health and of luxuriance, in as far as their growth has as yet progressed. This short cultivation of winter sown wheats is, in part, causing an opinion to be entertained, in the corn trade generally, that prices must be considerably dearer before the next wheat can be brought into our markets for sale. When we consider that the last wheat crop was both deficient in quantity and a great part of it inferior in quality, we cannot help thinking that there exist good grounds for this expectation; but then no advance hereafter can be of much advantage to the great majority of our wheat producers, for low prices have compelled many of them to sell very largely; the stock on hand, consequently, is even already unusually small, and little, we much fear, will remain for sale, at that period when the improvement in prices most probably will occur. Foreign corn merchants, we happen to know, are already regulating their conduct by these, to them, favourable prospects; for they are not pressing foreign free wheats too heavily on our different large markets of consumption, and purchases, to a considerable extent, have been even thus early made in the various corn markets within the Baltic sea, and in the north of Germany, at rather moderate prices, for shipment to this country, as soon as the season permits mercantile operations. No mandate of the Anti-Corn-Law League can induce storms, frost, and ice to allow grain shipments to this country, at this season of the year, from any part of the north of Europe; nor can the same League prevent an immense quantity of foreign wheat from being annually poured into our markets during the summer and autumnal months, whether our own crops be large or small, so long as our farmers are not properly protected against the competition of foreign land proprietors, who pay neither rent, taxes, nor tithes, and who maintain their agricultural serfs by the smallest quantity of coarse food, just enough to keep life and body together. That large importations of foreign wheat will be found necessary, during this corn season, the unfavourable state

of the large wheat crop sufficiently proves already; but even this necessity is no sound reason for not charging on that wheat a duty at least equal to the public and private taxes paid by our wheat growers at home. This would be only an act of common justice to all, and should be performed without any reference to that protection which it is the duty of every government to extend to internal industry. These foreign wheats, however, will be entered for home consumption at the commencement of the next harvest season, when our home grown wheats will be exhausted, and when prices shall have reached that point which must materially reduce the importation duty. The difference between our present duty of 20s. per qr. and the probable one of from 5s. to 8s. per qr. in August next, will, at the expense of our revenue, add materially to the profits attending these importations, and will be divided amongst foreign land proprietors, the Hebrews (who bring it down from Poland to the ports of shipment in the north of Europe, and in the Black sea), and the German corn merchants, who consign these wheats to this country for sale. In this state of the corn trade it is utterly impossible that our agricultural interest can ever return to a sound and healthy condition, for it must annually be subjected to pecuniary losses; and all attempts to prosecute further improvements in the fields must be abandoned; the farmers, from necessity, must reduce largely their farming expenses, and one half of the agricultural labourers must be reduced to poverty and distress, because it is the pleasure of the leaders of the Anti-Corn-Law League to transfer one half of our agricultural employment to the serfs and slaves of foreign nations. Under such circumstances, however, every interest in the empire must eventually suffer.

The steam packet, from North America, of last month, arrived, as usual, in due course of post. The navigation of the lakes and of the rivers was, at that period, unobstructed. The letters from Upper Canada communicate one piece of information which will be rather startling to her Majesty's present Ministers, and to those members of the Legislature calling themselves the friends of agriculture, and the protectors of the wages of internal industry; but which can create no surprise amongst those merchants and agriculturists who are acquainted with our North American possessions, with their internal resources of wealth, and with their great capabilities for supplying the United Kingdom with large quantities of all descriptions of American agricultural products. It will require only a couple of years, or so, to illustrate the injurious consequences of the present Canadian Corn Bill to our farmers, and to the best interests of our productive labourers. Of the possibility of transmitting the agricultural produce of the far west States of America direct to this country, without incurring even the expense of trans-shipment, the news now received by the Hibernian steam-packet must convince the self-called friends of British agriculture themselves; for we learn that a ship had then been actually loaded, at the head of Lake Huron itself, with wheat, and had sailed direct for London by way of the Welland canal. Thus this Canadian Corn Bill is scarcely made public, when a cargo of wheat—most probably from Ohio, Michigan, or some other of the western provinces of the United States of North America—is shipped direct to London from that part of our American possessions which is nearest to those of our trans-atlantic brethren in those regions. Shipping, at this late period of the season, was then

alone wanting; else we would now receive very considerable supplies of wheat, flour, and of cured provisions from Upper Canada; but this want, next year, will be removed by New Brunswick ships, intended for sale in the United Kingdom, proceeding to Lake Huron, and taking cargoes of grain and of provisions on board there, at very moderate freight, which will be much more profitable than coming to England direct from New Brunswick or Nova Scotia in ballast. To the members of the Anti-Corn-Law League this intelligence, however, must be highly gratifying; for, if their doctrines be correct—that competition is the only true source of real prosperity—our ship builders and ship carpenters will, in a short time indeed, be rendered much more prosperous than they are at present, by the increased competition which they will hereafter meet with from those ships built in our North American possessions, partly occasioned by the Canadian Corn Bill—that act of such supreme wisdom for the promotion of our internal industry. To our farmers, the prospect for the future must also be, in a high degree, gratifying; for yearly now must the quantities of foreign agricultural products for sale in all our large markets of consumption be increasing, and yearly, therefore, must the prices for home-grown agricultural products be improving, if the modern system of political economy now taught by the philosophers of the Anti-Corn-Law League be sound and correct. Our graziers, cattle growers, and provision curers, must likewise have just grounds to congratulate themselves on the altered aspect of their affairs; for one half of the cheese now consumed in this country is foreign; and that portion of it which is imported from the United States of America is inferior in quality to none produced in any county in England, including Cheshire itself. The prospects of the cattle breeders, feeders, and curers, in Ireland and in Scotland, are undoubtedly rendered daily more brilliant by similar causes. At a grand inspection of American cured provisions held in London in the middle of last month, and attended by the leaders of the free-trade system, the quality of these provisions was unanimously declared to be most excellent, and the prices were lower than similar descriptions could have been produced at in any part of the United Kingdom—a circumstance which gave the highest satisfaction to the patriotic friends of the productive classes in this country. Competition in these articles, therefore, must also enhance their value and increase their consumption amongst all classes in the United Kingdom. At the same London exhibition, samples of cured salmon were shown; and from their exceedingly good quality and moderate value, they were highly approved of by the judges. Salmon rivers, formerly, were considered valuable, particularly in Scotland and in Ireland, because they gave food and clothing to numerous industrious families; but it no doubt is much better for these men that the employment, in which they so lately gained their daily bread, should be transferred to foreigners professing the same profession; for, although it may deprive them of wages altogether, still they will have ample time allowed them for the enjoyment of the most profound idleness, with all those luxuries which usually attend this mode of passing through life. Shoemakers, hatters, ropemakers, and even our fishermen, a few years ago considered the bulwarks of British naval power, have equal reasons for praising the alterations made during the last session of Parliament in our Custom House duties; for the only consequences which can

attend them must be annually increasing competition, and that additional prosperity to all which must be the result of the adoption, by the British legislature, of the new doctrines of the Anti-Corn-Law school of philosophy.

From the north of Europe the intelligence received, in the course of the last month, is only important in so far as it confirms the rumours in this country of purchases of wheat having been already made at Stettin, Rostock, Dantzic, and Elbing, for shipment to this country, when the navigation of the Baltic sea again becomes practicable, and that the quantity will be considerably larger than it was last summer, should our prices here be encouraging. At present the elements stand in the way of immediate shipments; but even were shipments practicable, they would be delayed until our import duties be reduced by higher prices. The open weather, however, has permitted the shipments of oats and barley to be continued from Germany; and, accordingly, the arrivals of these two articles from the ports without the Baltic sea have been rather large since our last publication, have been entered on arrival for home consumption, and have materially interfered with the prices of grain of similar qualities grown in this country. This trade, so favourable to the German landed interest, continues to be carried on under foreign flags, and in ships navigated by foreign seamen. The grain is paid for in gold and silver, and so also are the freights. Goods are not wanted in the regular way of commerce, because the smugglers have already most abundantly supplied all the markets in Germany with the manufactures of the United Kingdom. Ireland, however, suffers severely by these large importations of foreign oats; our coasting trade is injured by the same cause, and it confers not one benefit on any class of the people within the British empire. It, however, is pleasing to the Anti-Corn-Law Leaguers.

In the prices of barley the variations, during the last month, have been exceedingly unimportant. The supplies, generally, have not been at any time large since the last crop was gathered from the fields; but with the addition of foreign barleys, of which a considerable quantity, whilst the season permitted, arrived, they have been fully equal to the consumption. For the maltsters' demand the quantity wanted is annually becoming less, and this department of tillage is consequently attracting annually less of the farmers' attention. The quantity of malt manufactured last year is one-third less than it was ten years ago, and this deficiency is the natural consequence of exorbitant taxation. In this source has originated that system of introducing so many deleterious ingredients into the great proportion of the beer now consumed, by which the public health is injured, and by which the beer consumers are defrauded of that pure beverage for which they pay their money. Malt and hops are the best as well as the cheapest articles from which beer can be extracted, but taxation has rendered them the dearest. Adulteration, therefore, is the necessary consequence of this erroneous system of legislation; and the numerous convictions which are periodically made in the Excise Courts prove, most clearly, the immense extent to which this nefarious trade is carried. The practice of it is easy, whilst its detection is difficult. Those acquainted with its details, in the first place, start into a vat two thirty-six gallon barrels of pure beer; and, to increase the quantity, thirty-six gallons of water are introduced into the same vat: to restore the colour, treacle and coarse sugar are put into the mixture, but these articles are too dear to permit any great quantity being used. To give this precious drink a frothy head, green vitriol is the article used;

and coculus indicus is requisite to give it the quality of intoxication; grains of paradise to warm, pepper to sharpen, salt to create thirst, and the essence of pigtail tobacco to stupify, are all necessary to the completion of this highly poisonous beverage. In this manner is the consumption of barley yearly now becoming more and more limited, nor can any improvement in the maltsters' trade take place, until, by the reduction of the malt and hop duties, this infamous system of beer adulteration be rendered unprofitable. Instead of reducing so very materially the Custom-house duties on all descriptions of foreign agricultural produce, our financial ministers would, indeed, render most valuable and important services to the vast majority of her Majesty's subjects, did they direct the attention of the legislature to the unequal manner in which our internal system of taxation falls on the people, and particularly on the landed gentry, their tenants and agricultural labourers. Barley pays more than a fifth of the annual public expenditure, the interest on the national debt included; nor is the amount paid from this article into the treasury complained of, but the manner in which it is imposed. It is still rumoured that Sir R. Peel means to introduce some reform into the malt and home made spirit duties, should his principles of expediency allow any alteration to be effected in them. But of this we feel much doubt. There, however, can be no doubt of the benefits which the reduction of the malt and of the home made spirit duties would confer on this country, even in a pecuniary point of view. To reduce the malt duty to 1s. per bushel would triple the consumption of beer, and would entirely destroy the iniquitous system of beer adulteration, to which we have already so frequently had occasion to allude. Englishmen would then again enjoy their favourite beverage in a pure and wholesome state, and many millions of the people, who at present cannot afford to consume beer at all, will, at all events, have occasionally some portion of this article, so necessary to their contentment and comforts. Within a year or two after this reduction was effected, the sum annually paid into the treasury from the malt duty would be considerably greater than it is under the present system of outrageous taxation. In consequence likewise of the high duty charged in England on the distillation of spirits, two-thirds of the spirits now consumed in that portion of the British empire are smuggled, pay no duties towards the public burdens, and are of the worst possible quality. Their introduction into this country corrupts the public morality, whilst their consumption is highly injurious to the public health. Smuggling is the foundation of many crimes in Great Britain, particularly of that of drunkenness; and moderate duties in England would suppress many of these evils as they have done already in Scotland and in Ireland. Here we have perfect experience of the benefits which arise from a moderate system of home made spirit duties. Drunkenness prevailed when the duties were high, but ceased in a great degree when they were rendered moderate. When the duty was high the sum paid into the public treasury was small; but when it was reduced, smuggling was suppressed, and the treasury received the full duty on every gallon consumed. This is the case at present in Scotland and in Ireland, where the spirit duties are low; and the same principle, if adopted in England, must be attended by similar consequences. The reduction of the duty in England, even to 5s. per gallon, would put down the trade of the smuggler, and would open the spirit trade to fair and legitimate competition.

But the reduction of the duties now charged on manufactured barley and on hops would be attended by other advantages fully as important as any to which we have now alluded. The increased consumption of barley which it would occasion, would render necessary the cultivation of hundreds of thousands of acres of land, at present in a state of perfect unproductiveness, and would give employment to many thousands of agricultural families, in addition to those who already obtain their food by the cultivation of the fields. Necessity would no longer exist for transporting to the colonies thousands of families annually, and this expense, at all events, would be spared to the community. With the unbounded public credit now enjoyed by the United Kingdom, it is wonderful that one acre of land should be allowed to remain in a state of nature, or that one industrious family should ask for employment in vain. It is not by encouraging the cultivation of foreign fields, or by throwing our own lands out of tillage, that the people of this country can be properly supported. Neither the public health nor the public morality can be improved by transferring the peaceful and salubrious labour of the fields from our own labourers to those of Europe and of America, nor can their condition in life be in any manner improved by increasing manufacturing and mineral employment amongst them. It is not by furnaces, machinery, and steam, that the labourers can ever be rendered contented with their lot in life; but in field employment alone can the vast majority of them receive productive employment. These great advantages can only be obtained by the legislature again restoring fair, and at the same time perfect protection to our internal industry in whatever channel it may be employed. The reduction of the malt and English spirit duties would be an excellent beginning to the improvements which may be easily effected in our internal polity, and real prosperity would speedily afterwards be showered on all classes in British society.

The oat trade has continued nearly in the same condition in which we described it to be in our last publication. The supplies in all the great markets have been fully equal to the wants of the consumers, but, having been increased by the foreign arrivals, prices have remained lower than are the expenses of their production in this country. To the farmers in those districts, in Scotland and in England, wherein oats are still cultivated, their depressed value is injurious; but, to the agricultural interest in Ireland, who have directed their attention principally to the production of this former valuable article of culture, it is little sort of being ruinous. Before the fair protection given to native products was withdrawn by the repeal of the corn laws, in as far as oats are concerned, agricultural improvements were making rapid progress in the sister kingdom, and her trade was gradually increasing. Neither the farmers nor the ship-owners in the west coast of Ireland now however, can compete with the oat growers of Germany, nor with the ship-owners at the ports in the north of Europe without the Baltic Sea. Freights at 1s. 3d. per quarter, from Bremen and Emden to the east coast of Great Britain, pay well the expenses of foreign shipping; and as only the finest qualities are forwarded to this country, the difference between our highest and our average prices pays the duty charged on importation. So long as the corn law remains in its present state, and our tariff of duties on the importation of foreign agriculture is continued, the labour of tillage in Ireland must annually become less, and a total stop must be put to any

further improvement being attempted in her, at present, millions of acres of most excellent but uncultivated lands. With the encouragement which the English market might give to her agricultural produce, and to her live and cured cattle and swine, and, with the use of the large sums of money at present unemployed in the United Kingdom, in Ireland alone, may food be grown perfectly sufficient for the consumption of our population; but remunerating prices must be secured by an alteration of our custom-house duties, and the capital so invested must likewise be rendered safe, else these mighty advantages can never be obtained. The protection of agriculture would give full employment and ample wages to the Irish people, and agitation and complaint would speedily afterwards cease to exist amongst them. Thus the principles of the free-traders deprive Ireland of advantages which would soon render the population generally happy.

CURRENCY PER IMPERIAL MEASURE.

WHEAT, Essex and Kent, new, red	48 54	White 48 53 58 60
Irish	48 50	Do. . . . . 50 52
Old, red	54 59	Do. . . . . 60 63
RYE, old	30 36	New . . . . . 56 —
BARLEY, Grinding, 30 32 Malting	34 35	Chevalier 36 37
Irish	28 32	Bere . . . . . 26 28
MALT, Suffolk and Norfolk	60 62	Brown . . . . . 56 58
Kingston and Ware	60 63	Chevalier 60 63
OATS, Yorksh. & Lincolnshire, feed	22 23	Potato . . . . . 22 25
Youghall and Cork, black	19 20	Cork, white 20 21
Dublin	19 20	Westport 20 21
Waterford, white	19 21	Black . . . . . 19 20
Newry	21 22	
Galway	18 19	
Scotch, feed	20 22	Potato . . . . . 23 25
Clommel	20 21	Limerick 20 21 23
Londonderry	20 21	Sligo . . . . . 18 19
BEANS, Tick, new	28 34	Old, small 34 38
PEAS, Grey	32 33	Maple . . . . . 31 33
White	23 36	Boilers . . . . . 34 38
SEED, Rape	27l. 28l.	Irish . . . . . 26l. per last.
Linseed, Baltic	30 38	Odessa 41
English Red Clover	—	— per cwt.
FLOUR, Town-made 48 50 Suffolk	40	40 per sk. of 280lbs.
Stockton and Norfolk 23 40	Irish 42	—

FOREIGN GRAIN AND FLOUR IN BOND.

WHEAT, Dantzic	42 45	
Hamburg	40 —	
Rostock	42 44	
BARLEY	20 —	
OATS, Brew	12 16	Feed . . . 11 15
BEANS	15 19	
PEAS	23 25	
FLOUR, American, per brl.	21 23	Baltic . . . 21 23

Account showing the Quantities of Corn, Grain, Meal, and Flour, imported into the United Kingdom, in the month ended the 5th Jan., 1844; the Quantities upon which Duties have been paid for Home Consumption during the same month, and the Quantities remaining in Warehouse at the close thereof.

Foreign Grain and Flour.	Quantity imported.	Quantity entered for consumption.	Quantity remaining in warehouse.
	qrs. bush.	qrs. bush.	qrs. bush.
Wheat, from British Possessions	8658 6	7815 1	1270 3
Barley	833 1	833 1	—
Peas, from do.	3012 2	3372 2	386 0
Indian Corn, do.	—	—	19 1
Wheat, foreign	26107 3	1131 7	181769 0
Barley, do.	8850 5	7253 5	12097 2
Oats, do.	1062 7	1574 5	60417 8
Rye, do.	—	—	2225 6
Peas, do.	3895 4	3197 1	25033 0
Beans, do.	344 6	5522 1	85529 5
Indian Corn, do.	2 5	130 5	2403 4
Buck Wheat, do.	0 1	0 1	—
	cwts. qrs. lbs.	cwts. qrs. lbs.	cwts. qrs. lbs.
Flour and Meal from British Possessions.	100370 2 2	106489 0 6	4906 2 13
Flour & Meal, foreign	13025 0 4	73 2 16	87875 1 11

COMPARATIVE PRICES OF GRAIN.

WEEKLY AVERAGES by the Imp. Quarter, from the Gazette, of Friday last, Jan. 26th, 1844.	s. d.	AVERAGES from the corresponding Gazette in the last year, Friday, Jan. 27th, 1843.	s. d.
WHEAT	51 8	WHEAT	40 3
BARLEY	33 7	BARLEY	27 8
OATS	15 0	OATS	17 0
RYE	31 7	RYE	30 4
BEANS	20 6	BEANS	27 10
PEAS	30 3	PEAS	34 4

IMPERIAL AVERAGES.

Week ending.	Wheat.	Barley.	Oats.	Rye.	Beans.	Peas.
Dec. 16th	50 9	32 0	18 6	30 0	31 6	32 4
23rd	50 3	32 0	18 7	29 9	30 10	30 10
30th	49 0	32 3	18 5	31 4	30 1	31 6
Jan. 6th	49 10	32 7	18 3	30 8	29 5	30 7
13th	50 9	33 0	18 9	23 5	29 8	31 0
20th	51 8	33 7	18 9	31 7	29 6	30 3
Aggregate average of the six weeks which regulates the duty.	50 6	32 7	18 7	31 2	30 2	31 1
Duties payable in London till Wednesday next inclusive, and at the Outports till the arrival of the mail that day from London.	20 0	6 0	8 0	10 0	10 6	10 6
Do. on grain from British possessions out of Europe.	6 0	0 6	2 0	2 6	2 0	1 9

PRICES OF SEEDS.

JANUARY 29.

Cloverseed, both red and white, is held firmly at former rates; and there is no alteration in Trefoil. Canaryseed was very unsaleable, but not cheaper. In other species of seeds there was scarcely anything passing.

Carraway	—	new	57	62	per cwt.
Clover, English, red	46	65	white	—	—
Flemish, pale	44	52	do.	70	115
New Hamburg	63	68	do.	70	122
Old do.	42	54	do.	70	115
French	50	70	do.	—	—
Linseed, English, sowing	60	60			
Baltic	—	—	crushing	25	37
Mediet. & Odessa	26	38			
Coriander	15	20	per cwt.		
Mustard, brown, new	12	18	white	10	12 p
Trefoil	—	—	old	14	23
Rapeseed, English, new	25l.	26l.	per last.		
Linseed Cakes, English	9l. 10s.	to 10l.	per 1000		
Do. Foreign	5l.	to 6l. 10s.	per ton.		
Large, foreign	—	—			
Rapeseed Cakes	5l. 5s.	to 5l. 10s.			
Hempseed	35	28	per qr.		
Rye Grass, English	—	—	Scotch	—	—
Tares, winter	4s. 0d.	to 4s. 6d.			
Canary, new	53	—	fine	60	—

PRICES OF HOPS.

BOROUGH, MONDAY, JAN. 29.

The demand for Hops has been quite steady, and takes off at the current rates all that is offered; but holders keeping back there is not so much doing as there might be. An advance of 2s. per cwt. has occurred since this day week in the Sussex and Weald of Kent pockets, but other qualities remain about the same. There have been sales of old Olds, owing to the dearness of new samples.

POCKETS, 1843.

Sussex	122s. to 130s.	Mid. Kent	140s. to 180s.
Wealds	124s. to 130s.	Do. bags	140s. to 175s.
Choice do.	135s. to 140s.	Farnham pockets	195s. to 210s.
East Kent	145s. to 210s.		

POTATO MARKET.

SOUTHWARK, WATERSIDE, Jan. 29.

Having had during the past week a continuance of fine weather, which has brought the turnip-tops into the green market earlier and more abundant than usual, and consequently arrested the improvement in the demand for Potatoes, though holders of Scotch reds have increased their pretensions; yet where it was necessary to clear vessels coming on demurrage, no advance whatever could be obtained on last week's price. We have quoted 70s. for Perth and Devonshire reds, as that price has been generally asked, but can only be regarded as nominal.

The supply during the past week has been limited, but these with former arrivals have been fully sufficient for the present demand.

York Reds .....	60s. to 80s.	Do. Kidneys .....	per ton. 65s.
Perth do. ....	65s. 70s.	Wisbeach do. ....	—s. 65s.
Early Devons .....	65s. 70s.	Do. Blues .....	—s. —
Corwall .....	65s. 70s.	Do. Whites .....	50s. 55s.
Jersey Blues .....	60s. —s.	Guernsey Blues .....	60s. —s.
Kent & Essex Wh. ....	50s. to 55s.	Prince Regents .....	55s. 65s.

BUTTER, BACON, CHEESE, AND HAMS.

Irish Butter, new, per cwt.		Cheese, per cwt.	s.	s.
	s. s.	Double Gloucester .....	52	60
Carlow, new .....	84 85	Single ditto .....	43	51
Sligo .....	72 —	Cheshire .....	52	76
Hanbridge .....	72 —	Derby .....	54	60
Cork, 1st. ....	84 —	Foreign ditto .....	40	44
Waterford .....	70 76	Bacon, new .....	36	40
English Butter,		Middle .....	40	44
Dorset, per firkin .	54 —	Hams, Irish .....	60	70
Foreign Butter, cwt.		Westmoreland .....	66	70
Prime Friesland. .	100 106	York .....	76	80
Do. Kiel .....	98 106	Fresh Butter, 14s. 6d. per doz.		

WOOL MARKETS.

BRITISH.

LEEDS, Jan. 26.—Sales of combing wools have been brisk this week, and a further advance in price has been realized; though not equal to the rates which the staplers have been compelled to give in the country. There is more doing in clothing wools, and at better prices than of late; but they are still considerably lower in proportion than fleeces and combing wools.

WAKEFIELD, Jan. 26.—Stocks in most kinds, both of long and short wools, have been moderately replenished this week, and sales have been about equally extensive, at prices somewhat further improved upon last week's prices.

LIVERPOOL, JAN 27.

SCOTCH.—There has been a decidedly better feeling in our market this week as regards all kinds of Scotch wool, and Laid Highland has been sold at an advance on late rates. White Highland is also in request at advanced rates. Good Crossed and Cheviot Wools have been much in demand at an advance likewise on late rates.

Laid Highland Wool, per 24lbs ..	s. d.	s. d.
White do. do. ....	8 0	10 8 6
Do. do. ....	11 0	11 9
Laid Crossed do. unwashed. .	8 9	9 6
Do. do. washed. . . . .	9 9	11 6
Do. Cheviot do. unwashed. .	9 0	11 9
Do. do. washed. . . . .	12 0	15 6
White do. do. ....	22 0	24 0

FOREIGN.—The stocks of all kinds being low, there is necessarily a limited business, but at rather increasing rates; besides the 650 advertised for the 9th February, 200 bales of Entre Rios and Buenos Ayres are to be brought forward.

FOREIGN.

CITY, JAN. 29.—The imports of wool into London were, last week, 1,119 bales, viz., 679 from Turkey, 288 from Madras, 230 from Sydney, and 22 from Russia.

The public sales begin on the first of February, and the brokers are busily engaged in the sorting and showing of the lots; which we hope, for the credit of Australia, will not only be good, but, as regards at least each separate bale, honestly and uniformly packed.

We have had advices of Sept. 12 from Sydney this week, representing that trade had not improved, though there was some activity in the preparation of Tallow from the boiling down of sheep, which would serve to render wool rearing more profitable, and divert part of a valuable trade from Russia to our own trans-marine possessions. The salting of meat will also enable the graziers to turn their sheep to better account.

LEEDS, Jan. 26.—We have no change to report in the foreign wool trade this week.

WOOL, on which the Home Consumption Duties have been paid at London, Liverpool, Bristol, and Hull, during the last week:—

WOOL.	This Year previous to last week.	Same time in the last Year.
London:—		
Spanish, .....	39,508	—
Australian, do. ....	393,460	847,002
Other sorts, do. ....	561,472	462,680
Liverpool .....	370,415	113,874
Bristol .....	10,640	—
Hull .....	294,932	181,518

IMPORTS OF WOOL.—Quantity of Wool entered at Hull for home consumption during the week ending Jan. 18:—

From Hamburgh .....	163,047 lbs.
Copenhagen .....	70,000
Aarhus .....	80,000

Total .....

PRICES OF MANURES.

Subjoined are the present prices of several sorts of Manure:—

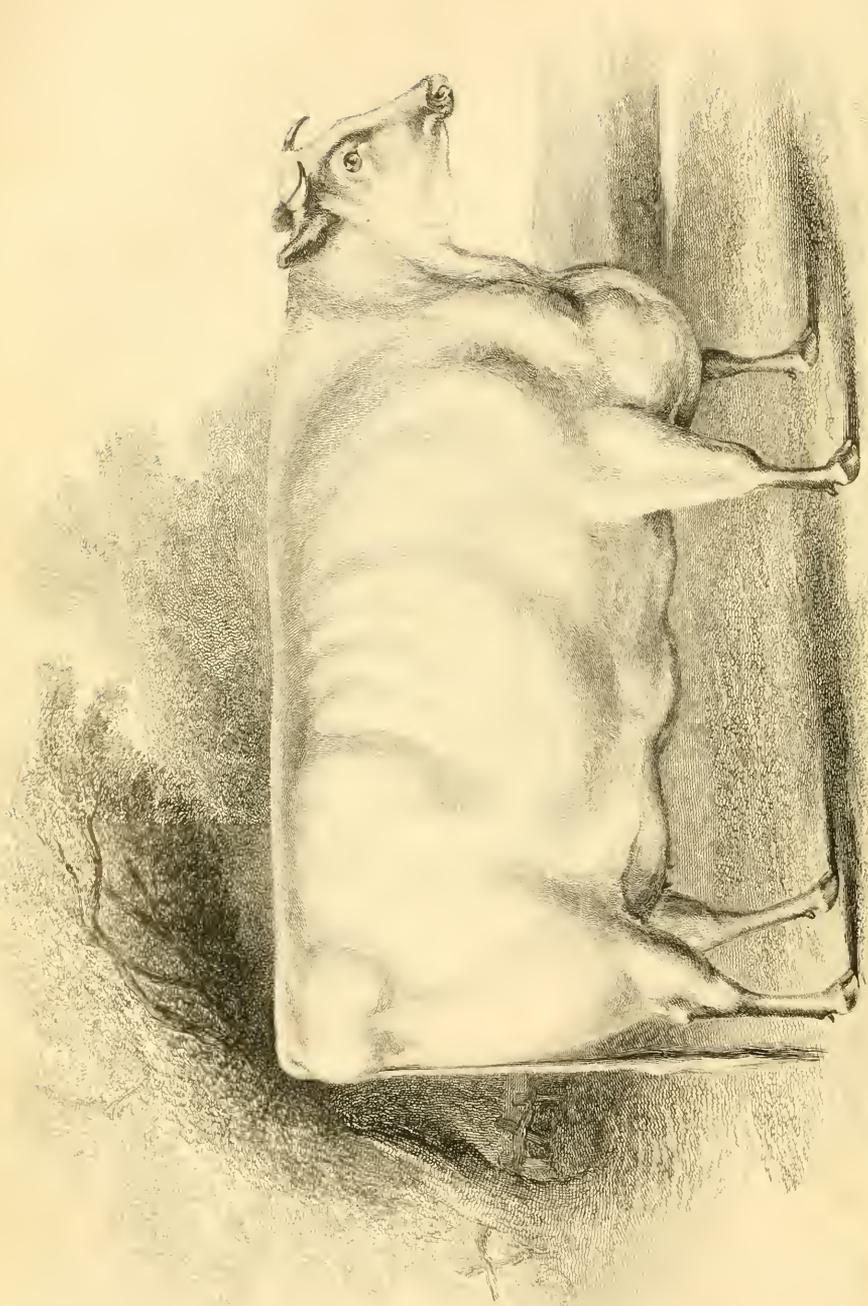
Hunt's Bone-dust, 16s. per qr.	Chie fou, 21s. per cwt.
Hunt's Half-inch Bone, 14s. per qr.	Grinwade's Preparation for Turnip Fly, 10s. 6d. per pakt. sufficient for three acres
Hunt's Artificial Guano, 8l. per ton	Wolverhampton Compost (Alexander's), 12s. per qr., subject to carriage to London, or forwarded from Wolverhampton
Rape Dust, 6l. to 6l. 10s. per ton	Guano, 10l. 10s. per ton; 12s. per cwt.
Rape Cake, 6l. per ton	Potter's Artificial Guano, 15s. per cwt.
Rags, 4l. to 4l. 10s. per ton	Muriate of Ammonia, 24s. per cwt.
Graves, 6l. 10s. per ton	Muriate of Lime, 12s. per cwt.
Gypsum, at the waterside, 32s. 6d. per ton; landed and housed, 33s. to 42s. per ton, according to quantity	Clarke's Compost, 3l. 12s. 6d. per hhd., sufficient for three acres
Agricultural Salt, 34s. per ton	Wright's Alkalies, 28s. and 42s. per cwt.
Lance's Carbon, 12s. per qr.	Soda Ash, 14s. to 16s.
Ditto Humus, 14s. per qr.	Chloride Lime, 28s. per cwt.
Soap Ashes, 10s. per ton	Sulphuric Acid, 24l. per lb.
Poittevin's Patent Disinfected Manure, 13s. 6d. per qr.	Sulphur for Destroying Worm on Turnips, 16s. per cwt.
Poittevin's Highly Concentrated Manure, 30s. per qr.	Sulphate Soda, 7s. 6d. per cwt.
Nitrate of Soda, 14s. 6d. to 15s. per cwt.	The Liverpool Abattoir Company's Animalized Manuring Powder, 2l. 10s. per ton
Nitrate Potash (saltpetre), 26s. per cwt.	Harrison's Manure Powder, 16s. per qr.
Petre Salt, 4s. per cwt.	
Willey Dust, 4l. 4s. per ton	
The Urate of the London Manure Company, 5l. per ton	
Daniell's new Bristol Manure, 8s. per qr.	
Hunt's new Fertilizer, 13s. 4d. per qr.	

PRICES OF SHARES.

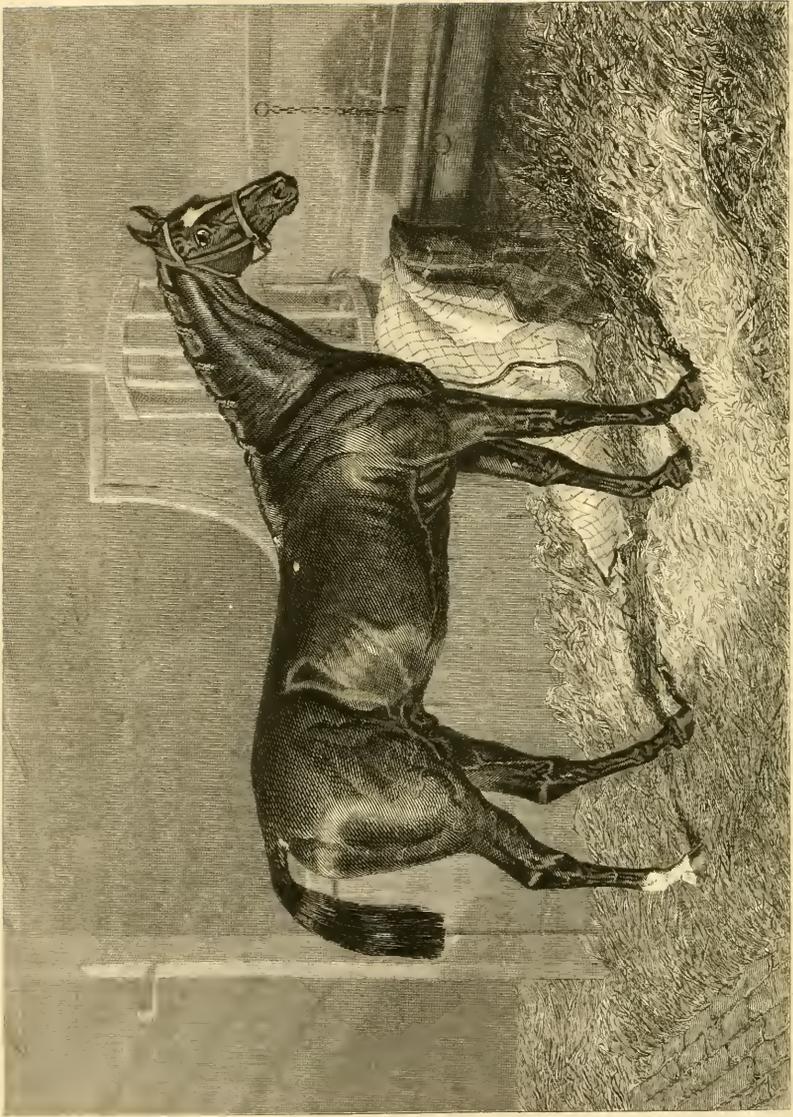
No. of Shares.	Div. per Ann.	IRON RAILWAYS.	Price per Share.	Shares.	Div.	MINES.	Price.
6,300	10s pr sh	Birmingham & Derby .. 100l sh pd	59½ a 6l	4,000		Alten .....	15l sh 13½ pd
6,300	3s 4d sp	Do. Thirds, iss. 8½ dis. 33½ sh 25l pd	19½ a ½	10,000		Anglo Mexican, iss. 5l p. 100l sh pd	100l sh pd
		Do. Eights .....	1½ pd	2,000	1l	Ditto Subscription .....	25l pd
9,500	1l 4s pd	Do. and Gloucester .. 100l sh pd	67 a 6		3l per ct	Bolanos .....	150l sh pd
10,000	6s 0d	Do. New, iss. 7½ dis. 25l sh 17½ pd	10½	10,000	17s 6d	Ditto Scrip .....	25l sh pd
15,000	4l per ct	Bristol and Exeter .. 100l sh 70l pd	67 a ¾	6,000		Brazilian Imp. iss. 5l p. 35l sh 21l pd	63 a ½
56,000	3s 0d	Eastern Counties .....	25l sh 23l pd			Do. Mocaubas & Cœcæa United	25l sh pd
88,000		Ditto New .....	25l sh pd	11,000		Do. St. John Del Rey .. 20l sh 15l pd	28 a 30
144,000	5l per ct	Ditto Extension .. 6/13s 4l sh 13s 4d pd	4½ pm.	12,000		Cobre Copper .....	40l pd
12,500	2½ per ct	Glasgow, Paisley & Ayrshire 50l sh pd		8,500	15s	Copiapo .....	20l sh 13l pd
18,000	2l 5s p sh	Edinburgh & Glasgow .. 50l sh pd	50 a ½	10,000		Columbian iss. 5l pm .. 55l sh pd	
18,000	7s 0d p.s.	Ditto New .....	12½ sh pd	1,500		Ditto New .....	11l sh pd
10,918	10l per ct	Ditto Registered .....	12½ pd	20,000		General Mining .....	20l sh pd
11,000	10l per ct	Grand Junction .....	100l sh pd	10,000		Hibernian .....	50l sh 10½ pd
		Ditto Half Shares .....	50l sh pd	15,000		Imp. Slate Company .. 10l sh 3l pd	
		Ditto Quarter Shares .....	25l sh pd	5,051		Mexican .....	60l sh 59l pd
10,000	2½ per ct	Great North of England .. 100l sh pd		20,000	10l per ct	Mining Comp. of Ireland 25l sh 7l pd	
25,000	3l 5s p sh	Great Western .....	100l sh 75l pd	11,500	10s p sh	Real del Monte, registered Av.	63l 10s 6d
25,000	2l 10s p sh	Ditto Half Shares .....	50l sh pd			Ditto Ditto unregistered .....	
37,500	12s pr sl.	Ditto Fifths .....	20l sh 12l pd	1,872	4l per ct	Ditto Red Debutentures .. 73l 15s pd	
8,000	4l per ct	Hull and Selby .....	50l sh pd	3,948	4l per ct	Ditto Black Ditto .....	71l 6s 3d pd
8,000		Do. Quarter Shares .. 12½ sh 4l pd	59½ a 9			Ditto Red and Black .....	
16,000		Lancaster and Carlisle .. 50l sh 5l pd		10,000	1l	Rhynney Iron .....	50l sh pd
		Leeds and Bradford .....		10l p sh		Santiago de Cuba .. 25l sh 10l pd	18
2,100	10l per ct	Leeds and Selby .....	100l sh pd	30,000		United Mexican, iss. 2l p. 40l sh pd	3½ a ½
5,100	10l per ct	Liverpool & Manchester .. 100l sh pd				Ditto Scrip .....	1½ pd
7,968	10l per ct	Ditto Half Shares .....	50l sh pd			Ditto New Scrip .....	1½ pd
11,475	1l 10s p sh	Ditto Quarter Shares .. 25l sh pd	109 a ½				
36,000	5l per ct	London and Brighton .. 50l sh pd	45 a 4½				
		Ditto Loan Notes .....	10l sh pd				
43,000		London & Blackwall Av. 16l 13s 4d	6½ a 8				
43,077	5l per ct	London & Greenwich Av. 12l 15s 4d	5½	10,000	1l 4s	Anglo Mexican Mint .. 10l sh pd	
11,136	10l per ct	Preference or Privilege Av. 18l 17s 2d		10,000	1l 15s	Australian Agricult. 100l sh 30l pd	
4125000	10l p ct.	London & Birmingham .....	Stock 244 a 5	5,709	6l per ct	Australian Trust Comp. 160l sh 35l pd	
54,450	1l 14s	Ditto New Quarter Shares .. 2l pd	30 a ½	6,000		British Ameri. Land 50l sh 35½ pd	
41,250	3/0s 0d p.s.	Ditto New Thirds .....	3l sh 2l pd	10,000	6l per ct	Canada .....	100l sh 32½ pd
46,200		London & South West. Av. 41l 6s 10l	76½ a 7	10,000	5l per ct	Upper Canada Bonds .....	10l
	13s 4d p s	Ditto Eights .....	23½ a 7½ pm.	5l per ct		Ditto .....	
33,000		London & Croydon .. Av. 15l 15s 9d	16 a ½	4l per ct		City Bonds .....	
7,000	3l 17s p sh	Do. Scrip, iss. 50d dis. .. 10l sh 5l pd	10½ a 7½	10,000	5l per ct	Comp. Copper Miners in England	100l sh 7l pd
13,000	1l 13s p sh	Manchester & Leeds 100l sh 70l pd	109½ a 7½	5,000	5l per ct	General Rever. & Invest. 100l sh pd	
13,000	1s	Ditto New Shares .....	50l sh 30l pd	2,700	1½ per ct	Equit. Reversionary 100l sh 70l pd	63
30,000	1l	Ditto Quarter Shares .....	2l pd	178s and			
		Manchester & Birmingham .. 70l sh 40l pd	39½ a 8	2s 6d bs		Gen. Steam Navigat. 15l sh 14l pd	27½ a ½
10,000		Ditto Extension .....	70l sh 7l pd	10l & bs.		Hudson's Bay Stock .. 100l sh pd	
10,000		Midland Counties .....	100l sh pd	1l 10s.		London Commercial Sale Rooms	
10,000		Do. ½ Shares, iss. 10 dis. 25l sh 15l pd	91 a 80½			Average 75l	
10,000		Ditto Fifths .....	20l sh 2l pd	8,000	5l per ct	London Reversionary Int. 50l sh	17l pd
19,000		Norwich and Brandon .. 2l sh 2l pd	4½ a 4	10,000		London Wood Paving Company	10l sh 2l pd
15,000	6s	Newcastle & Darling June. 25l sh 15l pd	30½ a 30			Mexican & South American 10l sh	7l pd
15,000	1l 10s 0d	North Midland .....	100l sh pd			New Brunswick (Land) .. 75l pd	
22,506	1l 0s 0d	Ditto ½ Shares, iss. 10 dis. 50l sh 40l pd	95 a 6			New Zealand .....	25l pd
		Ditto Thirds, iss. at 1l 13s 4d dis.				Ditto New .....	25l sh 12½ pd
10,256	1l 5s	Northern & Eastern .. 50l sh 45l pd	54½ a 8			Peninsular & Orient Steam 50l sh pd	52½
3,136	15s	Do. Scrip .. iss. 5 dis. 50l sh 15l pd				Ditto .....	50l sh 35l pd
12,208		Do. ¼ Shares. .. 12l 10s sh pd		5,387	4½ per ct	Reversionary Int. Soc .. 100l sh pd	104
80,000		Paris and Orleans .....	20l sh pd	14,000	6l per ct	Royal Mail Steam .....	
72,000	1l 17s 0d	Paris and Rouen .....	20l sh 20l pd	4,000		South Australian .. 25l sh 20l pd	
2,600		Preston & Wyre, appropriated 60l sh	33½ a ½	10,000	6s	South Metropolitan Cemetry 25l pd	
9,600		Ditto, not all appropriated 25l sh	32½ a ½			Thames Tunnel .....	50l sh pd
49,000		Ronen and Havre .....	20l sh 6l pd			Van Dieman's Land .. 100l sh 20l pd	
7,000	5l per ct	Sheffield, Ashton-under-Lyne, and Manchester .. 100l sh 82½ pd	11				
1,900	1l 15s	Sheffield and Rotherham 25l sh pd					
1,300	15l per ct	Stockton and Darlington .. 100l sh pd					
23,000		South Eastern and Dover .. 50l sh pd	35½ a ½				
23,000		Ditto New, iss. 25 dis. 25l sh 25l pd	36½ a ½				
7,500		Yarmouth and Norwich 20l sh 18l pd	17½				
6,700	10l per ct	York & North Midland .. 50l sh pd	123 a 2½				
6,700	10l per ct	Ditto New Shares .. 25l sh 20l pd	54½ a 5½				
		Ditto Scarborough Branch .....	2½ pd				

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# THE FARMER'S MAGAZINE.

MARCH, 1844.

No. 3.—VOL. IX.]

[SECOND SERIES.

## PLATE I.

### PEACH, THE BROUGHTON HEIFER.

This heifer was bred by Sir Charles Robert Tempest, Bart., of Broughton Hall, near Skipton, Yorkshire, and was calved February 14, 1839; she was got by Edmund the Second (3693), dam Pine Apple, by Norfolk (2377), gr. dam, Vestris by Cato (1791), gr. g. dam Verbina, by a son of old Wellington (679). Her weight was 221 stones 2 lbs., of 8 lbs. to the stone, and she produced 28 stone 4 lbs. of loose fat.

We saw the Broughton herd the early part of last year, and they are as beautiful as they are numerous. Several of his cows are excellent milkers, one had at that time by her side her fourteenth calf, it was the gr. dam of Peach, or sister to her dam. Sir C. R. Tempest is well known in this country as one of our best breeders, and has won the Gold Medal of the Smithfield Club two successive years; this has not been done by any other person, although, we believe Earl Spencer has won it twice, but at separate times.

## PLATE II.

### TOUCHSTONE.

Touchstone, a brown colt, was bred by Lord Westminster in 1831, and is by Camel, out of Banter by Master Henry, her dam Boadicia by Alexander, out of Brunette by Amaranthus—May-fly, by Match'em—Aneaster Starling.

The following is the total of Touchstone's winnings for each year, the Cups and Plates being given by their value in specie:—In 1833, 50*l.*; in 1834, 2,675*l.*; in 1835, 1,260*l.*; in 1836, 1,040; in 1837, 450*l.*: total, 5,475*l.*

In 1838, Touchstone stood at Moor Park, where he served forty mares by subscription, at 30*gs.* each. In 1839, '40, and '41, he covered an unlimited number of mares at the same place and price. In 1842, he was removed to Eaton, where, in 1843, his price was raised to 40*gs.* each; his subscription for the ensuing season of forty mares at 40*gs.*, has been full for some time.

The following are some of the principal winners which have already appeared by Touchstone:—Auckland, Ameer, Audrey, Blue Bonnet (winner of the St. Ledger), Cotherstone (winner of the Derby), Celia, Dil-bar, Fanny Eden, Gaiety, Jack, Lady Adela, Orlando, Phryne, and Rosalind.

His stock first came out in 1841 as two-year-olds, when they won amongst them in public money, 300*l.*; in 1842, 9,530*l.*; and in 1843, 20,454*l.*

OLD SERIES.]

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[No. 3.—VOL. IX.]

## ON LAND DRAINAGE.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

At a period, when so many excellent efforts, are used in many directions, to develop the resources of the soil, by improved modes of drainage, it can hardly fail to be productive of some little benefit to the farmer if I collect together a few well ascertained facts upon the ordinary modes employed; and this remark, will still in a great measure apply, even if I only repeat, and enlarge, upon what I have already in another place collected together.—(*Farmers' Encyclopædia.*)

The importance of this great agricultural operation is, in fact, rarely regarded so justly as it in reality demands; although upon but ordinary reflection every one connected with the cultivation of the earth very readily admits that in truth the very first care of the farmer, that on which the value of his future crops almost entirely depends, ought to be the removal of unnecessary supplies of water, whether arising from the tenacity of the surface retaining too much water, or from springs exuding to the surface, or keeping the subsoil too much saturated with water. And it is evident to the most careless observer, that as different crops require varying quantities of water, and even the same crops in different climates, so the cultivator must adapt the drainage of the soil to the crops he proposes to produce, and to the circumstances in which those crops are placed. The supply which is necessary, for instance, for the profitable growth of the rice plant, would destroy the corn crops and the meadow grasses of England. And again, the damp soils which support many of the richest meadows of England, would be by far too moist for the cereal grasses. The nature of the climate, the soil, and the subsoil too, must all, then, be taken into account. The plants growing on the sands, of course, will bear a much larger supply of water than plants of the same species vegetating on the clays; and thus the very soil which in the dry eastern side of England grows excellent crops of corn, would in the western counties, where twice the amount of rain falls on an average than in the east, be found to be materially too moist for the profitable growth of the same species of plants. Placed, then, as the farmer is, under such a variety of circumstances, cultivating lands of all kinds, resting on such widely differing subsoils, and in such varying degrees of atmospheric moisture, it is useless in this paper to attempt to assist him with more than general directions.

The water carried off the soil by artificial drainage is usually assisted to escape, either by boring, by open, or by underground, drainage, or by both. The system of land drainage by boring, is that first recommended by Elkington. It is chiefly adapted for low situations surrounded by high lands, and merely consists in boring with an auger, or digging a well in the land intended to be drained, until in some stratum or other a spring of water is pierced, whose head is lower than that of the surface of the field; and hence it follows, that when the water is suffered to drain into the hole made by the auger or the well, the water of necessity drains from the land out of the bottom of the well as fast as it flows into it at the top. This plan might be profitably employed to a much greater extent than at present. When combined with surface-draining, it saves, by shortening the water-channels, a considerable portion of the expense. Of open-surface drains, the very nature of the soil, its declinations, and its chemical composition, can alone

guide the farmer. In either case, too much care can hardly be bestowed upon it. It is a question that the legislature has deemed to be of even national importance, for, by the 3rd and 4th Vic. c.55, land-owners, possessing only limited interests in estates, are empowered to raise money, by way of mortgage on such property, to be employed for the purpose of improving them by draining. The preamble of this act, as is truly remarked in the public address of the Yorkshire Land-Draining Association, expresses very clearly the objects of this association, and, at the same time, shows the importance attached by the legislature to the subject. "Whereas much of the land in England and Ireland would be rendered permanently more productive by improved draining, and nevertheless, by reason of the great expense thereof, proprietors having a limited interest in such land, are often unable to execute such draining; and whereas it is expedient, as well for the more abundant production of food as for the increased employment of farming labourers, and the extended investment of capital in the permanent improvement of the soil, that such proprietors should be relieved from the disability, due regard being had to the interests of those entitled in remainder." The association to which I have just alluded is formed for the purpose of carrying out the objects of this statute, affording to the agricultural interest, by means of its collective capital, the funds necessary for the *thorough draining of land*; the repayment of the money advanced being arranged to be made, with interest, by such equitable half-yearly instalments as in the several cases may be determined. Whatever may be the fate of this society, yet that its objects are of the highest importance no one will be willing to dispute, for, as Lord Stanley remarked, at the meeting of the Royal Agricultural Society of England at Liverpool in July, 1841, "There is no bank in the whole country—no commercial speculation—no investment so safe, so sure, and profitable, as that in which even borrowed capital may be engaged, by investing it under the ground of your own soil."

I shall confine my observations, in this brief paper, chiefly to the formation of under-drains. These commonly vary in depth from 2½ to 4 feet; and on peat soils, on account of the very material settling which takes place as such soils are brought into cultivation, from this to 6 or 7 feet. The first operation commenced upon a field intended to be drained is the examination of the strata, or veins of earth, of which it is composed; and this is commonly effected by either the boring auger, or by digging small pits or open drains, as, by this means, the oozeings or weepings will speedily display themselves, and indicate pretty correctly the source from whence the superabundant water proceeds. The practice of thus carefully examining the soils previously to the arrangement of the drains, is rarely attended to with the necessary degree of care. It would be well, indeed, if in all cases the landowner would employ a regular drainage engineer; for I am confident that, by so doing, considerable waste of property would be generally avoided. A regular scientific civil engineer, too, will, in very many instances, place his drains at a much greater depth in the soil, and wider apart, and use larger tiles than are usually adopted (not less than 6 by 5 inches); for, by this mode, they are more completely, if not entirely, placed out of the reach of the roots of plants; they become, in fact, really *permanent* drains. I have recently witnessed some extensive draining on such a system, executed by an excellent Essex farmer (Mr. W.

Hutley, of Powers Hall), under the direction of Mr. Pearson, a very ingenious draining engineer, and irrigator, in the service of Henry Dixon, Esq., of Witham, near Wickham Mills, in the valley of the Blackwater, which I would commend to the notice of all those within a spring morning's ride of the farm. By these deeply-laid drains (from 4 to 8 feet from the surface), not only is the surface-soil drained, but that surface soil now no longer rests upon a substratum of soil, saturated with water, surcharged with the red oxide of iron, or other ingredients noxious to the roots of plants, or water which at least is injurious by dissolving a portion of the soluble matters of the land. And it is of importance to notice that the lands to which this system of deep draining is the most advantageous (and to which no other mode of draining applies), commonly consists of the very best low situated soils in the country; and, although these deep drains cost, for labour and tiles, from 1s. to 1s. 6d. per lineal yard, yet, from the great distance at which these are placed, this system is, in the end, much cheaper than the ordinary surface draining.

The source of the surface or stagnant water being ascertained, the direction of the under-drains will be the more easily decided upon. If the soil is of a description where the subsoil plough can be used with advantage, in that case the top of the stones, bricks, or tiles by which the drain is formed and preserved should not be less than 2½ feet from the top of the surface-soil. In the formation of these drains, the workman always commences on the lowest extremity; by this means, besides other advantages, the water, as he arrives at it, drains away from him, and shows him, by the escape of the water, that he is preserving a proper fall. When the drain is cut to a requisite depth, he proceeds to fill it up with the materials through which the drainage waters are to flow, to within such a distance only as is still completely out of the reach of the plough, and then the earth is shovelled back again over the drainage materials. The description of these materials of necessity varies with the nature of the country and its produce. In Essex, brushwood and straw are chiefly used; in the northern parts of the island, stones, or broken lime or sandstones, are employed; bricks and tiles are resorted to in districts where cheaper materials are not to be procured, and these last are made in a variety of forms, and recently one or two valuable improvements have taken place in the construction of them by machinery, so that by those of the Marquis of Tweeddale, Mr. Etheredge, and Mr. Beart, draining tiles are now made at a very reduced price. Those of the Marquis of Tweeddale are described in the *Trans. High. Soc.*, vol. vi., p. 50, and *Journ. Roy. Ag. Soc.*, vol. ii., p. 148, and those of Mr. Beart, with engravings of his machine, in the *Journ. of the Roy. Eng. Ag. Soc.*, vol. ii., p. 93, by which it seems that in Huntingdonshire the cost of the tiles made by his apparatus is about 15s. per thousand; this varies of course with the price of coals, of which variation Mr. Pusey has constructed the following table:—

Price of Coals per ton.	Making the tiles at the Proprietor's Yard, per 1,000.	Selling price, per 1,000.
s. d.	s.	s.
6 0	11	18
9 6	12	19
13 0	13	20
16 6	14	21
20 0	15	22
23 6	16	23
27 0	17	24
30 6	18	25

These are used commonly with the flat or sole tiles, which last cost in Huntingdonshire from 8s. to 10s. per thousand. The clay best adapted for tiles is that which contains a small proportion of sand or marl, or sand may be mixed with the clay.

The Tweeddale tile-making machine is described, with engravings, in various periodicals (*Johnson and Shaw's Farmers' Almanac*, 1844, p. 170). Its owners remark of it that "its advantages are easy of attainment at any tile work, however limited; it may be worked by hand; is portable, and may be shifted about in sheds, however irregular; will easily produce, by the labour of one man, from 10 to 15 tiles per minute; and is the only machine in the kingdom producing a very strong and completely formed draining-tile at one operation."

The very simple tile-making machine of Mr. Etheredge is also described (*ibid.*, p. 169) by its proprietor, and it is there said of it that its advantages are—

1. From its great simplicity of construction, little skill is required in working it; there is very little liability to get out of order, and the wear and tear is trifling.
2. Pipes or tiles can be made of any size, shape, or substance. They do not crack in the arch, and are much stronger than any others made by hand or machinery.
3. It is usually worked by a horse. Steam or water power may be applied.
4. That a machine with twelve dies will make 1,500 tiles per hour, or double the number of covers and soles; and one with eight dies 1,000 per hour, or double that quantity of covers and soles.
5. The tiles require no shelving.
6. The whole manufacture of the tiles being performed at one operation by the pug-mill, the cost per thousand is three-fourths to half that of former modes. Price of a machine with eight dies, £43.

The pipe, or pipe-drain tile machines, of Mr. W. Ford, of Nine Elms, are described by the proprietor as being "the most easily worked yet introduced; making two perfect pipes or tiles at once of any shape; from three to four thousand per day being made at a cost of labour in making of less than 2s. per thousand. To ascertain the relative value of the different machines, or mode of making the drain tile or pipe, Mr. Ford very justly observes the estimate should be confined to the *making* only, divested of those operations which must take place, and at the same cost, whether the tiles be made by hand or machine, viz.; the digging and preparing the clay, the drying and burning the tile. The price of the machine complete, with moulds to make pipes or pipe tiles of three sizes, only 13 guineas.

"The pipe tile is in the shape and form of the common drain tile with sole attached.

"The advantages of the pipe and pipe tile are, that being a perfect conduit, the expense of soles is saved; is of far greater strength, resulting not only from the cylindrical or entire shape, but from the extreme pressure in making, although the *durability* of tiles depends upon the proper burning, still pressure is advantageous as giving increased *strength*. These pipes are not subject to one-twentieth the loss from breaking in making or cartage, and more than double the quantity can be carried in a waggon. A further economy is effected by the use of the pipes of above one-third in the cutting of the drain. In some parts of Kent, where the clay is suitable, these pipes are made less than ¼ inch thick, 1 inch in diameter, 12 inches long, weighing only 1lb. each, consequently,

8,000 make a load of  $3\frac{1}{2}$  tons: these pipes are proved to answer to perfection."

From the returns made to the Editors of "John-

son and Shaw's Farmers' Almanac" (vol. I, p. 391), the following appears to be the size, weight, and cost, per thousand, of the tiles of various makers:—

Name of Maker.	Length of Tile.	Diameter of Tile.	Weight per 1,000 in lbs.	Cost per 1,000, coals being 20s. per ton.
R. Beart, Godmanchester . . . .	13 inches. Soles 9 inches.	4 inches. Out to out $4\frac{1}{2}$ .	3,500.	15s. Sold at 20s. to 21s.
F. W. Etheredge, Southampton . . .	15 inches.	3 by 2 inches inside.	3,000.	7s. 17s. 6d.
H. Dixon, Witbam.	15 inches.	3 by 2 inches.	3,500.	Contract price for making 18s.
Tweeddale . . . .	15 inches.	3 by $2\frac{1}{2}$ .	About 2 tons.	

The use of draining tiles is evidently on the increase, and every improvement which is made in them naturally extends their field of usefulness—they are by far the most permanent and effective of all the materials used for draining land.

The drain tiles, bricks, or other materials commonly used for the purposes of draining, are usually covered with any very cheap porous material that the locality affords—stones, gravel, scoria, refuse of the foundries, ashes, peat moss, sods, brushwood, straw, heath lime, rushes, broken chalk, &c. (*Trans. High. Soc.*, vol. vi. p. 89.) There are three very valuable papers on tile-draining in that volume, by Mr. Carmichael, p. 81; Mr. Stirling, p. 100; Mr. Wilton, p. 112; and on drainage, by Mr. Black, (*ib.*, vol. i. p. 214); by Mr. Adam, p. 375, who consider the best-shaped tile to be one similar to that of the Marquis of Tweeddale's. There is also an excellent paper by Mr. Pusey (*Journ. Royal Eng. Ag. Soc.*, vol. iv. p. 23), on the antiquity, cheapness, and efficacy of thorough-draining or land-ditching, as practised throughout the counties of Suffolk, Hertford, Essex, and Norfolk, all of which papers I commend to the perusal of the practical farmer; see also (*ibid.*, p. 151) Mr. Edwin Chadwick, on the sanatory effects of land-draining.

There is a paper, which the farmers in many districts may consult with advantage, on substituting tubes made of larchwood for drain tiles in certain localities, by Mr. Scott (*Trans. High. Soc.*, vol. xiii., p. 431; and *ibid.*, vol. xiv., p. 99). This gentleman estimates that these square tubes, composed of four lengths of wood fastened together by wooden pegs, having a clear water-way of 2 inches by  $2\frac{1}{2}$  inches, made by the proprietor, having his own wood and saw-mill, will cost about 1d. per root, of 18 feet, for workmanship. They are pierced with auger-holes in every part, and are tolerably permanent.

In a future number of this valuable magazine I hope to resume these rapid sketches of well ascertained facts relating to the best modern systems of drainage. It is a theme which can hardly too often be pressed upon the attention of the accomplished farmers of England. It is a question not nearly so well and so generally understood as is desirable; for not only are most of the low situated and heavy land farms only partially and too superficially drained, but the same remark applies to a very great proportion of the upland soil—even to those resting upon the gravels. Thus I have witnessed upon some of the deepest gravels of Surrey—not only in the winter, but in the summer months—well and very deeply laid draining-pipes, discharging a copious and constant volume of water that, to those who regard only the nature of the surface soil, seems as remarkable as unexpected. The intelligent farmer, then, will ever regard an examination of the subsoils of his farm, and the pro-

portion of water which they contain, as a research which must on no account be neglected by him who intends to derive the greatest benefit from the cultivation of the soil he tenants. Such an agriculturist will readily allow that, if this is only partially neglected, all other contemplated improvements will indeed rest on a very uncertain foundation.

#### ON THE UTILITY OF LEASES.

The following paper was read by Mr. Joseph Wright, of Bentley, at a meeting of the Bromsgrove Farmers' Club, on Tuesday, the 30th January last:—

The question of leases is just now the most conspicuous, as it is one of the most important; and as, after the high authorities which have lately pronounced in their favour, we may soon expect to see them become the rule instead of the exception, it will be wise to remember that the virtue is not solely in the lease, but in the conditions of it. It cannot but be gratifying to all who take an interest in agricultural matters, to witness the zeal with which several important questions are now discussed, and from which the best results may be anticipated; but, when the tide is turning, it may be well, ere the current sets strongly, to see that it runs in the right direction. The principal objection urged by landlords against leases is that they are only binding upon one party; for, should the tenant's property be depreciated by any means to an extent so as to render him unable to meet his engagements, the landlord would have the lease thrown back on his hands, and receive his farm probably in a worn-out and dilapidated state; whilst, on the other hand, should the bargain prove an advantageous one, the tenant would hold it on until the end of the term, to his own benefit, and probably to the prejudice of the landlord. Other objections are urged, such as that landlords refuse leases because they may lose their control over their tenants politically; but as no doubt the political opinions of each will be known to the other at the commencement of the term, it is fair to presume that under a well-defined lease the tenant would not seek opportunities of differing with his landlord upon political matters, and that it is only when rent becomes oppressive, by change of circumstances, that the tenant, finding it impossible to obtain a diminution of rent, endeavours to annoy his landlord by refusing his request.

I consider that all this may be remedied by a well-adjusted lease, and as the rent of land should be always proportionate to the amount of produce realized from the farm, a corn-rent appears the most equitable mode of adjustment that can be resorted to; but, at the same time, it is requisite that seasons and local casualties should be guarded against so as not to press too severely

at one time; but the sudden changes in the value of produce may be met by being extended over a longer period than a year, and thus counteract one of the principal objections raised against corn-rents by tenants. A corn-rent, on the principle of taking the average price of corn every year in fixing the rent of that year, is against the tenant in bad seasons, as he has a higher rent to pay and makes less of his produce, except his farm be very favourably situated in point of soil or climate. Now, if the average of three years were taken to govern the rent of one, upon the same principle as the Tithe Commutation Act, this difficulty would be overcome without prejudice, inasmuch as the tenant would pay exactly the same amount in his term, with this difference only, that he would not pay the increased rent in one year, but upon the average of three, or as the agreement might be made.

When a land-valuer makes an estimate of what the rent of a farm should be (when the rent is to be a fixed sum) for a term of years, he must fix upon some data on which this must be obtained; he must take the value of produce at the present time, or take the average of a number of years preceding, or what he supposes it will average for a number of years to come, or he may strike a sort of average between them all; some data he must have, or his work is of no value. The farmer who intends to offer for it should also make his estimate to see that the rent asked is a fair one; for this many things have to be considered, such as the thickness of the soil; its texture, whether clayey, loamy, stony, gravelly, sandy, &c.; also the subsoil, whether clay, sand, rock, marl, &c., wet or dry; land much exhausted; distance from manures and markets; rates and taxes; tenure from year to year, or on lease 7, 14, or 21 years; price of produce. The real annual value is affected by every one of the above circumstances, together with bad seasons. It has been fairly calculated that during the last 42 years there have been seven bad ones on moist soils and situations. The loss from bad seasons will amount to 10 per cent. on the rent, which it is only fair to divide between landlord and tenant; another 5 per cent. should be deducted for loss in cattle, casualties, and other losses.

To insure good cultivation long leases are necessary, and with long leases, to do justice to both owner and occupier, the principle of corn-rents should be adopted; whoever is unfavourable to this principle must wish to take some undue advantage, whether he be owner or occupier.

This is the time to push the question. The tenants have long been seeking leases, the landlords are now disposed to grant them; and although the advantages will be mutual, yet as the details of the agreement are of more importance to the occupiers, it becomes their duty to consult on what covenants are best for both parties, and to lay their views before the owners of land, with proper arguments in support of them. The farmer who is about to enter on a farm which requires capital to be expended on it, ought to have a lease; for although he might have the most perfect confidence in his landlord, yet as the land might get into the possession of some other person, the tenant ought to be secured under such a circumstance in retaining the occupation of the land. It is certain that the much valued good-will and mutual kindness between landlord and tenant would be better promoted by independence than dependence, the latter generates servility and checks many noble feelings.

I have often wondered, when reading of the discovery of any new science which has been brought to light by our professors in chemical knowledge as

applicable to agriculture, that they should have never stumbled on the metallic base of the human race, a base which exerts more influence on agriculture, and on human affairs generally, than all the metals, minerals, earths, alkalis, gases, and acids, put together; and while societies and clubs are engaged in the trifling occupation of decorating the attic story, let us examine the foundation of the house, and inquire if no improvement can be effected there.

Tenant farmers, it should be recollected, are liable to all those losses consequent on the vicissitudes of seasons in a fickle climate; and how much more must the elements affect him who holds his farm from year to year! Surely his risks must be great. But with a lease the farmer was safe, because what he lost in one year he gained in another. The great cry at the present time, from men of all parties, in regard to agriculture, is improve, improve. But where is the tenant that would be disposed to incur expenses in improving the property of another person—expenses which might not benefit him for some years to come—when he might, at the pleasure of the landlord, be turned out of his farm at the end of any year, and lose all his capital and labour; as the law now stands there being no compensation recoverable by a tenant?

If the landlords really wish to see improvements effected on their estates, which cannot be carried out in a single year, but sometimes occupy two, three, or four years, let them make up their minds to adopt the system of long leases which prevails in Scotland; the one thing necessary being to give the farmers confidence in their holdings, for we shall find that the most improvements in agriculture, have been carried out to the greatest extent by the farmers in the north of England and Scotland, who hold their farms under leases of no less duration than 19, but generally 42 years.

I was much amused at reading, in the *Farmers' Magazine* for August last, the conditions of a Scotch grain lease. After stating the terms and conditions of entering, &c., it states, "And to encourage the tenant in improving the said land by drainage, the landlord agrees to allow him a deduction from the rent of each of the first four years of £ . on his producing vouchers that he has expended such sums of money in improvements on the said farm." It then goes on to state that the tenant is directed to pay to the factor, in the landlord's name, the quantity and value of a certain quantity of quarters of wheat, in the name of rent or tack duty for the said lands, the conversion to be taken at the Fiar's prices of the county in which the farm is situated. The Fiar is a person appointed to make an annual valuation, according to the judgment of an assize, of the average price of all the different sorts of grain, of all the different quantities of each, according to the actual price in every county. Now, if such practice as this were to be adopted in this country, I have no doubt the tenantry would improve their lands to as great a perfection as the Scotch farmers, because they would be benefited by so doing, they would feel an interest to themselves and their families, and would also confer a benefit on the country at large; for let it be observed, that the first want of man is food, and the first source for it, the ground to obtain food, is the first consideration of mankind. Bread is the main object, but then great industry in the cultivation is required, and that must be directed by intelligence. Then, I would say at once, let not the landlords any longer stand in the way of those improvements which are necessary to be made by the tenantry of this country, but on the other hand let them aid and assist them

by granting leases under the Scotch plan. Give them a beneficial interest in the land they occupy, by securing the property which they invest; as annual tenants incur so great a risk by investing their capital in the improvement of land on so uncertain a tenure, that I might venture to assume that a lease is the only security that can justify a farmer in an outlay for which he can only expect to be remunerated in the course of some years.

I think that I have brought before this club sufficient arguments in favour of leases, that I presume we shall be all unanimous in their adoption; but there may be some little difference in the plan which I suggest, viz., leases on corn-rents, as the most equitable mode for all parties interested, that it will be necessary to state the principle on which this plan can be carried out.

In addition to the one which I have referred to as adopted in Scotland, several writers on leases have recommended several methods of fixing corn rents on land, but the one which appears to me the simplest is that of "Veritas," in the June number of the *Farmers' Magazine*.

It has been fully proved, from the experience of farmers, and confirmed by agricultural writers, that a farmer should make three rents in order to procure a proper remuneration that would justify him to continue holding on his land. Taking this as the groundwork whereon to fix a corn-rent, the average number of bushels, both of wheat and barley, such land is capable of producing per acre over the whole farm, the value of one acre of wheat and one acre of barley added together, and one third of the amount, will be the rent for four years, providing the land is farmed under the four-course system. On this principle the intervening green crops are considered as merely preparatory, and therefore are not taken at all into this valuation. As half the land is under corn on the four-fold system, the value of the farm on these two acres is the rent of four, in fixing a corn-rent. For example:—Suppose we agreed that the land would produce 17 bushels of wheat and 25 bushels of barley per acre, and make the calculation of the average of prices for the year 1842 for a corn-rent—

17 bushels of wheat at 8s.	136s.
25 do. barley at 4s.	100s.

3) 236s.	Three rents.
4) 78s. 8d.	Rent for four acres.
19s. 8d.	Rent per acre.

If we take these valuations from the price of corn for 1843, we have

17 bushels of wheat at 6s.	102s.
25 do. barley at 3s.	75s.

3) 177s.	
4) 59s.	
14s. 9d.	per acre.

This would be a reduction of 4s. 11d. per acre, and would assist the tenant in meeting the depression in agricultural produce.

Mr. Hillyard, who has written very extensively on agriculture says, that no one can deny but that the amount of rent ought to be regulated by the average price of corn, and that the rent should depend upon the price of wheat only, which may be estimated to vary in worth from two to seven bushels per acre. Supposing the price of wheat should be 50s. a quarter, rent should be as follows:—

	bush.	s.	d.
Very poor land....	2	12	6
Poor land .....	3	18	9
Fair quality .....	4	25	0
Good .....	5	31	3
Very good .....	6	37	6
Extraordinary ....	7	43	9

And for every 2s. a quarter, which the annual average price in each year shall fall below 50s. per quarter, 2½ per cent. to be deducted from the rent, and an increase of 2½ per cent. when the price shall exceed 52s. per quarter.

The only objection I have to Mr. Hillyard's plan is, that, in order to know what the description of land is, a land-surveyor would be called in, in order to satisfy his employer; and he, being a person of theory, and not of practice, might call land good which was of that description called fair quality, thereby making a difference of 6s. 3d. an acre. My opinion is, that land-surveyors have been the cause of the high price which has been paid for land generally, and which has ended in the insolvency, in many cases, of tenants, and deterioration of the land which they occupied.

I have one more example to state of fixing corn-rents: it has been done on wheat alone, and in some others on wheat, barley, oats, beans, and peas; thus a corn farm, cultivated upon the four-fold shift of husbandry, would have the payment made up from one-fourth in wheat, one-fourth in barley, one-fourth in oats, and one-eighth in peas and beans. If the rent was agreed upon at 220l., and wheat was at 50s., barley 32s., oats 20s., and peas and beans 28s. per quarter, the next question would be, what quantity of each grain would be wanted to make the sum agreed on?

50 quarters of wheat at 50s. ....	£125	0s.
25 ditto barley at 32s. ....	42	10s.
25 ditto oats at 20s. ....	25	0s.
12½ ditto peas and.....	} 27	10s.
beans at 28s. ....		
	£220	0s.

Then, if the price of grain did not reach the price fixed for the sum required, a deduction to be made from the sum fixed; if it increased beyond that sum, the rent to increase likewise.

A rent should always bear a relative proportion to produce. That mode must be the best that ensures it to both parties, making the contract a lease, that, being fairly adjusted to-day, may not, from sudden changes in the value of produce, at a subsequent period become ruinous to the tenant; and whenever such is the case, the landlord may be unwilling to remit any portion of the rent, feeling that he has entered into a contract that is equally binding on both parties. But all this may be remedied, as I have shown, by a well-adjusted lease upon a corn-rent. Nor am I advocating a new system, for it appears that, in ancient times, almost all rents were paid in kind, in a certain quantity of corn, cattle, or poultry. And if I turn my attention to foreign agriculture, the country that far excels all others in that art, I mean China, where the condition of the labourer is said to be much superior to the artificer, because no man is allowed to till the soil who has not a complete knowledge of chemistry; what is the ambition of the Chinese but to get possession of a bit of land, either in property or in lease, never thinking of renting from year to year? Then let us imitate the Chinese in demanding leases, that our fields may no longer remain in an unproductive state, satisfied as I am that this is the only correct principle, and one which will tend more than any other to improve the soil and increase its produce.

## FLOCKMASTERS IN THE OLDEN TIME.

Edward Lisle, Esq., a magistrate and gentleman of fortune, of Crux Easton, in Hampshire, who died in 1722, has the following remarks, in his "Observations on Husbandry," which, at the present day, are amusing and novel:—"Mr. Bishop, of Dorsetshire, his shepherd and his carter, told me, that, in lambing-time, and whilst the lambs might be in danger of the fox, they send out a couple of fellows with horns all night, to walk about and blow and halloo, and on these nights stake down a couple of dogs, at a fit distance, in a bleak, cold, place, which will make them bark all night; but that way, the shepherd says, will not always do, but a lamb, however, will be lost sometimes; nor can the same dogs abide it for above two or three nights, for then they will be so cramped as not to be able to get over a stile for two or three days afterwards. These men, who walk about, have sixpence a night and meat and drink. They must not walk about with a dog, for by so doing the sheep will be set a bleating and running as much as if the fox was amongst them; so that they would not know when the fox came; which, by the disturbance among the sheep, may be known. Another gentleman, a farmer of that county, assured me he drew his flock together within two acres of ground, almost as close as if he had folded them, and set four dogs, staked down at each corner, to keep off the foxes by barking all night, and yet the foxes stole away that night two lambs, and bit a third. I had an ewe in June, 1701, that broke out most miserably about her eyes, and had a watery running, with a swelling, with which she was blind, and continued so for six weeks: we could not imagine what was the matter with her; my shepherd said, he believed she was lark-spurred. I asked what that was; he said, at this time of the year, when the larks build their nests, if a sheep should come so near to a lark's nest as to tread on it, the lark will fly out, and spur at the sheep, and if the spur made a scratch anywhere on the eye or nose, it was perfect poison, and would rankle in such a manner as this ewe's eye did: this, said he, is certainly true, and other shepherds would tell me the same."

Mr. Lisle appears to have been very fond of farming and rural affairs, and altogether a good specimen of the "fine old English gentleman" of former days. He was in the habit of asking his tenants and others questions about farming, and noting them down; and by such means furnishing amusement and instruction. Most of his writings were upon divinity. He died at the age of 55, having had a family of 22 children, 17 of whom survived him. He observes in the introduction to his work—"Among the Greeks, the knowledge and estimation of agriculture was at the greatest height in their best times. Amongst the Romans, their senators ploughed, and the great examples they gave of virtue and industry laid the foundation of all their after greatness; but as agriculture decreased in their esteem, luxury took place and soon put a period to their power. Other worldly business carries our minds off from God, whereas in this we draw near to him: so that a country gentleman, especially if in the commission of the peace, shall in this station do a world of more good in preventing evil by his example than by punishing it."

Mr. Lisle has the following observations on the management of swine, &c. "In January, 1700, I was displeased to see the damage my tenant's hogs did me in rooting about, and told him I would have them penned up in his foddering-yard. His dame replied, if so, they must sell them, for they must not come into the foddering-yard amongst the beasts. I asked her why;

she said, it would endanger the cows, being big with calf, overlaying themselves: for, said she, the hogs would nuzzle and make holes in the straw, and the cows lying down in such hollows might die before morning, because they could not rise. The farmer said it was very true. And I observed that though no pigs came there, they took care every night to lay the straw smooth. I spoke of it afterwards to Mr. Edwards, and he was well apprised of the truth of it. Farmer Collins, of the Isle of Wight, assures me, that if pigs meet with a piece of hemlock-root in their digging up and down, he it never so little, they will turn perfectly mad, and jump as high as an ordinary chimney-piece, and it is quite odds but they die.

"I kept four sows, but soon grew weary of their farrows; finding that, from the neglect of servants, the quantity of corn they required, and various other circumstances, the profit of breeding these creatures is lost. I infer from hence, that it is no ways proper for a gentleman to be a breeder of pigs, or other young creatures, as poultry, calves, &c., any farther than a conveniency is to be regarded; but rather leave them to farmers' wives, who can attend to them themselves, punctually in all respects. A certain dame was commending the breed she had of sows and pigs. I replied, I thought them to be the smallest sort. She said the farmer could not abide the larger sort. I asked her what was his fancy for that; she said that the pigs that were farrowed in March, of the greater sort, would not make porkers in winter, for they will keep on growing still, instead of becoming fat.

"Farmer Morant, of Essex, assured me, that in their common field one of the tenants one year sowed rye in but two acres, and there was not that year one piece of wheat in the whole field clear from rye. It was conjectured it must be the common field sheep, crossing over the two acres of rye after it was sowed, that carried it about in their claws. It is a common proverbial saying of the countrymen, that at whatsoever farm a colony of rooks planted themselves, and made a rookery, it is a sign of good luck and good fortune attending that man; and on men growing unfortunate and low in the world, the rookery has been observed to forsake such farm—for both which observations some good reasons may be offered. For when a man has the means of farming his land well, there is to be found a greater abundance of worms and insects on which these birds feed; but when a farmer who is a bad cultivator of the land comes, there are fewer of these insects to be found, upon which it is no wonder if they say let us go hence. The destruction that rooks and pigeons make is incredible. A neighbouring farmer assures me that he has known an acre of land sown with peas, and a rain coming, so that they could not be harrowed in, every pea was fetched away in half a day's time.

"A farther evil there is in rooks: that their nests, when their breeding time is over, is a harbour to the latter brood of the sparrows; which birds choose them, when the weather grows warm and the air mild, to build *sub dio*, and not to stive themselves up under the eaves of houses. I advise every farmer to employ a nimble, active, and free labouring man in such business as consists in jobs and fractions; and employ the dull, heavy man, if such he employs, to single works (such as thrashing, &c.), whereof an account can be kept; for a lazy lubbard will lose half his time in the vacancies between one work and another if you employ him in many in the day. I had, in November, 1711, an ox fell lame in the field

as he was plunging, and I had in the same field my head of kine and a bull going with them. The bull had never been yoked; however, the men ventured to take him, and yoked him to an ox. The bull bellowed as he went along for two or three turns, but without making any resistance he ploughed quietly that day and the next; whereupon I was very well pleased, and thought to have continued plunging with him; but my oxmen said if I did he would kill the ox he went against. I thought they meant by horning him, but they said the bull would kill him with his breath. I was surprised with the answer, and asked how that could be. They said by blowing on him with his breath, which was very strong; and that in Wiltshire they, for that reason, always ploughed with two bulls together in the same yoke.

"Being in company with Mr. Gooch, a Norfolk gentleman, we discoursed about the turnip husbandry of Norfolk. I could not find that they so much valued the harm the fly did to their turnips while they were young and tender in the leaf, as they did a distemper or disease that fell on the roots of their turnips, which they called the hanberry, which was a warty excrescence that would sometimes grow to the bigness of one's fist; and that some years this distemper would take whole fields, and after it began to grow in the turnips they would never thrive. No one, he said, could ever find out the cause of this disease. I told him I thought it must proceed from the egg of a worm or fly that was laid in the turnip in the place where it had been bit; and the little maggot lay in the hollow place, which, with its tail continually working circularly, formed the juice of the turnip into a round excrescence about itself, in which it continued growing, like that of an oak-appe."

There is scarcely any subject relating to farming which is not touched upon in some way or other in the volume from which these extracts are made, and many of them are highly amusing at the present day.

THE ANTI-CORN-LAW LEAGUE AND THEIR AGITATION FOR A TOTAL, IMMEDIATE, AND UNCONDITIONAL REPEAL OF THE CORN-LAWS.

SIR,—It is not my intention, upon the present occasion, to enquire into the relative merits of a sliding scale and fixed duty, but to shew that the demand of "a total, immediate, and unconditional repeal of the corn-laws" is based upon a statement of circumstances grossly fallacious, and that it is a most unjustifiable attempt to revolutionize property and to depress the wages of labour.

In revolutionary enterprises, such as that in which the League has embarked, the agitators never deduce their claims from a clear, impartial, and unimpassioned exposition of facts, but usually begin with begging the whole question, and then proceed to inflammatory declamation, clap-trap illustrations, and unmeasured abuse; their doctrines are always as "clear as the sun at noon-day;" the duties on corn are the "bread tax," are declared to be plainly and positively opposed to the laws of God and holy writ, are represented as "murderers of the poor," and as wresting from the working-man a great portion of his hard earnings for the direct purpose of filling the landowner's pocket. The latter are represented as benefiting by the whole difference in prices occasioned by the protecting duties. These are the allegations and charges of corn-law re-

pealers, which they follow up with a loud and confident demand of "total, immediate, and unconditional repeal." The verdict of guilty is shouted by mobs deluded by false representations, and heated by public declamation; and then, with the breathless haste and blind fury incident to such convictions, they would rush upon their victim and execute summary vengeance, "immediate and unconditional."

Amongst other arts for cheating the ignorant and unthinking into conviction without reason, the leaguers vociferate, "*Monopoly! odious, inhuman monopoly!*" When the East India Company carried on the trade between this country and the East Indies and China, to the exclusion of all other British subjects, we there beheld a monopoly in the true sense of the term; but there is no such exclusion in favour of any privileged body or class of persons, either as to the possession or cultivation of land or trade in its produce; every and any person, who has the means, may at his own mere will purchase land, farm it, or deal in its productions. Where then is the *monopoly*? Foreign vessels are wholly excluded from our coasting and colonial trades, from the importation into this country of the produce of any other country besides their own, and in some instances even goods imported in vessels of that country, of which such goods are the produce, are chargeable with considerably higher duties than if imported in British ships. If protection to British agricultural produce be monopoly, then here is a monstrous monopoly sufficient to make the venerable locks of Neptune to stand on end, and to incite the leviathans of the deep to form a league. But no—*protection* is the proper term. It is no doubt convenient to the Anti-Corn-Law League to enlist into their vocabulary a word which has acquired an odious signification; but such artifices only convince one more fully of the dishonest purposes which actuate the prime movers in that body.

Having brought out the proper title of the subject matter in question, viz., *Protection*, we will proceed to a fuller discussion of it than may suit the leaguers. In this discussion I will take the case as it stood before the alterations, made in 1842, in the duties and prohibitions affecting agricultural produce, and other subjects of importation: first, because those alterations having prejudiced the agricultural interest, the reasons in favour of agricultural protection before that period will apply with greater force at the present time against further reduction of duties: secondly, because I have no sufficient data subsequently upon which to base my investigation; and lastly, because the real gist of the question may be equally well arrived at upon results either before or after that period.

The average price of British Wheat from 1829 to 1840 (both inclusive) was, per qr.,	2l. 18s. 4d.
The average price of Wheat at Dantzia, during the same period appears to have been	£1 14 0
To which add freight, shipping charges, insurance, and other incidental expenses of importation	0 10 0
Importer's profit 10 per cent.	2 4 0
	0 4 4
	2 8 4

Leaving as the amount of protection per qr. afforded by the duty . . . . . 0 10 0

The annual average produce of land in England and Wales, is about 6l. per acre, and the average rent 17. Then if produce amounting to 2l. 18s. 4d. commanded a protection 10s., what did that protection amount to per acre?

[2l. 18s. 4d. : 10s. :: 6l. : 17. 0s. 7d.]

The answer is 1*l.* 0*s.* 7*d.*; being more than the amount of the landlord's rent. Here then we have an immediate refutation, by the *argumentum ad absurdum*, of the assertion that the increase in the price of British produce occasioned by protective duties, goes into the landowner's pocket. If that were the case, then it is evident that without protection the landlord would have no rent whatever, and that "immediate and unconditional repeal" would be a total confiscation of his property. However, it is at once evident that the difference does not go into the landlord's pocket, but that he only shares in it proportionately with others, as an indemnification against the greater burthens borne by all classes in this country. In regard to the indemnification here mentioned, I shall have occasion to say more presently, as the case stands between the several classes of the community. The natural protection which the expense of importation affords, together with that given by the duty, amounted to 2*l.* 10*s.* per acre, which is more than double the landlord's rent, and about two-fifths more than rent and farmer's profits together. As the question affects either landlord, farmer, or labourer, the natural protection afforded by cost of importation is equally operative with that which the duty supplies.

I have taken wheat as the basis for ascertaining the protection in favour of British agricultural produce generally, as I conceive it affords a sufficient approximation. It is true that the prices of, as well as the duties upon, wheat are greater than the prices of and duties upon other grain, and that British agricultural produce also includes beef, mutton, and other meats, cheese, bacon, butter, &c.; but then the quantity of inferior grain per acre is in general proportionably greater, and the protective duties upon other items of agricultural produce are about equivalent to those upon wheat.

I will now pass on to a detail of the protection which our laws afford to other branches of industry; and we should bear in mind, as we proceed, that agriculture is essentially a manufacture (the greatest of all), the soil and seed being the raw materials; and that the produce would be little else besides weeds and briars, without the farmer's capital and skill and the labourer's toil.

By way of preface, I will place at the head of the protecting duties in favour of manufactures, the rate of protection afforded to agriculture according to the preceding calculations.

PROTECTION IN FAVOUR OF AGRICULTURAL PRODUCE (BEFORE THE CHANGES OF 1842) AMOUNTED TO 17 PER CENT.

PROTECTING DUTIES IN FAVOUR OF BRITISH MANUFACTURES:—

*Cotton Manufactures.*—Not made up, including yarn, 10 per cent.; made up, 20 do.

*Woolen Manufactures.*—Not made up, 15 per cent.; made up, 20 do.; worsted yarn, 6*d.* per lb.

*Linew Manufactures.*—Certain enumerated articles, on which might be paid, at the option of the importer, instead of the specified particular duties, 40 per cent.; sails, 30 do.; manufactures of linen, not enumerated, 25 do.; ditto, made up, 40 do.

*Silk Manufactures.*—Certain enumerated articles at specified duties, or at the option of the custom-house officer, 25 to 40 per cent.; thread, 15*s.* to 18*s.* 6*d.* per lb.; lace, 30 per cent.; millinery, 40 per cent.; velvets, gauzes, crapes, 30 per cent.

*Metals and Minerals.*—Iron in bars, 30*s.* per cwt.; iron hoops, 23*s.* 9*d.* per cwt.; ditto cast, 10 per cent.; ditto wrought, 20 per cent.; iron ore, 5*s.* per ton; pig iron, 10*s.* per ton; manufactures of copper and brass, 30 per cent.; ditto of pewter, steel, and tin, 20 per cent.; copper ore, 12*s.* per cwt.; tin ore, 10*s.*

per cwt.; lead ore, 25*s.* per cwt.; pig lead, 40*s.* per ton; lead pencils, 30*s.* per cwt.; coals and cinders, 40*s.* per ton; slates, 66½ per cent.; tiles, 30 per cent.; Dutch tiles, 15 per cent.

*Hardware and Cutlery.*—Buttons, cutlery, and japanned or lacquered ware, 20 per cent.; silver or plated ware, 25 per cent.; bronzed ware, 30 per cent.

*Pottery and Glass.*—Ornamental china, 30 per cent.; plain ditto, 15 per cent.; earthenware, 15 per cent.; crown glass, 8½ per cent.; other sorts ditto, 6*s.* to 11*s.* per square foot.

*Fisheries.*—Duty on Whale oil, caught and imported in British vessels, only 1*s.* per tun; in foreign vessels, 26*l.* 12*s.* per tun.

*Miscellaneous Manufactures.*—Artificial flowers, 25 per cent.; blacking, 72*s.* per cwt.; boots and shoes, 18*s.* to 54*s.* per dozen; boxes, 20 per cent.; bricks, 22*s.* 6*d.* per 1,000; candles—tallow, 63*s.* 4*d.* per cwt., sperm and wax, 2*s.* 6*d.* per lb.; carriages, 30 per cent.; clocks, 25 per cent.; corks, 7*s.* per lb.; gloves, 4*s.* to 7*s.* per dozen; glue, 12*s.* per cwt.; gunpowder, 60*s.* per cwt.; Hair, manufactured, 30 per cent.; hats and bonnets (chip and straw), 1*l.* to 6*l.* 16*s.* per dozen; hides, tanned or curried, 30 per cent.; leather, 30 per cent.; mahogany veneers, 20 per cent.; mats and matting, 20 per cent.; musical instruments, 20 per cent.; painters' colours, 10 per cent.; paper hangings, 20*s.* per square yard; paste-board, 3*l.* 8*s.* 2*d.* per cwt.; pens, 30 per cent.; perfumery, 20 per cent.; plate, gold, 1*l.* per oz.; gilt, 2*s.* 6*d.* per oz.; plaiting hair, 20*s.* per lb.; ditto, straw, 17*s.* per lb.; powder, hair, 9*l.* 15*s.* per cwt.; ditto, perfumed, 13*l.* 13*s.* per cwt.; sculpture, prohibited; snuff, 6*s.* per lb.; soap, hard, 4*l.* 10*s.* per cwt.; ditto, soft, 3*l.* 11*s.* 3*d.* per cwt.; spermaceti, 1*s.* 6*d.* per lb.; spirits, 9*s.* to 30*s.* per gallon; starch, 9*l.* 10*s.* per cwt.; sugar, refined, 8*l.* 8*s.* per cwt.; tobacco pipes, 30 per cent.; toys, 20 per cent.; turnery, 30 per cent.; twine, 1*l.* 11*s.* per cwt.; verjuice, 73*l.* 12*s.* 9*d.* per tun; vinegar, 18*l.* 18*s.* per tun; watches, 25 per cent.; wax, bleached, 3*l.* per cwt.; ditto, sealing, 30 per cent.

The extensive protection afforded to British shipping was briefly stated in the early part of this letter.

The preceding statement shews that agriculture—which Montesquieu justly denominated "the greatest of manufactures"—enjoys no better, and indeed not so great a protection in general as other branches of British industry. If protection be prejudicial in one instance, a plain, unsophisticated man must be at a loss to understand why protection *in general* should not be abolished. If dear bread is an *evil*, are dear calicoes, linens, woollens, iron and other metallic wares, hardware, pottery, candles, common oil, soap, straw-hats, and tobacco-pipes, *blessings*? One must infer, from the present outcry, that bread, and nothing else but bread, entered into the expenditure of the working classes. I have read somewhere of a man who derived so much solace from his pinch of snuff and cigar, that they were to him, as he expressed himself, "meat, drink, washing, and lodging." Now, will you, manufacturers, clamouring and plying every available power and artifice for the abolition of agricultural protection—will you (yea or nay, without equivocation) consent to the *abolition of all protection "immediately and unconditionally."* Common sense and the experience of the session of 1842, in which Sir Robert Peel slightly reduced a few of your protective duties (but not including any upon cotton manufactures), as a partial counterpoise to the reduction of duties on agricultural produce, assure me that the consent which I ask would not be "immediate

and unconditional," but be clogged with ifs and buts, evasions, qualifications, and delays. Oh, no! the present agitation, under the mask of patriotism, aims at a violent revolution, for the benefit of a class which has already absorbed too great a share of the general wealth, by spoiling the rights of another class, and letting in the competition of foreign labour upon our dense labouring population.

We will now inquire into the true merits of that policy which is best known as *protection to British industry*. It appears to me an effort of legislation to stem back the otherwise overpowering effects of taxation and of accumulated wealth upon the industrious classes. I beg the reader to look back through the preceding detail of protective duties, and he will perceive that the rates are proportioned to the amount of labour expended upon the several articles respectively, being always higher where the labour has been greater or more valuable. Free-traders! place this one circumstance plainly and honestly before the labourers and artisans of your country, instead of attempting to gull them by corn-law rhymes and inflammatory tracts, illustrated with woodcuts and garnished with texts of scripture: place that circumstance clearly before them, and then be sure they will not lend themselves to "agitate" for an "immediate and unconditional" abolition of duties which save them from the competition of foreign labour.

But we will enter into the question more largely. The landowner, the farmer, the agricultural labourer, respectively, contribute by direct and indirect taxation to a very large public revenue; and the miner, manufacturer, and artisan are also subject to the like burthen. Now, besides excluding the competition of foreign labour, protecting duties aim at indemnifying each protected class against the burthen of taxation, and also against the pressure occasioned by protecting duties in favour of other classes. The duties which favour agriculture bear upon every class of the community (including fund-holders and other tax-receivers), according to the proportion of agricultural produce which each consumes, and the protecting duties in favour of each particular branch of manufactures also bear upon agriculturists and every other class (including fund-holders and tax-receivers) proportionably to the amount of manufactured articles used or consumed by each. Thus, supposing all protective duties to be reciprocally equal and evenly balanced one against another, every class is in its turn indemnified by means of its own particular protecting duties, against the pressure of the protecting duties which favour other classes. It may be asked, of what use, then, are protecting duties, seeing that what each class gains by means of its own protection, it loses by that in favour of other classes? If I granted that protective duties were useless, it is evident that it would be most unjust to abolish only those in favour of a particular class, which would be the plundering of that class for the gain of all others. It is also to be considered, that all existing contracts, in which the obligation on one side or the other is the payment of money, have reference to the proportionate value of money and of all landed produce, manufactures, merchandize, and other subjects of exchange and commerce. How blind or wicked, then, must that man be, who would enforce by popular "agitation," "an immediate and unconditional" repeal of protective duties! But there is (as I have already noticed) a beneficial result from our system of protection, that being applied in due proportion to the products of industry, they exclude the competition of foreign labour; and in that way would operate, if we were free from taxation,

for the purpose of revenue. In this country, population and accumulated wealth have together rapidly increased, from whence ensues a consequence to the working classes far more serious than any results of taxation. The competition of labour in this country is already too great, and the lords of the loom and the anvil, who have added the gigantic competition of machinery, would now tear down the embankments which protect the working people of their country from the inundation of foreign industry. We cannot arrive at any just conclusion as to the effect of protective duties on wages, merely by comparing wages in this country with wages in other countries: there are many other circumstances to be taken into account, particularly the relative abundance of labour in the several countries between which the comparison may be instituted.

It has been observed, that protective duties bear upon fundholders and other receivers of taxes proportionably with the other classes of the community, all of whom have the means of indemnification. Officers of state and public functionaries, soldiers, sailors, &c., are also indemnified by the grant of salaries and allowances commensurate with the cost of living, and the taxation to which they are subject; but I cannot discover that fundholders have any means of indemnification, and it therefore seems that protective duties are an absolute charge upon funded property.

The leaguers give themselves no trouble about the interests of those who have purchased land with reference to existing rents, and whose investments in general afford less than four per cent. Neither have the leaguers any sympathy for those who have mortgaged their estates—no pity for such spendthrifts and improvidents! Such foolish persons having run through two-thirds of their property, what harm in robbing them of the residue? Virtuous men deem the frequenting of houses of ill-fame as infamous, and have no pity for those who are robbed in them; but, nevertheless, the law deals with the pilfering strumpet and the plundering bully as with any other felon; and all but rabid revolutionists will so judge of leaguers who have no respect for an equity of redemption, because belonging to an improvident man. "But there are other mortgagers besides the improvident, and there are those who are subject to rent-charges, fixed according to the present annual value of the property. Many have purchased estates subject to mortgages and rent-charges, and others purchasing property have mortgaged it to enable them to complete the amount of purchase-money paid." Mortgages are not unfrequent for enabling parties to pay off portions and legacies under settlements and wills, and rent-charges are created under similar arrangements in order to provide incomes and annuities in favour of others than the proprietors of the estates on which charged. Owners of property thus circumstanced are surely entitled to consideration, and are not to be overwhelmed by "immediate and unconditional repeal."

As to the farmers, the League endeavours to cajole them with the prophecy that they will be as well, ay, better off after "immediate and unconditional repeal," than at present. Monstrous absurdity! In our implicit submission to the League, we must resign our common sense and abandon all the rules of arithmetic we have before learned. The farmers cannot understand the free trade logic of the League, and they have no reason whatever for placing implicit confidence in their dogmas; consequently they are now rising in all quarters manfully to oppose the designs of that body. Earl Spencer tells the farmers that, in the event of free trade, the price of corn on the continent would rise to a level with corn in this country. Wonderful

discovery! The price of home grown produce would go down a *great deal*, and increased importations into this country would cause continental produce to rise a *little*; and thus the two would meet. Remove or perforate the barrier which separates the one stream from the other, and then of course they will assume the same level.

The Leaguers glory in their association being a "great fact;" an expression which they are continually mouthing; and no sooner has a nobleman (the Marquis of Westminster) subscribed 500*l.* to their fund, than they forthwith spend it by posting upon all the walls of the country, immense handbills announcing the subscription as "another great fact! What trumpery! Everybody knows that the Anti-Corn-Law League is a great and very monstrous fact—but what then? Napoleon's army which he marched to Russia was a "great fact," but the "great fact" was annihilated. And Napoleon's force at Waterloo was "a great fact," but it was defeated. Let the farmers arouse themselves, and stand shoulder to shoulder, and the "great fact" of the League will share the same fate.—I am Sir, your most obedient servant, R. I.

Bristol, Jan. 18.

## AGRICULTURAL CHEMISTRY ASSOCIATION.

### LECTURE BY PROFESSOR JOHNSTON.

The first of three lectures was delivered in the Highland Society's Rooms, on the important subject announced below, and for which the thanks of the meeting were voted.

Professor Johnston began by adverting to the simultaneous feeling that began to be entertained in almost every country in Europe, and even in the United States of America, that great benefit was likely to result from the application of science to agriculture, while in none of them had it been brought into more practical shape than in Scotland. The reason he believed to be that Scottish farmers were better instructed than any other on the face of the globe; that the cultivation of their land was farther advanced; and that therefore they were able to start from a higher level, and to take a wider and more comprehensive range, than the farmers of other countries. The association, whose officer he was, believed that important benefits might be attained by the application of science to agriculture. These benefits were of two kinds—direct and indirect. With regard to the direct benefits, they hoped to diffuse more extended knowledge among the people, and to increase the resources of practical men, so that they might surmount difficulties which were before believed to be insurmountable. In consequence of that higher knowledge, they hoped that the old methods of cultivation, slavishly following in the footsteps of their fathers, would give way to more improved processes; and the result of the whole would be, that farming as an art would itself be elevated. Among the indirect benefits to be expected from this association, one would be, that the expenditure of money would be limited to those soils that would return an adequate amount of profit, or that it would be expended in such a way as to secure the same result. Above all, they expected that the experiments which the farmers might make would be increased in number, and that they would be conducted in such a manner that the

theorist could depend upon them as well as the farmer. And on this point he begged to state, that of all the experiments a farmer might make, none could be reckoned a good one which did not hold out a fair prospect of paying its own cost, and leaving some profit; that no experiment would be recommended to be undertaken which did not hold out a fair prospect of paying its own cost; and, lastly, that no man should undertake an experiment which, if it failed, would be likely to injure him by the loss. This would show that the association was not composed of mere theorists—that they did not even adopt the motto of the Royal Agricultural Society of England, which was, "Science with practice"—they rather wished to adopt for their motto—Science with profit. (*Applause.*) To obtain these ends the association proposed to have recourse to two means—the first of which was to diffuse the knowledge which was at present in existence, but which was confined to a few; and the other was to enlarge the actual amount of knowledge. To carry out the first of these objects, the committee had already received invitations, from various parts of the country, that he should deliver lectures on agricultural subjects, which they were willing to accede to—only, at the solicitations of various parties, they had agreed that he should commence his lectures by delivering the present course in Edinburgh upon the improvement and manuring of the soil. Now, there were three sources of information on this point. The first was by an examination of the soil itself; the second, by an examination of the vegetable substances that were raised from the soil; and the third was by actual trial. These three sources of information would form the subject of his three lectures; and that of to-day would be an examination of the nature of the soil. Every man at all acquainted with the subject knew that there was a great difference in the nature of soils; so that by personal examination, though he could hardly explain why, he could at once pronounce that one soil was fertile, and another barren. Now, the study of the soils and of the rocks that lay beneath them, had led geologists to conclude that the loose materials of which the soil were composed were derived from the solid rocks that lay beneath them; that there was a time when these rocks were everywhere on the surface; but that gradually, by the operations of the rains and other natural causes, these rocks had been worn down and disintegrated, till what had been solid rock became the loose materials which formed the soil. These rocks were essentially of three kinds—limestone, sandstone, and clay or slate, the latter in various degrees of hardness; so that if they wanted to know the kind of soil in any given district, they had only to inquire into the nature of the rocks which formed the substratum of that district. The learned professor here pointed out the practical advantages of geology, which thus enabled a man to form an opinion, if he knew the geological formation of the district, upon the various degrees of fertility of districts in England, or even in New Zealand or Australia, without ever visiting the places. But besides this, the physical examination of the soil told a good deal of its nature. For instance, if they were to take a quantity of soil of a given weight, and pour water over it in a vessel, then allow a minute or two for the heavy particles to subside, and pour off the water, with the lighter particles floating in it, into another vessel, and repeat this till all the lighter particles are carried away, then again dry the heavy materials and weigh them a second time—the difference between the first and the second weight of the soil would give the amount of

the fertilizing matter contained in the soil; for all the vegetable or fertilizing substances would be carried off in the water, leaving the inorganic or unfertilizing substances behind. Exactly the same result would be arrived at by heating a quantity of soil, of given weight, in an oven or other place—the vegetable matter would be burnt out; and the difference between the first weight and that of the residuum would be the amount of fertilizing substances in the soil. These were rude chemical tests; but when they examined the soil by more refined analysis, they discovered that there were eleven substances (a table of which he exhibited) every one of which was necessary for the growth of vegetation. This, he said, he would dwell upon more particularly in his next lecture. He then referred to the subsoil, and that part of the soil to which the vegetables do not usually penetrate. Every farmer knew that a few years after he had limed the surface of his fields, the presence of the lime became gradually less and less, till it altogether disappeared. Now, it happened that this lime was to be found sunk into the subsoil. So it often happened that the very substance of which the upper soil was most deficient were to be found in the subsoil. The cause of this might be easily explained; for when they considered the action of the rains, &c., they would see that their tendency was to carry fertilizing substances from the surface, down to the subsoil. It became, therefore, a matter of importance to know whether it would be advisable to bring up the subsoil to the surface, and mix the two together. This was not in every case advisable. For instance, he exhibited a section of a soil, eighteen inches deep, which he had received from a place in Renfrewshire, the surface of which contained a certain quantity of fertilizing substances, while the subsoil contained only half the quantity. It was clearly unadvisable, therefore, in this case, to do more than, by draining, to open up the soil, and let the roots of the plant draw from the subsoil that nourishment which it was capable of affording. He concluded by stating that his next lecture would contain more beautiful illustrations of this subject from an examination of the nature of plants.

#### KIRBY STEPHEN AGRICULTURAL SHOW.

At the late meeting, Wm. ELIISON, Esq., of Sizergh, amongst other useful observations, said that, as regarded the sheep, there were premiums offered for Leicesters, but the greater part shown for Leicester prizes were not of that breed, they were what is commonly called Teeswater, or long-woolled sheep, big and narrow shouldered; of course the premium was given to the Leicesters, and he was glad to see those shown were not too fat, as, when so, it injured their breeding propensities and usefulness: over-feeding, in breeding stock, was a great error; one-half, nay, far more than half of what was shown at the Royal Agricultural Society of England's meetings, male or female, did not produce one-third of what they would have done had they not been over-fed; the rams, the boars, and bulls—what a folly it is to have to reduce them in condition before they can serve their species and procure procreation. Though not appointed a judge of pigs, he had taken an opportunity of looking at the pens in which they were, and he was glad to see some very good ones, particularly a sow which obtained the head prize. Mr. Eleison made some very valuable re-

marks on the new manure, guano, which he had tried in various ways; he found it acted very differently on dissimilar soils: wheat, at 2 cwt. the acre, and sown on the land in the autumn and brush-harrowed in, had not produced so well as that in the middle of the field on which no guano was put. The guano seemed to answer best on heavy land for grain, but on thin limestone land it failed; for grass, the yield had been greatly increased. One result seemed to him certain, that the guano answered best with corn if sown in the spring, when the grain was up. As regards its exhausting properties, that was easily answered—the land might be renewed by adding more manure; though, of course, in most cases, it was better for the land to have the turnip crop eaten upon it; still, if dung was brought, as proportionally to what was taken off the soil would take little harm: the quantities he applied were 2 cwt. per acre for grain; 4 cwt. per acre for turnips, mixed with peat moss for the latter: on one piece of grass, at the rate of 29 cwt. per acre was put on a patch, it seemed a little burnt; but, this year, it produced two-thirds more grass than the land adjoining, which had no guano. Guano answered well with peat moss for potatoes. After some further remarks, he said that the Wyersdale cow, his friend enquired about, was one of a cross breed he met with at Lancaster fair, bred in Wyersdale, near Lancaster, and a cross between the late Mr. Cothorn's, M.P., Argyleshires and short horns—the cow had a dark muzzle and blue horns. (*laughter*), in other respects very superior. He gave 13*l.* or 13*l.* 10*s.* for her, with her calf: he told the man, after he paid for her, that he meant to carry away the fifteen sovereigns at the Royal Agricultural Society's show, who laughed at the idea. He sold her calf, fat, for 3*l.* and shewed her and won the 15*l.* prize, and then sold her as not being suited to his stock of thorough-bred short horns; he also obtained 10*l.* for his horse on the ploughing field, this gave him great pleasure as he was of his own breed. The Kendal Agricultural Society was instituted in 1799; many years after that the black-faced mountain sheep were the staple breed amongst farmers in the Kendal district, but now nearly all, or, at least, a very great part of the sheep on the inlands or cultivated grounds, are improved sheep, between the Leicester and Teeswater breeds. Pamphlets are published to show that less beef and mutton is slaughtered, in almost all towns, than a few years ago. The community must bear in mind that the beef, mutton, and pork, are now quite different to what they were 30 years ago, by the formation of agricultural societies; and premiums given for cultivation have been such a stimulus to improvement, both in the cultivation of the soil and the breeding of stock, as no person would ever have contemplated; by the improvement in breeding stock 30 to 40 per cent. more animal food is produced, and the average weight of each animal, compared with 20 or 30 years ago, is full one-third more: take one of the old fashioned Dutch cows, and take an improved short horn, let them have the same given quantity and quality of grass, and the short horn will be fat before the Dutch is half fat. Farmers now make great exertions; agricultural societies' premiums have been a great stimulus to improvements—the more they do to cultivate the soil the more they benefit the community, by raising a greater produce for the increasing population of the country—they give more labour to the operative, and he wished he could say that the times permitted them to give better wages.

SALT AS A MANURE.

ON SPADE HUSBANDRY.

TO THE EDITOR OF THE LIVERPOOL MAIL.

TO THE EDITOR OF THE FARMERS' MAGAZINE.

SIR,—I beg to call the attention of your agricultural readers, who are in the habit of using guano and artificial manures, to the fact that most of the carbonate of ammonia contained in them, or generated during their decomposition in the soil, is quickly evaporated before the plants can derive any benefit from it. At least 20 or 30 per cent. of animal manures may be saved by the use of salt, which will prevent the ammonia escaping into the atmosphere, and two substances highly necessary to vegetation will be formed. The merits of salt as an agent in agricultural operations seem to have been nearly entirely overlooked by our experimental farmers; but I am satisfied, from extensive experience of my own, that when it is properly applied it will be found a most valuable addition to the various natural and artificial manures now offered to the public.

I am, &c.,  
A FARMER.

EXTRACT FROM A FARMER'S DIARY.

“During the process of fermentation which takes place when large quantities of stable and farm-yard manure are thrown together, a considerable portion of the most valuable part is lost in the shape of carbonate of ammonia, which flies off. To prevent this great waste, common salt may be used. It is a principle in chemistry that substances combine more freely at the moment of their generation or disengagement than at any other time. The chloride of sodium or common salt immediately unites with the carbonate of ammonia as it is formed, and a double decomposition takes place, producing muriate of ammonia and carbonate of soda.

“A recent discovery in chemistry has elicited this fact, and goes far to prove the utility of salt as applicable to manure. That the ancients were acquainted with the several properties of salt and its uses, is sufficiently shown by the following passage from scripture:—‘Salt is good; but if the salt have lost its savour, wherewith shall it be seasoned? It is neither good for the land nor yet for the dunghill: men cast it out.’

“To render this quotation perfectly intelligible, it is necessary to observe that in parts of Syria a species of rock-salt exists, which, if exposed for any length of time to the atmosphere, loses its saline properties, but retains its outward appearance. ‘It has lost its savour;’ ‘men cast it out;’ ‘it is neither good for the land nor yet for the dunghill.’ Here are two distinct uses, besides domestic purposes, to which salt was applied, and in both cases it was good. Upon the land it produces various effects according to the quantity used, and most agriculturists are acquainted with its nature; but the great source of its utility is upon the dunghill. There, in nature's laboratory, a chemical change takes place, and carbonate of soda and muriate of ammonia are formed.

“Sir H. Davy, in his ‘Agricultural Chemistry,’ remarks that farm-yard dung, in its decomposition, loses from half to two-thirds its weight; besides a saving of this immense loss, all noxious weeds and seeds are destroyed by the salt, as also the larvæ of insects, and the insects themselves, which consume great portions of the dung. To all farmers who are desirous of increasing the value of their farm-yard manure, I would strongly recommend the use of salt on the dunghill. It may be used in a liquid state, sprinkled amongst the manure at the time of throwing it into a heap, or spread afterwards in a dry state as a covering to the whole.”

SIR,—At a time when the whole country are deploring the want of employment for the poor, and consequent increase of poor-rates, any system that can be promulgated to remedy those evils must be productive of good to all classes. Seeing we are all links in one continuous chain, which cannot suffer material injury in one part without weakening the stability of the other, it becomes the duty of individuals (even theorists) to make known their ideas for the benefit of the common weal. With these views I feel disposed to offer you some observations on the comparative merits of spade or hand culture, with plough husbandry. I will suppose an acre of land to be fallowed for mangold or turnips, and calculate as near as I can the cost of each method of preparing it fit to receive the manure previous to sowing, and the difference in amount.

SPADE CULTURE. £ s. d.

First digging with three tined, flat-pronged forks (7 inches deep), picking the couch, &c., in October and November, 160 rods at 3d. per rod .....	2	0	0
Second digging, as above, in Feb. and March, 160 rods at 2d. ....	1	6	8

PLOUGH CULTURE. s. d. 3 6 8

First ploughing (with 3 horses) in Oct. or Nov. ....	12	0
Second ditto, with do. in Feb. ....	12	0
Harrowing 3 times at 1s. 3d., picking couch 4s. ....	7	9
Third ploughing with 2 horses in April. ....	9	0
Harrows 1s. 3d., picking 2s. 6d., scarrifier 2s. 6d., harrows and picking 4s. 9d. ....	11	0
Fourth ploughing 9s., harrows and picking 2s. 9d. ....	11	9
	<hr/>	<hr/>
	3	3 6

Surplus cost on spade culture, 3 2

If, sir, this calculation be correct and fairly stated, the extra cost to the farmer for cultivating a few acres by the spade is a matter totally insignificant in itself, when compared with the advantage to be obtained in reducing the rates by employing the poor, and thereby prevent the ill consequences to society engendered in idleness. Independent of which, there is, I believe, but few soils which would not improve under hand tillage, and gradually become more valuable and productive under that system than under the plough, and a greater advance towards perfection in agriculture be obtained than adhering to one method alone, viz., the plough. It is lamentable to see so many persons wanting employment, when employment could be given on such easy terms. The philanthropist fails to supply that sturdy, honest independence by gifts and presents which full employment would afford, and the pride of our most useful link in the chain is fast sinking into mendicity for the want of it.

I have the honour to be, sir,  
Yours, &c.,

Ongar, Feb., 17th, 1844. ESSEX.

P.S. Some querist perhaps will consider I have not calculated sufficient for the digging and picking, but I would remind them that it is as necessary to have a proper instrument for digging as for ploughing, and that the three tined, flat-pronged fork is as

far superior to the spade for that purpose as the foot-plough now in use to the heavy turn-wrist plough of the last century; and I am convinced by experience that a man will accomplish much more in a given time with the fork alluded to, and with greater effect, than by the spade.

### ON THE EFFECTS OF SOAKING SEEDS IN CHEMICAL SOLUTIONS.

(Abridged from the *Scottish Journal of Agriculture*.)

There was perhaps no object in the exhibition of plants in the society's show, at Dundee, in August, 1843, which attracted such general attention as the remarkably strong and vigorous oats growing in soil, exhibited by Mr. James Campbell, of the Educational Seminaries of that town. The soil in which they grew possessed no peculiar property, except that it had not been manured for eleven years. The vigour of the plants, according to Mr. Campbell, was entirely to be ascribed to their seed having been subjected to a process by which they were soaked in certain chemical solutions. Mr. Campbell has, since the show, in the most liberal and disinterested manner, placed the particulars of his process in the hands of the society, for the benefit of agriculturists generally; and to further his good intentions, the society has thought it proper to publish his own explanation of the method of conducting the process of preparing the seed, as it is given in a letter to the secretary.

"I steeped the seeds of the various specimens exhibited in sulphate, nitrate, and muriate of ammonia, in nitrate of soda and potass, and in combinations of these; and in all cases the results were highly favourable. For example—seeds of wheat steeped in sulphate of ammonia on the 5th of July, had, by the 10th of August, the last day of the show, tillered into nine, ten, and eleven stems of nearly equal vigour: while seeds of the same sample, unprepared, and sown at the same time in the same soil, had not tillered into more than two, three, and four stems.

"I prepared the various mixtures from the above specified salts exactly neutralized, and then added from eight to twelve measures of water. The time of steeping varied from fifty to ninety-four hours, at a temperature of about 60 degrees Fahrenheit. I found, however, that barley does not succeed so well if steeped beyond sixty hours.

"Rye-grass and other gramineous seeds do with steeping from sixteen to twenty hours, and clovers from eight to ten, but not more; for, being bi-lobate, they are apt to swell too much and burst.

"The very superior specimens of tall oats, averaging one hundred and sixty grains on each stem, and eight available stems from each seed, were prepared from sulphate of ammonia. The specimens of barley and bere were prepared from nitrate of ammonia; the former had an average of ten available stems, and each stem an average of thirty-four grains in the ear; and the latter an average of also ten available stems, with seventy-two grains in the ear.

"The other specimens of oats which were next the most prolific, were from muriate of ammonia; and the promiscuous specimens of oats were from nitrates of soda and potass—strong, numerous in stems (some having not less than fifty-two), and not so tall as either the preparation from the sulphate or muriate of ammonia.

"It was objected by some that the tallest oats were too rank, and would break down before coming to seed;

but I have no fear of that, as they were strong in proportion to their height; and should there even be any ground for the objection, I am confident that a combination of sulphates of ammonia and soda, or potass, would rectify the excess of height, and render the grain equally productive.

"I have at present a series of experiments going on in the country, with seeds prepared in seven different ways, and sown in pure sand, and in a tilly subsoil, taken six feet from under the surface, and in which there is no humus or organic matter of any kind. Along with the prepared seeds are also some unprepared, and I expect to be able to form a comparative estimate of their growth by visiting the place in October.

"At all events, from the experiments which I have already tried, I am quite satisfied that, even without the application of common manures, double crops, at least, may thus be raised; and under the application of the ordinary manures, crops tenfold greater than usual.

"The various salts were prepared by me from their carbonates.—I am, &c."

### PROTECTION VINDICATED.

BY CINCINNATUS.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—Having trespassed so much on your indulgence, and occupied so much space in your useful pages, in detailing the economical and simple expedients I have adopted in draining, fencing, and improving land; and also in endeavouring to draw the attention of government to the palpable contradictions, absurdities, and blunders, in the numerous General Turnpike Acts, in order to lead to the enactment of a short, clear and simple digest of the law on turnpike roads, I really feel ashamed of attempting a further intrusion; but the question of *free trade* has, of late, assumed an aspect so dangerous to agriculture, and, in its consequences, by injuring the home trade, so infinitely more ruinous to manufactures; and the view taken of it by all parties, both in and out of parliament, appearing to me to be unnecessarily complex, I am induced to offer the opinion I formed upon it, nearly half a century ago, which has been confirmed by subsequent events and mature reflection.

I fear its simplicity will cause it to be disregarded, for it seems to be the fashion of the day to attend only to things monstrous or magnificent—millions, for the construction of railways, are readily obtained, but to borrow a mere trifle to repair an old road is almost an impossibility; we have money in abundance to enlighten and improve the most distant parts of the world, whilst our fellow-countrymen and neighbours, the brave and loyal Cambrians, are driven to open rebellion by a total disregard to their feelings and their necessities: however, with your permission, I shall proceed to explain what that opinion is, and to endeavour to establish a principle, the departure from which has greatly added to the distress which prevails, not only amongst agriculturists, but amongst numerous branches of trade and manufacture.

I am well aware that, in suggesting a principle, at variance with the numerous opinions and theories that have issued from the press, I expose myself to the charge of being presumptuous or rash. That I may not be so deemed by those who investigate and reflect before they condemn, I crave indulgence

whilst I narrate the train of events which first drew my attention to the subject.

On leaving school I was received by an old established commercial and manufacturing house, and, in the first place, I was taught to warp, or, in other words, to arrange the threads that run lengthways in the piece, and to form them into a ball ready to be delivered to the weavers, then a happy class, residing in the country. Amongst a variety of articles which I was instructed to prepare, calicoes were the most extensive, and I well recollect being much puzzled to account for the invariable practice of placing three blue threads on each edge or selvage; they certainly were not ornamental, and I could not discover any utility.—In due time the mystery was explained to me. It was to *protect the cotton manufacture* from the overwhelming superiority of calicoes manufactured in India; vast warehouses of the East India Company, in London, were filled with cotton cloth, called by various names, derived from the places or districts in which they had been manufactured; the kingdom of Calicut produced such an immense quantity, that calico became a general term for plain cloth made of cotton. The East India Company was not allowed to sell any for consumption in Great Britain, all were exported; and, in order to prevent their being smuggled into the kingdom, the admirable expedient of blue threads was adopted; any calicoes found in Great Britain without blue threads, were seizable; and, in order still further to protect the imperfect manufacture of cotton, and, at the same time, to encourage the art of calico printing, then also in its infancy, India calicoes were allowed to be printed in Britain, on the party applying for the privilege giving a bond, with a heavy penalty, to insure their exportation; and, as a further protection, double duty was charged on the printing of foreign cloth—3½d. per yard being the duty on British, and 7d. on Foreign calico. This simple fact, to which I can bear witness, I defy the League to invalidate; and, as to their frequent affirmation, that the cotton trade has not been benefited by protection, it is an abominable falsehood.

The King of Prussia well knows that if British cottons were now, in the infancy of the Prussian manufacture, permitted to be imported, ruin and misery would ensue; though friendly to Britain, he wisely prefers his own subjects; nor would it be possible by a free trade in grain, or any other temptation, to induce that benevolent sovereign, by unequal competition, to throw any of his subjects out of employ. This remark applies with at least equal force to other European powers.

But how does this apply to that earthly paradise, that paragon of perfection—in the opinion of the League—the United States of America? This brings me to my second narrative.

In the spring of 1796 I visited the states of New York, Pennsylvania, and Maryland; General Washington was then president—it was before that republic had manifested decided hostility to Great Britain, by the embargo, by the war, and by that masterpiece of knavery, repudiation.

The wisdom, integrity, and honour of Washington, well supported by Vice-president Adams, had then raised the United States to a high station in the estimation of the civilized world; prosperity seemed to reign triumphant, to pervade all classes of society. I was so much struck by observing the general prosperity, that I took great pains to ascertain the cause of it, and fortunately I had the opportunity of

acquiring information from the best sources; with the President I had the pleasure of conversing on agricultural topics, his *most* favourite pursuit; with members of the senate and of congress, judges and lawyers, on political questions, revenue, and statistics; and with merchants, both American and the representatives of British houses, on commerce, currency, &c.

The result of the information thus acquired led to the conclusion, that the country, generally, was in a state of decided prosperity; and that this happy state of things arose principally from duties so judiciously imposed as to protect every person, whether engaged in agriculture or manufacture, from foreign rivalry. At that time Great Britain received American flour duty free; but this made not the slightest difference in the American tariff, which was formed, not to please foreigners, but to protect their own agriculture and their imperfect manufactures from foreign competition. Thus, in order virtually to exclude foreign cheese, and to encourage native industry, the duty on the importation of cheese was 7 cents., or, as nearly as possible, 4d. per pound. The wisdom of that policy is now manifest; by protection, the *manufacture of cheese* improved; and it increased in magnitude in a similar ratio with the *manufacture of cotton* in England; both were effectually protected, and each country has been immensely benefited by the plain common sense of their respective governments at that period. America continues to act on the same wise principle of protection, regardless of free trade mania; whilst Britain sits down, like a simpleton, with open mouth to have her teeth extracted; impoverishing her own children to enrich rivals who laugh at her folly. The conclusion I must defer until your next publication. CINCINNATUS.

Feb. 22, 1844.

## VALE OF EVESHAM AGRICULTURAL SOCIETY.

The amicable discussion between Mr. Holland, of Dumbleton, and Mr. Hanford, of Wollashill, agreed on at a recent meeting of the Association, upon the question of tenure by lease, was entered into on Monday afternoon last, at a meeting of the Association.

MR. HOLLAND commenced by thanking Mr. Hanford for the offer which he had lately made, and, as some then present might not have attended the October meeting, explained the manner in which the present discussion had then been agreed upon. It was difficult to enter into the question of tenure under lease without adverting to other details, as the subject of land stood not alone, but was blended with others, such as rent; but he should endeavour to keep as closely as possible to the question of tenure by lease. Every practical man allowed that whatever a man's capital be vested in he ought to have it secured, and is entitled to the time necessary to receive a return from it; yet, strange as it may appear, only one-fourth of the land of this country was let upon lease. The reason of this appeared to be that the landlord objects to his land going out of his hands for a certain period, because, if prices rose, he would then be letting it too low; or, whatever may be his politics, he felt that he possessed influence. That influence, in feudal ages, compelled the tenant to follow the banner of his chief, but, in modern times, it too often sent him to the poll. Another reason was, the landlords wish to preserve a large quantity of game; but the two last he should dismiss, and confine himself only to money, or profit.

Here he approached his friend Mr. Hanford, when he stated there were circumstances where it was better for a landlord not to lease, but, taking advantage of the price of corn, to let on short tenures. Mr. Hanford considered it possible that in a twenty-one years' lease the tenant might farm well during fourteen years, and but indifferently during the remainder, and therefore he required security for his property. These objections Mr. Holland considered were to be met by the principles of the lease considered as a protection to both parties. Most leases were at present hampered with empty covenants, which in earlier times were perhaps necessary; but now that agriculture had become a science, all covenants in leases should be based on common sense. The simpler such documents were, the better; small in compass, but yet secure. First, no harm, but good, would, he considered, be done by ceasing to tie down the tenant to raising particular crops. He would, however, insist on not having two white crops successively, but in alternate years, and that on clean fallows, free from couch. Another item should be introduced, to secure the consumption of hay and straw upon the land; and, in case of any covenant being unfulfilled, the landlord should have the power of re-entry on the estate. All disputes should be settled by a friend chosen by each, in conjunction with an umpire. Thus Mr. Hanford's objection as to the tenant farming well during only a part of the term would be avoided, for, if from any cause the cultivation was neglected, this right of entry would satisfy the owner. As to the supposition that landlords were not blameable for taking the higher rents, when so much competition is urging them, the landlord ought to choose the man who gives the *right* rent, and not the largest sum; otherwise, the tenant, to obtain the farm, may expend in rent what ought to be expended on the land, and thus the landlord injures his estate. Tenants were, he considered, generally in favour of leases; for whatever their confidence in the landlord himself might be, this lasted only during his life: they knew not what might be the conduct of his executors.

Mr. HANFORD, though placed in a difficult position by his friend's mode of treating the question, would still endeavour to make good his ground that the granting of leases should depend upon circumstances. He could not regard the lease as a *sine qua non*, for he did not consider it as necessarily advantageous to the landlord, the tenant, or the community. Security of property being the foundation of the social structure, without that we must degenerate into barbarism. Security of property is equally necessary to the proprietor of 10,000 acres as to the owner of a solitary rood. If we looked at the title-deeds of most estates, we found them granted from the Crown to some feudal baron, who was bound to military service in return. He thus holding, and having no enterprising middle class, let the estate in portions for a long period to fighting men. The Crown thus secured his service, and he his tenants' aid. Such was the origin of leases. Leases in the present day were chiefly held under chapters and other corporate bodies, and the holders of such were, by the covenants, regarded as claiming half the value of the land. His friend, he thought, would hardly so let his land that the tenant might thus claim, and if so, he must admit that land ought not uniformly to be leased. Mr. Hanford then cited other countries in the present day, where, from lack of capitalists, the proprietor was content to divide the produce with the cultivator. Now that we have men with capital and energy, Mr. Randell's argument had been that, in case of a landlord's death, where no lease

was granted, advantage might be taken of the tenant by the trustees. But, to reverse the case, Mr. Hanford asked, how is the landlord to be protected, in case of his tenant's death, for the fourteen years that may continue unexpired? The tenant's executors must not be allowed to injure the farm to screen the family, and at the same time to injure the community, who would derive increased advantages from proper cultivation of the land. But in the case of farming without lease, the farm in its best condition may be upon hand; but we don't want parties running over each other to take it, perhaps without the necessary capital, and by such entry impoverish the farm. Regulations to prevent such outrages were needed, and he believed that the provisions of Lord Portman's bill (which he would, if in Parliament, cordially support) would be a sufficient remedy. All great and permanent improvements, he conceded, ought to be made by the landlord; but though a lease was not in such case always needful, yet it might at all times be necessary—as upon new inclosures, and in breaking up commons, or where the landlord, from embarrassment, was unable to contribute. One provision of his friend would ground every lease upon a corn rent. There would then be some security for the landlord; but every reasonable man ought carefully to examine all circumstances before either giving or receiving a lease. It might chance to bind only one party; and in case of bankruptcy, neither the tenant, the landlord, nor the community, would be bettered; and the latter must be regarded, for property claims its advantages as well as its rights. Thus, leases ought to depend upon circumstances; but if considered otherwise, he must submit.

Mr. RANDELL explained, in reference to one of Mr. Hanford's remarks, that a landlord's trustees might naturally consider it their duty to make more of the land, to the injury of the tenant, if only holding at will. As to the supposition of the tenant's death when holding on lease, the terms should prevent his executors from then injuring the farm.

Several other farmers present here expressed their sentiments upon the question, being invited to do so by the chair, Messrs. Izod and Morris siding with Mr. Hanford; Mr. Beman, Mr. Woodward, Mr. Goodwin, and Mr. Ashwin, with Mr. Holland.

Mr. HOLLAND, in reply, thought that his friend differed more upon detail than upon principle. For himself, he admitted that he desired a corn-rent as the basis of a lease, and, with regard to the consumption of corn and hay, which some members had noticed, said that if sold, artificial manures might be purchased instead, but those might benefit certain crops more than the land, and his object was to notice what might generally apply throughout the country. Landlord, tenant, and labourer, ought now to join. The tenant has been called upon at every agricultural meeting, the landlord must help him with leases under a corn-rent. This would be fair for all. Then, when times mend, and landlord and tenant thrive, the labourer would reap the advantage which increase of employment would confer.

Mr. HANFORD briefly rejoined, and concluded by expressing his satisfaction at the very amicable discussion which had taken place, and though he well knew that the decision of the meeting would be against him, yet he had deemed himself called upon to endeavour to elicit truth, which he should, with due boldness, still seek after.

The question being put to the vote, the propriety of granting leases was carried on a show of hands by twenty to two, and on a corn-rent fourteen for and three against.—*Worcester Chronicle*.

## ON THE MODE IN WHICH LIME OPERATES IN RENDERING THE SOIL BETTER ADAPTED FOR THE GERMINATION AND GROWTH OF PARTICULAR PLANTS.

BY ROBERT M'TURK, ESQ., OF HASTINGS HALL,  
DUMFRIES-SHIRE.

[Premium, the Silver Medal.]

There is no substance, perhaps, so extensively used for agricultural purposes, with regard to whose agency and the time of applying it to the soil the opinions of practical men have differed so widely as that of lime; for, while it has been, and I may say is at the present time, regarded by one class of agriculturists as a manure, it is by another, and perhaps not the worst-informed class, regarded merely as a stimulant; that of itself it contributes almost nothing to the growth of plants, and that the benefit resulting from the application of it to the soil is owing entirely to the action which it exerts upon other bodies which it encounters in the soil. It would not be difficult to shew that lime, like the other earthy bodies, enters so sparingly into the constitution of plants, that its presence in many whose growth it promotes can, upon analysis, with difficulty be detected; and we are therefore entitled, perhaps, to regard its presence on some occasions as accidental, rather than as a necessary constituent. Were lime really regarded to be entitled as a manure, we are inclined to think that its effects would be less evident than they really are, especially when we take into consideration the very small proportion in which it is found to exist in those plants which are considered as most worthy of cultivation, and for promoting the growth of which it is most frequently applied. To what, then, are we to attribute the increased fertility of those soils which have received a due proportion of lime? Most certainly not to the influence which it exerts over the earthy bodies which constitute the soil, these being saturated metallic oxides, which have no affinity for it. Nor has lime an affinity for any of the elements which they contain; and if the soil did not contain other ingredients, upon which it powerfully acts, its application would be followed by no beneficial results. These ingredients are the remains of bodies which have lived and died, and still, in some degree, retain their organization; and in proportion to the quantity of decomposed matter which they contain, and the causticity of the lime when applied to them, will be the effect produced. If, then, the action produced by the lime depends so much upon the state in which it is applied, it is also proper that we should mention that its causticity depends, *first*, upon the freeness from other earthy matters, or, in other words, its purity; and, *secondly*, on the time that is allowed to elapse between the burning and the application: the burning being simply the means by which the carbonic acid is expelled, and the lime being thereby changed from a mild to a caustic state, or, as it is called, quicklime. Water is then applied for the purpose of slaking or pulverizing it, in order that its distribution over the land may be more equal and effected with greater facility. But, from the time it is cooled, after it comes from the kiln, its affinity for carbonic acid gas is very strong, and it will continue to attract it from the atmosphere till it is again united to a proportion equal to what was expelled by the operation of burning; and if this is allowed to take place before it is applied to the soil, it returns to a state comparatively inactive; and in proportion as it has

been allowed time, and placed under circumstances favourable for attracting carbonic acid gas, it will lose the power of acting upon, or disorganizing the animal or vegetable remains which it encounters in the soil, and also of neutralising any acidulous matter which may there exist.

We shall now endeavour to explain the nature of the action which lime exerts upon the organized matter it encounters in the soil, and in what manner this action tends to promote the germination and growth of particular vegetables.

When a plant dies, it leaves its roots in the soil; and the roots of some plants occupy a much larger space than a person unacquainted with their growth may suppose. The softer and more juicy parts begin to rot or to be decomposed—which, in fact, is the loosening of that mysterious influence by which the elements of all organized bodies are held together as long as life endures; and the process of decomposition of any animal or vegetable substance is, therefore, simply the restoring to nature those substances in their elementary forms, which it at first received from the soil or atmosphere—and this process goes on with more or less rapidity, according to the nature of the substance and the circumstances under which it is placed. Although it is a well-established fact that putrefactive fermentation, or the process of decomposition, cannot take place unless in a temperature of above 32 deg. Fahrenheit, a free admission of atmosphere, and a certain degree of moisture; still these agents are always present in the soil within a moderate depth from the surface, and under circumstances sufficiently favourable to effect the decomposition of the softer and more juicy parts of animal and vegetable substances: but when their decomposition has taken place, the more solid parts still remain; and these, with the yearly contribution afforded by the more recent plants, constitute an inexhaustible source of organized matter from which, by well-directed skill and industry, man may derive his means of subsistence. In this beautiful provision of nature, we find that, when man commits to the earth the remains of animal or vegetable bodies, he not only secures a present nourishment to crops which supply his own immediate wants, in the more decomposable parts of those remains, but has also laid up a bountiful store for those of his race who will take his place on earth when his labours are over. Lime, then, is an agent which enables us to avail ourselves of the hidden stores of nourishment which the soil contains; for, when it is applied to the soil in its caustic state, it is washed in by showers of rain, and, in its progress through the soil, encounters a portion of inert, insoluble, but decomposable matter, which it acts upon in such a manner as to effect its decomposition, and resolve it into three parts, essentially different in their nature and character, all which parts are contained in the smallest portion that can be decomposed—*first*, the gaseous; *second*, the soluble; and, *third*, the residuary matter. It is the two first of these we are to regard as the immediate cause of the increased fitness of the soil for the germination and growth of particular plants.

*First*, then, with regard to the germination of particular seeds; and there is none with regard to which it is more remarkably the case than that of white clover, and at the same time, there is no plant more desirable to be obtained. When lime is applied to the surface of pasture land of such inferior quality that clover has not before made its appearance, and if the land is not so wet as to counteract the influence of the lime in the course of the second

year after its application, white clover is almost certain to appear. It is evident from this that the seeds of the clover must have been in the land before it was limed, as the calcination of the lime completely precludes the possibility of the lime itself being the medium through which they had been conveyed. How long the seeds may have lain there without the vital principle being destroyed, we have no data to form an estimate; but we know they must have been there from a very remote period, and their coat must be of a very impervious nature to have prevented germination, and to have protected it so long from injury; for germination, like decomposition, requires a certain temperature, and the seed to be in contact with moisture and the atmosphere; and the rapidity of the process, in these circumstances, depends upon the temperature, so long as it does not exceed 100 deg. of Fahrenheit. When lime, then, commences its action upon decomposable matter, a portion of gas is disengaged, which penetrates the soil above it, and is partly absorbed by the soil, and partly makes its escape to the atmosphere; and, as decomposition proceeds, the soil becomes looser and more permeable to the atmosphere. The temperature is, at the same time, increased by the more ready admission of the sun's rays, while the heat which is always evolved in the process of putrefaction stimulates the seed to absorb moisture, and, at the same time, oxygen from the atmosphere, which now finds ready admission through the now permeable soil. The germination of the seed is thus effected which had lain for ages in the soil, and might have continued so for ages to come, had the action of lime on the decomposable matter not rendered the superincumbent soil porous, by which the atmosphere was admitted, and the oxygen, its vivifying principle, absorbed, and the temperature raised by the ready admission of the sun's rays and the heat evolved during decomposition.

The next point for consideration is the manner in which lime promotes the growth of particular plants. Although the seeds of some plants are covered with a coating so impervious to moisture and the atmosphere as, when buried, in the consolidated earth, germination cannot take place without the agency of some powerful stimulant, such as lime, still we are acquainted with no plant of which it does not in some degree promote the growth. It is true that, when applied to land, some of the plants which before occupied the surface disappear; but it is doubtful whether this arises from anything in the lime which is deleterious to such plants, or whether its action has so powerfully promoted the growth of others that their increased luxuriance proves fatal to those of weaker character; and, if pasture is allowed to become too tall and rank for two or three summers together, the white clover, which indicated the improvement of the land, is choked; and the action of the lime having subsided, the germination of other seeds of the same plant does not take place.

When gaseous matter is disengaged by the action of lime, the matter to which it has united itself is partially rendered soluble in water; and it is a truth which requires no illustration, that no substance of any kind can be received as nourishment by plants which has not, in the first instance, been dissolved in water, the mouths of the roots being so very small as not to admit the point of the finest needle. It farther seems to be a law of nature that organized substances cannot again form part of a living being without being in the first place dis-

organized; and in proportion to the quantity of the inert matter which the lime has acted upon and rendered soluble, and also in proportion to the gaseous matter which has been evolved during the process and been absorbed by the soil, will be the amount of nourishment or advantage resulting from the application of lime. Although we have selected clover as the plant, the germination of which frequently follows the use of lime, there are others over which it exerts an equal influence; but as its appearance is the surest indication of an important change having taken place in the soil, whether the lime had been applied to improve the pasturage or to enrich the soil for the cultivation of other crops, the appearance of other plants is often overlooked, and some do not germinate till after the land is ploughed and placed under more favourable circumstances, of which class of plants the dead nettle furnishes a good example.

There is another argument which we may advance in support of this view of the germination and growth of clover, arising from the influence of draining. Where this improvement has been sufficiently made, so as to effect an amelioration of the soil, white clover is sure to make its appearance. This is owing exactly to the same change in the soil, in consequence of drainage, which we have ascribed to the lime; for, when superabundant moisture is withdrawn, plants of a semi-aquatic nature die, and others more suited to the altered nature of the soil take their place, and the atmosphere and sun's rays are permitted to penetrate with facility the space which the water had occupied. The necessary agents for promoting decomposition are then present, and the process first commences among the partially decomposed remains of vegetables which have perhaps died many years before, and it matters not whether their decomposition has been brought about by the action of lime or the influence of draining. Seeds of difficult germination, existing in the soil, are placed under the same favourable circumstances as with lime; for the oxygen absorbed by the seeds during the process converts the farinaceous matter which they contain into sugar, and the roots of the infant plant are supplied with it till it possesses strength to take hold of the soil, and to appropriate to itself a portion of the soluble matter which the process we have described had formed in the soil.

The Marquis of Tweeddale stated, at the Society's meeting at Berwick, that lime seemed to be injurious to crops on land that had been drained. The noble Marquis did not state in what respect the crops were injured in consequence of the lime; but it appeared to us not less evident that if his Lordship had stated it in explicit terms, that the injury could only have arisen from one of two causes, namely, from too violent action excited by the united influences of draining and liming a soil containing much decomposable matter; and the consequent evolution too of much gaseous matter in its ascent to the surface, had loosened or *heaved* the soil, that the seed was thrown out, or the plant rendered so loose as to become incapable of nourishing itself in the slightest drought. This is one way in which lime might prove injurious to drained land; but there is another we have frequently witnessed in the *lodging* of the crop before the ear is filled, from the luxuriance arising from excess of soluble matter, excited by the united agencies of liming and draining.

We shall now mention some of the experiments which we made in the course of the season, which

tend to illustrate and confirm the statements here advanced as to the causes of the appearance of white clover when lime is applied. On the 12th May, 1841, we had a piece of land, well dug and cleaned, divided into nine parts, by means of pins driven into the ground, and division-boards nailed to them to keep them firm in their places. The use of the division-boards was not only to divide the portions of ground separately, but also, when the ground was levelled within them, the exact depth of earth in each division might be measured.

No. 1.—Six feet square; the clover-seed sown on the surface.

No. 2.—Ditto; the clover-seed raked in gently.

No. 3.—Ditto; half an inch of cover.

No. 4.—Ditto; six-eighths of cover, one-half of the division compressed by treading and afterwards smoothed.

No. 5.—Ditto; one inch of cover, and the other half compressed.

No. 6.—Ditto; one inch and a-quarter of cover, the other half compressed and smoothed.

No. 7.—Ditto; one inch and a-half of cover, the other half compressed and smoothed.

No. 8.—Ditto; two inches of cover, one-half compressed and smoothed.

No. 9.—Ditto; two inches and a-half of cover, one-half compressed and smoothed like the rest.

After the one-half of the divisions, Nos. 4, 5, 6, 7, 8, and 9 were compressed by treading upon them, and smoothing them with the back of a spade, the one-half of each of the nine divisions in the opposite direction received an ordinary liming. The weather, for some time after the 12th, was mild and sufficiently moist to forward germination. Nos. 1, 2, and 3 were in an active state of germination on the 19th day of the month; No. 4 on the 21st, and the compressed division not till the 25th; No. 5 on the 24th, and the compressed and limed divisions not till the 1st of June, the other sometime afterwards; No. 6 germinated only on the limed divisions, the uncompressed about the middle and towards the end of June; No. 7 exhibited at this time no appearance of clover, and afterwards a few plants appeared on the limed divisions some time after the removal of the weeds which had germinated upon it; and this operation no doubt promoted both the action of the lime and the germination of the seeds, by allowing the air more ready access to those parts from which the roots had been extracted, and also, not improbably, by bringing some of the clover-seeds nearer the surface. On Nos. 8 and 9 we had no clover-plants in the course of the season. On Nos. 1, 2, 3, and 4, we could observe no difference on account of the lime, though applied in a hot or caustic state; and the reason we conceive why it had no influence on these divisions was, because they were placed under circumstances so favourable to germination that it was effected before the action of the lime commenced; and that on Nos. 5, 6, and 7, which were under circumstances less favourable, the germination did not take place till stimulated by the action of the lime; and whether it will have any influence on Nos. 8 and 9, next summer will shew.

The practical inference we would draw from these experiments, in the first place, is this—Is the present system of sowing clover calculated to promote germination? We have no hesitation in saying that it is precisely the reverse; for, when sown with ryegrass seed, and harrowed in in the usual way, it cannot fail to be too deeply covered, and the consequence of the rolling, which is now a general practice, must also increase the evil. It is, perhaps, from

this cause that we always see the best braird of clover on the hard and gravelly parts of the field, and we therefore conclude that it is the land best suited for its growth; when, in fact, we are inclined to think that under the present system of sowing, harrowing, and rolling, that it is only the best adapted for the germination of the seed from its more permeable nature. It might be worthy of investigation to ascertain how far the present system of management will account for the falling off of the crops of red clover, which has been experienced for some years back; for the germination of the seed of this plant requires circumstances not less favourable than that of the white. To ascertain this point, it would only require to be sown by itself, after the ryegrass is harrowed in, and might be tried either with or without rolling.

There is another practical application that may also be drawn from the view we have advanced regarding the action of lime upon decomposable matter. We have imputed to this action nearly the whole benefit resulting to the crop from its application. If this view is well founded, it must follow that its application to land which naturally contains but little, or which has been exhausted of its decomposable matter by overcropping or otherwise (for much ploughing, by exposing the soil to the action of the atmosphere, also tends to decompose animal or vegetable matter, and the crops to exhaust it), can be attended with little or no advantage, and it is from this cause that the first application of lime is always attended with the best effect from the undiminished accumulation of this matter in the soil. The application of dung or any other manure to the soil, to use a familiar illustration, is like giving a feed of corn to a horse—it tends to strengthen and nourish; while lime may be regarded as the application of the whip or spur—it imparts no strength, but stimulates into action the power which previously existed.—*Quarterly Journal of Agriculture.*

## ACCOUNT OF IMPROVEMENTS ON LINSLADE FARM.

BY W. G. HAYTER, M.P.

In November, 1839, I took in hand a farm at Linslade, in the county of Bucks, of about 250 acres of convertible land, which had been for some years untenanted (the previous tenant having, after a long continued course of bad management, failed upon it), and which had been held on by a bailiff, put in merely to prevent it from falling into absolute waste until some opportunity of letting it might occur.

The capital, upon the farm, when taken in hand, was computed and taken at £1,000; and the annual value placed upon it, but which it was wholly out of the question, without a very considerable outlay on the part of the landlord, to obtain, and which, in fact, could not be obtained, was £250.

The quality of the land was of a varied character; nearly one-half of the arable (the whole being about 170 acres) consisted of a strong clayey loam, and the other half of a light siliceous sand, but both very wet, and requiring extensive and thorough draining. The meadows (40 acres) were of the worst possible description, divided into numerous and capricious portions, intersected by broad and deep ditches, overgrown with sedges and other aquatic plants, and flanked with old and decayed willow-trees; they were at all periods of the year liable to be

overflowed by a mill-stream, which half encircled them, and the bed of which had been gradually raised by a long-continued deposit brought down by the sluggish river Ouzel, the boundary on this side as well of the property as of the counties of Bedford and Bucks.

The fields, as well arable as pasture, were unequal in dimensions, divided from each other by wide, overgrown, and irregular thorn hedges, the ready and constant receptacle of weeds and vermin. Upon the whole, the farm was much in the same condition as many others in that locality and in other parts of the county now are, although from its peculiar circumstances somewhat below the average.

In the course of three years, by an improved system of husbandry, by a greatly increased growth of green crops, and by a consequently increased stock both of sheep and cattle, an entire revolution in its character and prospects has been effected; and that which was one of the worst is now in the progress of being made—and when a set of farm-buildings, about to be erected, shall have been completed, will become—one of the best farms, for its size and situation, in the county of Bucks.

Nearly the whole farm has been thoroughly drained, and the principal part of the arable land subsoiled and limed; indeed, more than sixty miles in length, both of tiles and soles, have been laid down. The fields have been squared as well as circumstances would allow (a curve of the Birmingham railroad passing through the centre of the property), the roads have been straightened and shortened, and the arable land has been divided into ten fields, each as near as may be of 17 acres, fenced with live quick hedges, and protected throughout by strong fir railing. The bed of the river has been effectually cleared out by the removal of upwards of 7,000 cubic yards of alluvial deposit, by the means of which the wide, open ditches of the meadows were all filled up, preparatory to the laying down of tiles over the whole extent of them, which has been effected. The meadows have been now completely drained, and by their abundant crops have already paid an ample interest upon the outlay. The cleansing of the river has also afforded the means of effecting a great permanent improvement in the texture and composition of that part of the arable land which consisted of a light sand, upon a great portion of which from 40 to 50 tons per acre have been carted.

The farm has, moreover, been amply stocked, and a regular course of husbandry adopted and laid down for its future management. Upon the strong land the course proposed is—

Wheat, followed upon a portion by tares, to be fed off.

Green crop, consisting of potatoes and turnips.

Barley.

Grass.

Beans.

Upon the lighter land—

Green crop, consisting, as to one half, of carrots, mangold-wurzel, and cabbages; and, as to the other half, of turnips.

{ Half wheat, after carrots, mangold-wurzel, and cabbages.

{ Half barley, after turnips.

Grass.

Grass, to be fed off.

Oats.

On the 1st of November, 1842, the live stock upon the farm was as follows:—

46 head of cattle, of the improved short-horn breed,

317 sheep, principally the improved Leicester.

25 pigs.

10 horses.\*

The value of the live and dead stock and growing crops upon the farm on the 1st of November, 1842, at the then depreciated prices, amounted to £3,177 16s.

To what extent, then, has this outlay been carried? And has it or not been beneficial? This I will now proceed to show.

During the period of the three years to the 1st of November, 1842, in which the course of improvement has been proceeding, the total amount of the disbursements, including rent at £250 per annum, interest at 5 per cent. upon the capital, together with the salary of the bailiff, has been £8,163 16s. 8d. Thereceipts during the same time have been £3,079 9s. 7d. And the value of the stock on the 1st of November, 1842, was £3,177 16s., making a total of receipts and stock of £6,257 5s. 7d., and constituting an excess of disbursements over receipts of £1,906 11s. 1d.†

The result, therefore, is that on the 1st of November, 1842, there had been expended upon the farm, beyond the value of the stock and crops, the sum of 1,906l. 11s. 1d. This expenditure, however, was incurred with a view to the ultimate improvement of the farm, and to its increased value as property, and neither could nor ought to have been incurred by any tenant except under the security of a twenty-one years' lease, in which event it would have been a provident investment of capital.

In order to ascertain the actual position of the property consequent upon this expenditure, the farm was, in the month of July last, valued by an able and experienced surveyor, himself the tenant of a large farm in the immediate neighbourhood, and who, during the whole course of improvement, has been a witness to it, and from continued and personal observation is enabled to testify as to the correctness of the above statement.

The annual value which he has placed

upon the farm is . . . . .	£344	0	0
‡ A small portion let off . . . . .	12	0	0
‡ Three cottages and gardens . . . . .	11	0	0

£367 0 0

Several applications have of late been made by most respectable persons to become tenants of the farm, and there is no doubt whatever but that it may be readily let at the above rent, or even at an advanced sum for a twenty-one years' lease; and if that be so, the result is, that an annual increased rental of 117l. has been obtained by the outlay of 1,906l. 11s. 1d., in other words, that land has been purchased (for permanently increasing the value of existing land is tantamount to the purchase of an additional quantity) at a price which will yield rather more than 6l. per cent. per annum upon the capital invested.—*Journal of the Royal Agricultural Society.*

\* At present there are 57 head of cattle, and 8 horses; but seven horses, including a riding horse for the bailiff, will ultimately be adequate.

† Stock is taken regularly on the 1st of November in every year, everything is then valued as if at that precise period a tenant were to succeed taking off stock and crops. The very reduced price of all farm produce made a difference of nearly 20 per cent. upon the value of the stock and crops in November, 1842, and also in the subsequent estimated rental.

‡ These two portions are included in the original rent of 250l.

## LEOMINSTER FARMERS' CLUB.

At a meeting of this institution on Friday the 8th ult., the subject of discussion was "The Rearing and Management of Apple Trees." The opinion of the club was this—that while a large portion of the orchards of the county were now in their prime, sufficient care is not taken to plant a succession of young trees to succeed the present plantation as it becomes unfit for bearing. This being an important subject to the neighbourhood, it was resolved to adjourn the meeting till the next Friday. Upon the 15th ultimo the club again met, when the following paper was read "On the Rearing, Management, and Grafting of Apple Stocks." A vote of thanks to Mr. Galliers was carried unanimously for his valuable communication and liberal offer of grafts of his choicest cider fruits to the members of the club. The opinion of the club coincided with Mr. G. in the rearing, management, and grafting, but thought it advisable to plant the trees full ten yards apart. It was suggested by a member that grafts should be taken *only* from the wood of young healthy trees, as the stocks so grafted were of finer growth, and not so liable to canker, as when the grafts were taken from old trees. H. Rudge, Esq., of Leominster, kindly consented to deliver a lecture upon the diseases of wheat, notice of which will appear in the county papers; being a subject in which the agriculturist is so deeply interested, it cannot fail, we think, in procuring a large attendance of members.

## ON THE REARING, MANAGEMENT, AND GRAFTING OF APPLE STOCKS.

(Communicated by Mr. Galliers, Pridewood.)

"For upwards of twenty years I have been a planter of cider apple trees, and after ten years' experience on different sorts and on different plans of raising an orchard, I strongly recommended that (at this season of the year) some women be employed to take kernels from the apples now in heaps in the apple yards, selecting them from the mildest sorts of fruit and kindest apple trees,—and after having collected sufficient seed for planting a bed ten feet by five, (or any other size), being first prepared with light soil of a sandy nature, mixed with a little mould from the woodyard or an old hedge-row, or other like place. In the latter end of January or early in February deposit the seed on the bed, lightly raking it in in quantity about a quart to a bed of the size above mentioned. I should here observe that on the seed being taken from the pulp of the apple it should be placed in a flower-pot or like vessel, with some dry sifted sand to prevent mouldiness, to which the kernels are very liable. A week or nine days after the seeds are deposited on the bed, care should be taken to prevent the chaffinch from devouring the kernel, (which they are very fond of), as it is then sprouting. This is easily done by placing a net over the bed, supported by sticks about four or five inches from the ground, afterwards keeping the bed until the beginning of September free from weeds; a little soot mixed with bran should be strewn lightly over the bed in summer in order to keep it free from slugs. In the month of July or August following the sowing of the kernels, prepare ground sufficient for a nursery for transplanting; this ground should be prepared, selecting a dry soil, with scrapings of the turnpike-road spread over the intended nursery, which should be double dug and well mixed up together, leaving the ground as rough as possible in order that the sun and wind may pulverize it; repeated diggings should

be given the ground between now and the time for transplanting, but no dung should be used, as that may cause the plants to canker. In the latter end of February or early in March, or even in January, if the weather is suitable, take the plants which have made most progress from the seed bed and plant them in the nursery one foot apart, and two feet between the rows, first taking off the "carrot" root; the other small plants may remain in the seed bed to be done the same with the next year; after planting the nursery let the plants remain three years, in the mean time being particular to keep the nursery clean; the summer before the end of the three years prepare another larger piece of land, let it be sward, and in the month of November select the strongest plants in the nursery, and re-plant them three feet apart, and four feet between the rows, keeping them clean and free from weeds; three years after the second planting select from kind trees, free from canker, the fastest growing wood, being particular that the fruit growing on the trees from which the grafts are selected is of a mild and sweet nature, being as free as possible from acid; then graft the stocks in the nursery about four or five inches from the ground. It should be here observed that the trees after transplanting into the second nursery should be pruned about one foot each year from the ground according to the progress of the plants, cutting off the offshoots about two inches from the body of the plant, serving it the same the next year about two feet from the ground, and taking the old offshoots off close to the body; this will cause the plant to have better roots, and also stiffer, the bottom of it to receive the graft. My object in grafting so near the ground with a mild fruit, free from acidity, is, to form the body or trunk of the tree; when the trunk is formed, which will be in about five or six years, then select good cider fruits, which graft with to form the head, taking care to keep the body or trunk of the tree free from shoots, which is easily done by rubbing your hand downwards on the tree when the shoots are young, and this in a great measure will also prevent the "American blight." Let the trees remain in the nursery two or three years according to the strength of their growth, then select a piece of turf-land deep in soil, well double ploughed or dug about Candlemas, turning the turf undermost to receive the apple stocks ready for planting in the month of November; now select the strongest stocks in the nursery and plant them seven yards distant each way, at about the depth of eighteen inches, making the holes at least four feet square, putting in a little compost of rotten turf and road-scrappings, or any other light rich soil, taking care it is free from dung. The smaller trees are then to be planted, two between each standard in a similar manner: at the usual time for planting a young hopyard, plant the piece of land intended for an orchard with hops, not planting any hops in the rows in which the trees are planted; thus, supposing it to be a piece of three acres, it will raise sufficient stock by taking away the lesser stocks, and being well preserved, to plant an orchard of six acres, over and above the piece already planted. In pitching the poles in the hop-yard, caution the pole-pitcher to take the shoots off the trees, and also those which spring up from the roots, and also the same on stripping and piling the poles: it is also necessary to thin the tops of the trees, that they may not become too heavy for the trunks, taking care to cut out those branches that are most likely to sleeve off, thereby forming a proper head to the tree. Great care should also be taken in the winter months to firm the soil round the bottom of the trees with a

light rammer in order to keep the wet from the roots. The tree should be kept growing at least six or seven feet from the ground till it is allowed to form the head, and the young trees should be occasionally pruned, the pruner always taking care to cut the bough upwards. With respect to grafting old trees, the method I use is to take the heads off in the month of December, leaving a foot or so for the grafter to cut off before he sets the grafts; having selected your grafts from young growing wood, cut them as soon as you observe the sap arising in the tree, which may be ascertained by the bud, or by placing your knife between the bark and the wood; place the ends of the grafts about four or five inches in the ground in a shady aspect; let them remain eight or nine days before using them; let the grafter cut off the bough in a slanting direction, sloping downwards, then set one, two, or three grafts in it, according to the size of the bough, on the upper part thereof, not putting any in the lower part, as in that case the wet may get into the orifice cut for the graft, and thereby destroy the heart of the tree."—*Hereford Journal*.

### AGRICULTURAL SOCIETIES.

The following article was read at a Meeting of the Great Torrington Farmers' Club, on Saturday, the 16th of December, by Mr. Joseph Risdon, of Speccott, near Torrington:—

"Agricultural Societies and Farmers' Clubs are now very general, and the press is daily giving account of their proceedings and the speeches made by the aristocracy, statesmen, and others, who feel interested in the cause. That societies and meetings of this description tend to benefit the cause of agriculture cannot, I think, for one moment be doubted, as the different grades in society are here brought together, and the opinions and private worth of the persons attending them are more clearly made known and appreciated. Politics are, I believe, invariably and wisely excluded, and very properly so; as, if it were to form any part of the discussions, the cloven foot of party would manifest itself, and there would be angry feelings displayed that would cause endless disputes and animosities among those that otherwise would be on terms of friendship. It has long been a maxim of mine never to fall out with any one on religion or politics, although I hold firm fixed opinions on those points. To come, however, more closely to the point I have looked over, most of the speeches of the great orators at the meetings reported, of late—and I find them very barren as to meaning—indeed may say the great drift in most of them appears to be to say much and convey little. It is frequently pointed out that, by scientific management, more can be done than has hitherto been performed; and to this I readily assent, as I am one of those who think we can do much more if our internal arrangements would admit. I believe I have before stated, when I have had the honour of addressing you, 'That increase of production has been the cause of our meeting difficulties unknown to our forefathers, and I am convinced much more can be produced.'

"London, in his *Encyclopædia of Agriculture*, says that 'Farmers, as moral and intelligent agents, may be divided into reading men and illiterate beings. The first class derive hints for improvements from books; but the second can only (if at all) derive

benefit from example.' Now, meetings of this description make thinking men think more, and experience is more readily conveyed to those around; and it must be borne in mind that man is here for a short time, even he that is spared the longest, and the experience he has acquired does not devolve on his heirs; therefore to impart that which experience has taught to be right or wrong must be of the greatest consequence to those with whom we are interwoven. Nothing can be more presumptuous than that which frequently occurs by pretenders to the science of agriculture changing their soil and climate, and going to a distant district and there commence operations contrary to the received opinions and practice of the ablest and most experienced persons in that neighbourhood. This we frequently know to be the case; and whatever such a person may have acquired, rest assured he must have a ridiculous opinion of his own abilities, as, go where he will, he will find others that have been there before him, and persons who have visited those districts from whence he came, and who have made comparisons as to how far the operations can be suited to that particular soil and climate.

"Caution should therefore be used before any topsy-turvy measures are introduced, as otherwise great loss may be sustained. To do away with many harmless prejudices would be exceedingly tyrannical to be insisted on at once, as sudden changes are never good; but as the mind is improved, all other improvements are likely to follow.

"History furnishes us with the habits, progress, and manners of those who have been the cultivators of the soil of different forms of government from the earliest time up to the present day. That agriculture is at this time in its infancy I am ready to admit, but that it is making rapid strides must also be very apparent to every one who at all looks at it. In this country we have three classes that are wholly dependent on it—viz., landowners, farmers, and labourers, and these may again be subdivided into many different grades. There is an highly respectable class, many of whom may be set down as ornaments to their country, both as regards their usefulness and intelligence—I mean the wealthy yeoman who farms his own estate; but as the landed property is chiefly in the hands of the nobility and ancient country gentlemen whose property has descended from father to son for centuries past, it is with property of this description and the occupiers of it I at present have more particularly in view. Risdon, the antiquarian, who wrote his "Survey of Devon" more than two centuries ago, in giving a description of the yeomen of his time, says, "many of them keep up good hospitality, his chief concerns be most in matters of husbandry wherein they are found no where more industrious and skilful in suiting every soil with improvement answerable to its quality;" he then speaks of paring and burning the turf, and says it is rare in other counties, and known by the name of denshering in other counties—and goes on to say that burning lime for manure was at that time a new invention, but produced most beneficial effects, he finishes the article with these words:—"This kind of life (I mean husbandry) the Romans have so much praised, that Cicero affirmeth nothing to be meter for a free born man than it, as being the nurse of all arts, other sciences being only helpers and appendants to it." It will be seen by this how Risdon estimated the cultivators of the soil, and it will also be seen that he did not at that time think his countymen (for he was a North Devon man) under the stigma that has since been laid on us that we are a century behind some

other districts. Be that as it may, I trust we are emerging from the ignorance imputed to us, and in point of practical improvements and general intelligence can show ourselves in the ranks of the heretofore more fortunate districts. Within the compass of the time I have referred to, great progress has been made in all the arts and sciences—revolutions and reformations have taken place in this country, and England is at this time pre-eminently distinguished among the nations of the world for her commerce as well as her other advancements; and to keep pace with the times, those connected with agriculture have been obliged to exert themselves, both as to the qualifications of their minds, as well as the improvements on their farms, in order to be fit companions for people of other pursuits. To that end education has become more general, and many may be said to have sprung from the plough who have distinguished themselves in every other national character; and with this general improvement may be traced the altered dress and manners of the age.

“Leases for lives were formerly very generally adopted by the great proprietors, the lessee forming as it were a middle grade between the proprietor and rack-renter; this is now in most parts of England getting out of use, its advantages or disadvantages I shall not for the present go into. As short terms are now usually adopted—a system directly at variance with this system, and much to be regretted as it makes the cultivators of the soil feel but little interest as to any permanent improvements, either as regards the land roads, or moral improvements of the labouring poor, nothing being looked at but self-interest—the tenant, under such circumstances, looks towards his landlord or steward with suspicion, instead of those fine old English feelings of veneration and respect.

“The system of tendering for estates is, to the disgrace of agriculture, become very general—I say disgrace, because it carries degradation with it, as the well-intentioned industrious man with a capital has to contend with ignorant, designing men of straw, and this too without knowing his true position. I am aware, under certain circumstances, it may be done without carrying with it all the odium I have named; yet, as one of the evils of the age, I venture to condemn it upon principle, for it betrays a want of knowledge as to the real value by the owner or agent concerned, or a disposition to make more than a fair price, provided a tenant can be found under any circumstances to give it. If an estate is about to be given up for any cause, it would be much more creditable to all parties if the conditions for letting were published, and let applications be made to the agent, who, as a matter of course, would enquire as to character, respectability, and competency; and if the applicant is found eligible on all these points, let a price be named, for depend on it the man that offers more than a proper value should be rejected as firmly and as cautiously as the man that offered too little. The conditions for letting should likewise be liberal; for he that expects a tenant to take an estate to improve without receiving the reward of his labour will find himself disappointed.

“London on this point says, ‘It may be true that, under the security of the honour of an English landlord, tenants-at-will have been continued in possession from generation to generation, and acquired wealth which he has never, like the landholders of some other countries, attempted to wrest from them; but there are few individuals in any rank of life who continue for a length of time to sacrifice their just claims on the altar of pure generosity,

something is always expected in return.’ In conclusion,—‘No prudent man will ever invest his fortune in the improvement of another person's property, unless from the length of his lease he has a reasonable prospect of being reimbursed.’

“We hear it frequently asserted that farmers are now what they were not in their altered manners, way of living, and dress. If they were not, they would remain among their kindred and friends, in a country like this (where sciences, manufactories, commerce, and our intercourse with other nations has changed all around us), a race as singular in their manners as the Jews are in religion among Christians. It should also be remembered that the sons of yeomen, in all ages, have been found to take part in what is going on; we therefore find members of the same families sent into the world in various ways, and have shown too in the church, in science, manufacture, commerce, and in all the useful arts, not forgetting those (when our country was assailed by foreign enemies) who left their homes and fought and bled in the honour and defence of their native land. Under all these circumstances, I ask, is it probable or consistent with reason, that those who continue to cultivate the soil are to remain, in point of general intelligence, fit companions only for unpolished clowns? Depend on it the mind that has received a proper education is more likely to fill the duties of his station with honour to himself, and usefulness to every class connected with him, be his station in society what it may; and on no principles of justice can I see, if two persons start in life with the same capital, abilities, and education, equally industrious and frugal, that one shall be allowed to make a fortune (or, at least, a competency to retire), and the other be doomed to be a drudge to the end of his days; and at last, leaving nothing behind more than what he originally began with, and frequently considered fortunate to do this.

“Adam Smith, in his ‘Wealth of Nations,’ says of farming, ‘After what are called the fine arts and liberal professions, however, there is, perhaps, no trade which requires so great a variety of knowledge and experience. The innumerable volumes which have been written upon it in all languages, may satisfy us that among the wisest and most learned nations it has never been regarded as a matter easily understood. Not only the art of the farmer, the general direction of the operations of husbandry, but many inferior branches of country labour require much more skill and experience than the greater part of mechanic trades.’ I therefore contend, to make the most of the soil, farmers should be well educated; besides, if such is not the case in a country like this, where there is such conflicting interest—‘If one part of society has the degree of cultivation desired, and the other has it not, it is evident that there can be very little sympathy between them.’ We see, as we mix with the world in business, many uneducated men who seem to get on pretty well, but those frequently make use of low cunning instead of wit; and after all, however prosperous, they cannot but feel their inferiority, for it is said—‘To introduce an ignorant youth into an highly civilized country, under the supposition that he could obtain the requisite degree of prosperity and happiness, would be more absurd than to turn an educated child into a country of savages.’

“Arthur Young did much in his day to aid the cause of agriculture, and many political economists have from time to time thrown many useful hints, but never was the cause so popular as at present. The English Agricultural Society, which has amongst

its members some of the greatest men of the age, and the meetings have been attended not only by them but by various foreigners of distinction; under such auspices I think we have reason to suppose that we shall progress. But we must remember one of the causes why we are so frequently attacked by others, whose interests, or pretended interests, are to have our produce below the price it can be produced at, is that we, as a body, were never incorporated, and till very recently never thought of uniting; it therefore is a duty we owe to ourselves to watch the movements of our enemies, and do all in our power to resist any violation of our just rights.

"The best works in political economy are by no means adapted to our circumstances, as we are under obligations contracted since those works were written, and which every well wisher to his country would shudder at breaking, and that there are wily persons in all communities cannot be doubted. And it must be admitted that in the agricultural, manufacturing, commercial, and monied interests, there may be found, and certainly are, persons who would sacrifice all others for the aggrandizement of their own particular interest; and as all those parties in their various departments make up the entire population of this great country, I say to all *watch* and see that justice is not withheld from you, and never permit yourselves to sacrifice your rights at the altar of expediency. To those connected with agriculture I however more particularly address myself, and say, let us be united by the ties of equity and justice, and if any *League*, however powerful, attempt to rob us of our birthright, let us resist it by every means, and that with energy; let us show with firmness that we are not to be cajoled nor juggled out of our rights, and that we will not part with them.

"Hitherto the farmer and his labourers have not been so well educated as other classes; this is one of the causes why others endeavour to take advantage of us; and being scattered over the face of the country, we cannot avail ourselves of the schools and seminaries where learning and arts and sciences are taught; this, however, is in some measure beginning to be supplied, and will, I trust, become more and more general, and, as I have before said, that my opinion is that agriculture is in its infancy. I also believe that no one has any need to leave his native land, for the purpose of cultivating distant soils, exclusively to obtain a living, as I am convinced we can provide for a much greater population than we have. I do not object to free emigration, on the contrary, say let the enterprising go and try what can be done, it is creditable to them if done in a proper spirit; but I do object to its being forced, as it were, on the industrious classes for the mere purpose of earning a livelihood. There is something as endearing to the poor man in his native clime and connections as to his wealthy and more fortunate neighbour; and if he is an industrious, honest, well-intentioned character, he has a claim to be supported at home, and the fault must be our own internal mismanagement if he is not able to do so.

"It is the opinion of an author, whose writings and opinions I highly appreciate, 'that education is as much the birthright of a child in a community where there is a high degree of civilization, as food and clothes are its birthright in the rudest state of society, because without it he has not a fair chance of making the most of life.'

"We must be all aware that much ignorance prevails; and even some of those who have had a little education are equally as unfortunate as their more ignorant brethren. Where their education has not

been founded on right principles, we see many of them deeply impregnated with transatlantic notions of liberty and equity which, in fact, nowhere exists. This, when carried out, shows itself in anarchy and ruin; therefore the first principles of a sound and useful education is, duty to God and our neighbour, which will show itself in obedience to superiors, and a willingness to alleviate misfortune and misery, keeping constantly in view that no one is created to live in idleness, that something is expected from every child of Adam, and that we are all inheritors of his fate—viz., 'By the sweat of our brow we are to eat bread, till we return to dust again.' He, therefore, that refuses to work with his hands disobeys the command of his Maker, and, consequently, is a rebel in the sight of his Creator, and a bad member in the society where he dwells.

"In conclusion, let me earnestly entreat all classes in agriculture to be united. Let those whose business it is to direct the cultivation of the soil go on improving, and continue to improve; if this is properly conducted there may be difficulties, but ultimately there 'will be no decay, no leading into captivity, and no complaining in our streets.'

#### ON DRAINING.

SIR—Having already given my opinion in your columns, that land cannot be drained effectually but by three separate and distinct modes of draining, and not even then unless, at times, accompanied with piping and boring, under particular and extraordinary circumstances, known only to practical men—either the party accustomed to setting out, or the working man who has been engaged in it for years—it was not my intention, at present, to again intrude myself upon your notice; but it is so difficult to convince some men that they are in error, and so bigoted and attached are they to "old ways and customs," that it is almost a matter of impossibility to drive these out of them. If you see a man about to put his hands into the fire, and you were to tell him he would be burnt, he would be a simpleton in not taking your advice; but there are in the world men who would not believe, even then, unless they found their fingers actually in contact with the fire—such is the case, however, and such is the position assumed by some men in the present day with regard to draining. Where is the use of men, of long tried practice and experience, sending their opinions into the world if they are not attended to? Of what avail is it if the press teems with information, from the 1st January to the 31st December in every year, if some have made up their minds not to read, and others that do read that they will not carry out the plans laid down for their guidance? I, sir, am led to make these remarks, in consequence of reading the admirable and pithy remarks by "A Craven Farmer," &c. I cannot sufficiently answer his question as to the depth of the drains which are requisite to be cut, without knowing the *rise of the water*. This I can tell him, that if the water is spring water, and it is evident to me from his statement that it is, all the 3 ft. drains he (that is the party named) may dig, if they are at less distance apart than 18 ft. will not reach the *root of the evil*, even if they are at 9 ft. apart. It is a fact, and one that it is impossible to disprove, that one *deep* drain, cut judiciously on the side of a hill, where the water rises, will take the water off scores of acres, if the land in the vicinity has open measures, that is, measures of gravel, sand,

&c., intermixed with blocks of clay; the pressure of the water from the hill forces it along its underground passage, and wherever it finds an open, porous measure, or stratum, it then ascends to the surface: it is possible, over this description of land, to place your drains in at all depths and distances, and even to chamber the land with drains, and then not remove the cause. Such being the case—and practice and experience may be adduced, in numberless instances, in support of it—how truly astonishing and surprisins it is that men will not be convinced! *Shallow draining will not cure land that requires deep draining*, but it is possible for a deep drain to cure a large quantity of land. I have, therefore, no hesitation in pronouncing that, if the land is of the description named, the shallow draining will be a failure. To find the source of spring water and the depth which it lays, it is necessary to dig for it upon dry land, not upon wet, that is, above the place where it begins to show itself; and, in doing so, do not be afraid of going more than 6 ft.; dig several holes in the line, and let them be from 6 ft. to 12 ft., depending upon the appearance of the water—the level to which the water will rise in these holes will tell you whether they are all acted upon by the same water, and the quantity shewn will tell you the size of the tile (not stones), necessary to carry it off. The *outfall* to commence this drain with, the *level* line to be taken, the *mode* of laying the tile, and the *covering* requisite for securing it and rendering this drainage effectual, are subjects which would require much greater space than the limits of this letter will admit of, and are only known to men really accustomed to carry on the work. A truly practical man may set out lines for drainage, but unless the man who carries the level of the water and lays the tile is a practical working man, it is more than 100 to 1 that the work is imperfect. The working man, who understands his work, is as necessary an appendage to good drainage, as the scientific individual who sets it out. The above remarks will, I trust, be sufficient answer to the queries by “A Craven Farmer;” and I agree with him, in the expression of his sentiments, not only with regard to the magazine, but, that, in a few years, the drainage of the country may be effected and effectually performed upon the principles laid down, so that the productions of the land, not only in the Craven district, but in all others where it is required, may be improved from one-fourth to double its present quantity.

Page 86, “Amicus.” There is but *one size* tile required for shallow draining, upon all descriptions of land, with the exception of the outfall drain, which requires to be larger; and this tile will take all the water that will fall in any given time upon any quantity of land, if properly put in. It is not necessary to drain the strongest land nearer than 8 yards, and the more porous your soil the greater the distance required for placing in your tiles. The size of the tile required is 3 inches by 4 inches clear in the opening, 4 inches in height, 3 inches in width; and this will be found sufficient upon strong land at 8 yards: the outfall will require to be 5 inches by 6 inches, depending upon the mould used in the yard from whence you obtain your tile, as it may be perhaps half an inch less both ways; this is no obstacle provided the proper proportion of height and width are ascertained and kept in the tile, nor will it make any great difference in carrying off the water, as this tile will carry all that may be brought into it, from 10 to 20 acres.

Of what use are the cylindrical or pipe tile in draining strong clay land? To any man of common sense, who understands tile draining at all, it will be

known that the interstices or joinings of the tiles together, are the openings for admitting the water in shallow drainings; how, then, can it be possible for these tiles, fitting one into the other, to take the water so rapidly as the common or ordinary tile. The only use of these tiles are the carrying water over or through soft porous places, in the same manner that water is conveyed by iron pipes; and the object is to keep the water from again entering into the lower measures of the earth, and to carry it into the outfall drains. These tiles, now only making their public appearance, have been known and used by practical men for twenty years past; if they had been of any value, or had possessed claims over the other tiles, for the purpose of shallow draining, is it not fair to presume that the public would have been in possession of it ere this. A common draining tile, properly made and burnt, and judiciously placed in the soil at a depth of 20 inches, will resist all the weight which it is ever likely will have to travel over the surface; unless, by some sudden revulsion of nature, the inclination of the earth, where laid, should be shaken; and will, at the end of fifty years, be found as perfect, for the purposes of drainage, as on the day when first placed in the ground.

I trust I have here sufficiently answered the enquiries by your correspondents, and, for any further information on this important and highly essential and necessary accompaniment to good husbandry, I I would beg leave to refer them to my forthcoming work on draining.

I am, sir, your very obedient servant,

H. H.

## FARM LEASES.

(Concluded.)

What is the position of landlord and tenant in various parts of the country at the present moment, and how different are the holdings, or the terms upon which farms are occupied, even under the same landlord; how many agreements have been made by parties who have professed to look after land, and prevent the tenant from encroaching upon his landlord, and what endless blunders have been committed in drawing them up; and after the tenant has quitted, or about to quit his farm, how have these same agreements been read and mis-read, so as to form a case for lawyers to get up, and drag on, the one against the other, into an endless law-suit, in which neither parties are benefited and both have had to pay?

There are many farms upon which the whole of the property, that is the *tenant-right*, belongs to the tenant, comprising the whole of the seed, labour, manure in the yards, all unexhausted manures in the land, herbage, following or way-going crop, and allowance for extra proportions of grass, &c., and which he claims, and is allowed on quitting, without any interference. Again, perhaps in the adjoining parish the whole of these are the property of his landlord, with the exception of the labour actually performed on the place, and the seed deposited in the ground prior to his quitting. There are parishes too, in Yorkshire, where all the claims above-mentioned and enumerated were formerly the property of the tenants, which were wrested from them by the agents of a noble duke, since deceased; that is, by paying those who were determined to have their rights, and quitting them off the estates, and by compelling those who choosed to remain to enter into fresh agreements, so as to se-

cure to the owner the rights which were possessed by the tenants before. This might form a case where it would be assumed that, if the tenant had had a lease, he could not have been disturbed nor his rights trampled upon; but these are solitary instances, and they ought to be so. There is an old saying, that "good agents make good landlords, and good landlords make good and grateful tenants;" that, in cases of this sort, an awful and serious amount of responsibility rests upon the agent who advises his employer to adopt such mean and disgraceful practices. There are other parishes in which certain claims are allowed from that stupid and ridiculous of all practices, "Custom," which are exceedingly difficult to define, even by a man possessing a clear knowledge of business; as what has been a custom in one parish or hundred, has been totally disregarded in another. Even with regard to the durability of manures, or rather the length of time supposed to elapse before they are exhausted, it is a matter which has not only occupied the attention of valuers in various parts of the country, but has also created great difference of opinion; and, at present, so long as there is argument in the case, there is no law to prevent men from giving their opinions and abiding by them. Let us take two or three of these instances:—In one county bones are allowed upon a four years principle, whilst in another only three years, upon arable land. The duration of marl is stated, in one county, to be seven years; whilst in other parts of the same county there has been no allowance at all. The duration of draining, in the county of York, was put, by the late author of "Rents and Tillages," at ten years, deducting one-tenth for every year from the commencement to the time of valuing; whilst, in the county of Lincoln, the term allowed in the same manure was seven years; and, again, in other places they have got to twelve years. Such being the case, and numbers of those appointed to value knowing no more of the way in which the draining ought to have been effected than the tenant himself, nor yet of the time when he may be said to have derived the benefit of the improvement—it is not at all surprising to see this great difference of opinion as to the term allowed. These and numbers of other instances can be mentioned of this want of a rule to guide the valuer in determining the differences between the off-going and in-coming tenant, such as lime, rape, soot, burnt earth, &c., and, at the present time, saltpetre, salt, gypsum, desiccated carbon, guano, &c. How is it possible that, in the event of part or all of these being used and tried upon the farm by the occupier, that the lease can be so framed as that he shall receive the benefits unexhausted in the land at the expiration of his lease, when, as yet, no definite conclusion has been arrived at to determine the period of durability? Will all the landlords of the county agree to put the tenants, from one end of the kingdom to the other, upon the same footing; or will they be disposed to give to the tenant that which is in many instances (particularly small owners) *their property* at the present time? Again, are the tenants all agreed to sink their claims, or let them all be consolidated under one general code of rules laid down for valuers (distinguishing, as a matter of course, the holdings of the light soils from the strong ones), so that they may, at the end of the term of their leases, receive such amounts as those rules have established? Until this is done, I am of opinion that, as far as leases are concerned, it will be a difficult matter so to frame them that they may become general throughout the country. Such then, being the present undetermined and widely different modes of occupying land, and receiving the allowances upon it, which are almost im-

possible to reconcile, how is it likely that the whole can be regulated? I have no doubt that some of the advocates for leases would be disposed to throw them over altogether, if they thought that their own pockets would be touched by this revolution in the occupancy of the land in this country.

Many years ago, a highly respected and talented individual, and who possessed qualities of no common order, was called upon to frame an agreement for letting the farms of a nobleman in Notts, the whole of which were to be managed upon the terms laid down, and upon a four-field principle, all alike light land and strong, without regard to seasons. The land was divided into classes—such fields were to be wheat, such fallows, such barley, and such seeds; and whether the land could be got into order or not, he was to give this subject close and strict attention; and having got the agreement ready, it was to be inspected by the agent, and the whole were to be, as the farms fell in by death or change of entry, put under the regulated clauses of this agreement; and it was to be so framed, that the tenant could not break the conditions, excepting under heavy penalties, that he should not in any way infringe upon the rights of his landlord. A few weeks passed on, and at length the document made its appearance, or rather the draft of it; when, to the astonishment of the parties, instead of comprising as much matter as would fill a sheet of foolscap, it was as bulky in size and quantity as the draft of the title-deeds prepared for the purchase of a large estate, and which had a number of unexpired terms in it which required cutting off. It was returned to the learned gent. to be pared down, and, after several attempts, he declared his inability to frame one that would be applicable to all the tenantry. Such being the case with an agreement from year to year, how much more so would it be where the duration of the term was to be fourteen or twenty-one years?

Again, it is stated that the only proper way of letting the land by lease would be by means of a *corn rent*, subject to certain conditions as to management, &c. This certainly is as near as some may come to be perfect in rents, but it is imperfect in its process. Is the corn rent to be the average price of corn sold throughout the kingdom for the year; or, is it to be the average of the *county*, the *district*, or the *markets* to which he takes his grain to sell, that is to regulate the rent of his farm? If the average price of the kingdom is to be taken, look at the extraordinary difference there is in the markets of one part as compared with the other part of the kingdom. If the county, why then the same arguments will apply, as the markets often vary as much as from 2s. to 4s. per quarter; then we have but to take his own market, or the place where he sells his grain, and the average of it: but even this will be an act of injustice to him, unless the time when he sells his corn is taken into consideration. Are all the farmers in one lordship or parish to be at one rent, or is the difference to be made between good and bad land? And even then, are all men farming under like circumstances? It is a fact, as clear as the sun at noon day, that whilst the small farmer, who has to sell his produce to pay his bills, his servants, and his rents, before lady-day arrives, has always disposed of his crops, and at a time when the markets are glutted, whilst his more fortunate neighbour (the man of capital) has been enabled to keep on his grain until the following year, the difference of the selling price between the two, for the average of wheat, has been 10s. per quarter, and even more: I say then, that, unless you take the

produce of the farm and the farmer's *own selling price*, you will commit an act of injustice by placing his corn rent at the same rate as that of his neighbour; and, if you do not do this, how can you undertake to protect him by a lease? This, then, is another, or rather other reasons, why leases cannot be framed so as to protect him, that is, the *little farmer*, unless you will adopt the plan I have here pointed out; and unless these and various other minor matters, are so arranged as to preserve a distinct and clear understanding between landlord and tenant, and so establish that kind and friendly feeling which has or ought to exist between the two, by securing to the landlord the free enjoyment of his property at the expiration of the lease, and the pleasure of seeing the improvements carried on by his tenant during the lease, and, at the same time, the tenant secured from all vexatious, unjust, and oppressive restrictions, I am clearly of opinion that the position of landlord and tenant is better under the present circumstances than it would be by lease. I should be sorry to see the landlord out of his proper place, and, at the same time, the tenant suffering at the expense of his landlord.

One more remark upon this subject, and, for the present, I have done: the subject of leases and the necessity for their being adopted, had its origin in that worst of all schemes, for dividing landlord and tenant, viz., Electioneering, or *political purposes*. The landlords take themselves to thank for it, in many instances, by coercing their tenantry; and the object of the parties in starting leases, was to secure, as they thought, the free enjoyment of opinion in political matters by the farmers: everything which tends to sever the tie which binds the two together, is bad both in principle and practice; and I would, therefore, humbly urge upon the consideration of landlords generally, the propriety of non-interference in this matter. As long as the fair position is held between the two, so long may the landlord depend upon the support and assistance of his tenant; he is not ungrateful—and it would be a bad day in this country that should see these social links of the best support which she has, broken asunder by any political difference of opinion between the parties; and I am well persuaded that those landlords who have acted on the system of non-interference have received as much support as those who have endeavoured to do so by pursuing an opposite course.

I trust I have explained my views so as to be understood, and if I can throw any more light upon it I shall be glad to do so.

I am, Sir, your obedient Servant,

H. II.

### REARING CATTLE, WITH A VIEW TO EARLY MATURITY.

The production of beef at the quickest and cheapest rate being the object in view, the first requisite is a stock of cows possessing qualities suitable for this purpose. Accordingly, they should be good milkers, able to keep at the rate of two and a half to three calves each, of a kind known to have a tendency to fatten readily, and to come early to maturity, and of a structure likely to produce a vigorous, well-grown steer. In other words, they must be good short-horns; only having more regard to their milking properties than is usually done by breeders of bulls. And here it may be well to notice, that it is in

general highly inexpedient for the beef grower—the farmer who depends largely on his regular cast of fat cattle—to attempt breeding his own bull. It is only a few individuals in any district who have the taste and skill requisite for this difficult department of the business, not to mention the large capital which must necessarily be invested in it, the precariousness of the return, the greater liability to casualties of such high-bred animals, and the additional expense of their housing and maintenance. On Tweed side, the breeding of bulls is confined to a very limited number of persons, chiefly Northumbrians, who, by devoting their whole attention to this department, are able, from year to year, to furnish a class of bulls which are steadily improving the general breed of the district. The contrary practice is at this moment compromising the character of this valuable breed of cattle in several districts of Scotland into which they have been more recently introduced. Made wiser on this point by experience, the farmer of the Border purchases from some breeder of established reputation a good yearling bull, which he uses for two or three seasons, and then replaces by another in like manner. This bull serves his own cows and those of his binds, and some of the neighbouring villagers; and thus, though his own stud be limited to six or eight cows, he can select from the progeny of his own bull as many calves as he requires to make up his lot, and has them more uniform in colour and quality than could otherwise be the case. As the male parent among sheep and cattle is known to exert by far the greater influence in giving character to the progeny, and increasingly so in proportion to the purity of his breeding, it is evidently much to the advantage of the beef grower to spare no reasonable trouble and expense in obtaining a bull of thorough purity, and then to select his calves with the most scrupulous attention. From overlooking all this, how often may lots of cattle be seen, on the best of land too, which can only be fattened at an enormous expense of food and time, and, after all, are so coarse in quality as to realize an inferior price per stone! Occasionally a few beasts of the right sort will be seen in such lots, which, by going a-head of their fellows to the extent of 4*l.* or 5*l.* a-piece of actual market value, shew what might have been done by greater skill or attention on the part of the owner. It is very desirable to have all the cows to calve betwixt the 1st of February and the 1st of April. If earlier, they will get almost dry ere the grass comes, and calves later than this will scarcely be fit for sale with the rest of the lot. When a calf is dropped, it is immediately removed from its dam, rubbed dry, with a coarse cloth or wisp of straw (this being what the cow would do for it with her tongue, if allowed), and then placed in a crib in the calf-house among dry straw, when it receives a portion of its own mother's first milk, which, being of a purgative quality, is just what is needed by the young animal. For a fortnight, new milk is the only food suitable for it, and of this it should receive a liberal allowance thrice a day; but means should now be used to train it to eat linsed cake and sliced Swedish turnip; and the readiest way of doing so is to put a bit of cake into its mouth immediately after getting its milk, as it will then suck greedily at anything it can get hold of. By repeating this a few times, and placing a few pieces in its trough, it will usually take to this food freely; and whenever this is the case, it should have as much as it can eat, that its allowance of milk may be diminished, to meet the necessities of the younger

calves which are coming in succession. This is of the greater importance that it is always most desirable to avoid mixing anything with their milk by way of helping the quantity. When a substitute must be resorted to, oatmeal porridge mixed with the new milk is perhaps the best. Sago has of late years been much used for this purpose; but an eminent English veterinary surgeon has recently expressed a very decided opinion that its use impairs the digestive powers of the animal, and predisposes to disease. The sour smell invariably found in a calf-house, where porridge or jelly of any kind is mixed with the milk, is proof sufficient that indigestion is the consequence. An egg put into each calf's allowance, and mixed with the milk by stirring with the hand, is a good help, and never does harm: but, with this exception, it is best to give the milk warm and unadulterated, however small the quantity; and along with this, dry farinaceous food, turnips and hay, *ad libitum*. If more liquid is needed, a pail with water may be put within their reach, as this does not produce the bad effect of mixed milk. Indeed, in this, it is best to keep as closely as possible to the natural arrangement according to which the calf takes its suck—at first frequently, and then at longer intervals, as it becomes able to eat of the same food as its dam. The diet of the cows at this season is a matter of some consequence. Swedish turnips yield the richest milk, but it is too scanty, and calves fed on it are liable to inflammatory attacks; globe turnips should therefore form their principal food during the spring months. Care must also be taken that they do not get too low in condition in the autumn and winter, and for this end it is well to put them dry at least three months before calving. Some may think this long; but, on a breeding farm, milk is of little value at this season. The cows, when dry, are kept at less expense, and, by this period of rest, their constitution is invigorated, greater justice done to the fœtus, now rapidly advancing to maturity, and so much more milk obtained after calving, when it is really valuable. When the calves are from four to six weeks old, they are removed from their separate cribs to a house where several can be accommodated together, and have room to frisk about. So soon as the feeding-yards are cleared of the fat cattle, the calves are put into the most sheltered one, where they have still more room, and are gradually prepared for being turned to grass; and, when this is done, they are still brought in at night for some time. At six weeks old, the mid-day allowance of milk is discontinued, and at about fourteen weeks they are weaned altogether. When this is done, their allowance of linseed cake is increased: and as they have been trained to its use, they readily eat enough to improve in condition at this crisis, instead of having their growth checked, and acquiring the large belly and unthrifty appearance which used to be considered an unavoidable consequence of weaning. The cake is continued until they have so evidently taken with the grass as to be able to dispense with it. They are not allowed to lie out very late in autumn, but, as the nights begin to lengthen and get chilly, are brought in during the night, and receive a foddering of tares and clover foggage. When put on turnips, the daily allowance of cake (say 1lb. each) is resumed, and continued steadily through the winter and spring, until they are again turned to grass. This not merely promotes their growth and feeding, but (so far as five or six years' experience can determine the point) seems a specific against black-leg, which was often so fatal as alto-

gether to deter many farmers from breeding. It may be well to state here distinctly the particular purpose for which cake is given at the different stages of their growth. At first, the object is to accustom them to a wholesome and nutritious diet, which will supplement the milk obtained from any given number of cows, so as to admit of a greater number of calves being reared, and at the same time have greater justice done them than could otherwise be practicable. At weaning-time, again, it is given to help the young animal over the transition from milk to grass alone, without check to growth or loss of condition. During the following winter, however, the special object of its use is to prevent black-leg, as, but for this, turnips *ad libitum* would be sufficient. When put to grass as year-olds, they decidedly thrive better on sown grass of the first year than on old pasture, differing in this respect from cattle whose growth is matured. They are laid on turnips again as early in the autumn as these are ready; and it is a good practice to sow a few acres of globes to be ready for this express purpose. It does well to give the turnips upon the grass for ten or fourteen days before putting them finally into the feeding-yards; and then, if they can be kept dry and warm, and receive daily as many good turnips as they can possibly eat (globe till Christmas and Swedish afterwards), they will grow at a rate that will afford their owner daily pleasure in watching their progress, and reach a weight by the 1st of May which, if markets are favourable, will reward him well for his pains. The leading features of this system are uniform good keeping and progressive improvement; in other words, to get them fat as soon after their birth as possible, and keep them so till they reach maturity. The details given above are a description of the expedients generally adopted by the breeders of this district for securing these objects.—*Mr. Wilson, Berwickshire.—Transactions of the Highland Society.*

#### STATEMENT OF A NEW AND SUCCESSFUL ROTATION OF CROPS FOR HEAVY CLAYS.

By J. S. NOWLSON.

*From the Journal of the Royal Agricultural Society.*

*To Ph. Pusey, Esq.*

Sir,—My course of crops is as follows, viz., one-fourth wheat; after that oats,\* one-half of which is sown alternately with clover; after that, sown with

\* As a general rule applicable to much, perhaps most, of the soils of this country, the alternation of corn and green crops is better than two corn and two fallow crops in succession; but on land of the peculiar character of that in Northaw it is otherwise, and a comparison of Mr. Nowlson's crops with those grown on similar land in the neighbourhood, managed on the alternate system, sufficiently proves that that rule must not be taken to be without exceptions.

Nyn Farm is situated at the northern extremity of the extensive parish of Northaw, which is a border parish of the county of Herts. On the south is that wild part of Middlesex once Enfield Chase, but now enclosed and cultivated. The quality of the land in Northaw varies considerably, but its general cha-

winter tares, eaten off green by fattening sheep; \* then a bastard fallow for wheat—the other half fallowed for turnips, part eaten on the land and part drawn off; then fallowed for spring-tares or colesseed, eaten off by fattening sheep; then ready for wheat again. For example, say if the farm be 200 acres of arable land—

50	acres	Wheat.
50	"	Oats.
25	"	Winter Tares.
25	"	Fallow for Turnips.
25	"	Clover.
25	"	Colesseed and Tares.

200 acres.

This is a system I have used for some years on strong retentive clay-soil, which I have found answer well.†

I am, sir, your obedient servant,  
*Nun Farm, Northaw, Herts.* J. S. NOWLSON.

acter is that of a wet and singularly tenacious clay (on the plastic clay formation), interspersed in places with beds of rounded gravel. These beds are merely superficial, that is, few of them are more than 6 feet deep, and they have invariably the stiff clay beneath them. Chalk can in many places be reached, on Nun Farm, at the depth of 60 feet; and about thirty years ago, when great part of the farm was enclosed from a state of common by Thompson of Northlaw (a name well known to the readers of Cobbett), much chalk was raised, and used in bringing the land into cultivation, the good effects of which are visible to this day. The arable land has been completely drained with bushes, as is common in this district; and the drains having been laid at 18 feet apart, the land is as dry as, from the character of the soil, is possible. Still the arable land is so tenacious, and its reduction to a tilth must be affected so much by the action of the atmosphere, that every plan for its cultivation should be arranged to avoid unnecessary tramp lig either with horses or sheep in wet weather.

The object, therefore, of Mr. Nowlson's rotation is to prepare as much of his land as possible in the summer and autumn months. For instance, the advantage of sowing oats after wheat is, that the wheat stubble, on being ploughed up in the autumn, remains rough through the winter, can be harrowed down to a fine tilth, and the oats sown in the very first dry week which occurs in the early spring. Experience has shown that nothing but early sowing can secure an abundant crop, and this could not have been done after the land had been trampled by sheep feeding off roots, &c.

Indeed, the interval which intervenes in the spring of many years, between the time when the land is too soft to be worked and when it has become excessively hard, is often so short, that unless the preparations for spring corn have been nearly completed in the previous autumn, those crops are with difficulty got in at all.—R. G. WELFORD.

\* One half of all the green and fallow crops, except the clover, is fed off by ewes and lambs, fattened on corn for the London market. The other half is drawn off for other cattle.—R. G. W.

† I saw the principal field of wheat, of about 50 acres, on the day the reaping of it commenced (17th August, 1843), and a more splendid crop is seldom seen. It has been estimated, by various competent judges who have seen it, at considerably more than 40 bushels to the acre. This identical field, fifteen years ago, produced a wheat crop which *only averaged 6 bushels to the acre*. The wheat now growing is "Revetts," a bearded wheat.—R. G. W.

*Northaw, Barnet, August 19th, 1843.*

## ON DRAINING.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

Sir,—In your journal for this month, "A Craven Farmer" asks a question on the draining of a bog; but he does not give such particulars as every drainer would require, before he could decide on the mode of draining it.

Looking simply on the question asked, there can be no doubt as to which of the two plans named is the most suitable for the draining of bogs generally; though in most of those I have seen, both would doubtless have failed, unless by a free use of the auger the errors as regards the position of the drains had been rectified by fortunately intercepting the springs. The proposition of 3 feet drains, 18 feet apart, seems contradictory to all the observations I have been able to make on the draining of lands, strictly bogs or morasses, and, I believe, to the opinions of any writer on the subject. As regards the cutting of 6 feet drains on three sides of the bog, I do not think, "under any circumstance, it is a plan I should adopt; but before an opinion could be given as to the probable effect, it would be necessary to know the extent, whether the surface is level and evenly wet, or more wet at some parts than at others, with trifling elevations of the surface, and variations in the appearance of the herbage, particularly in dry weather; its position, with respect to the adjoining lands and country; and, if possible, the depth of the peat, and the probable substratum. In short, before we can form a plan for the drainage with any confidence of success, we must obtain such a knowledge of the bog and its surrounding substrata, as shall enable us to judge of its formation. As I have before given a short description of a system of draining such lands in your journal for September, 1840, page 205, I will not now occupy your space to the exclusion of other more novel matter; but should your correspondent deem it worth his seeking, I believe, if he can persuade the gentleman to whom he alludes to adopt the system there advocated, he will find the drainage, if properly performed, effectual and permanent. Although there is a considerable difference in the details, the principles are those originally projected by Elkington; and if your correspondent has not read, he would do well to read, Johnstone's account of Elkington's mode of draining; for, though he greatly erred, but more particularly those who have followed his system, in endeavouring to apply the principle of tapping the main spring, or cutting off water to soils on which it could not be effectual, yet it must be universally allowed that, on soils where it can with propriety be applied or partially applied, no system is calculated to work so great and lasting good at so small a cost—for the draining of bogs it is peculiarly adapted, it is unquestionably the best and often the only mode of taking away the water, and at the same time leaving the land, from the small number of drains required, in the most fit state to gradually become productive. On soils of so porous a nature as bogs when drained, it of course must be injurious to open the soil (and particularly by drains near the surface) more than we are obliged in extensive morasses, at least such as during dry times will admit of our cutting open ditches, should they be thought requisite or convenient as main receivers or fences: we can often, by placing them in or nearly in the direction of the heads of the springs, avoid cutting the soil by numerous drains, the auger being of course liberally used where requisite; and there are few bogs, I imagine, of any depth where it may not be used with advantage.

I am, Sir,

Your obedient servant,

*January 26th, 1844,*

AGRICULTOR.

THE WEATHER OF 1843.

As "the memory of man" is very treacherous with respect to such daily occurrences as changes of the weather, a chronicle of these changes, as far as respects the past year, may, perhaps, prove both useful and amusing to the readers of the *Carlisle Journal*. In the hope that such may be the case, I will proceed to give the results of my observations in the order that I followed in my report of the weather for 1842. Hence we come to consider, first, the following table of

RAIN.

	Quantity fallen.		Average of last 8 years.	Days' rain	
	1842	1843		1842	1843
January....	2.331	2.585	2.493	16	21
February..	1.315	1.327	2.007	15	19
March.....	2.962	1.151	2.629	23	19
April.....	0.418	5.196	1.150	7	20
May.....	1.671	3.021	1.499	17	22
June.....	1.849	3.266	2.901	13	9
July.....	2.529	4.513	4.217	16	24
August....	1.675	1.638	3.332	14	17
September.	1.812	0.618	3.448	20	12
October..	1.795	3.591	3.082	9	22
November..	1.925	2.157	2.724	18	21
December..	1.543	1.183	2.188	18	17
	21.825	30.296	31.673	186	223

And we find that, though the quantity fallen is upwards of an inch and a quarter below the average of the last eight years, yet that it is nearly eight inches and a half above the quantity which fell in the preceding year. The months wherein the deficiency as to the average occurred were February, March, August, September, November, and December. The only months wherein less rain fell than in the corresponding months of 1842 were March, September, and December.

The number of days on which rain fell during the past year exceeded the number in 1842 by 37, and exceeded the average by four. The only months wherein the number of days' rain fell short of the number in the corresponding months of 1842, were March, June, September, and December. The excess of April and October is worthy of note.

The following table will shew in what months the difference in the number of days on which snow fell occurred during the last five years:—

SNOW.

Number of Days.

	1843	1842	1841	1840
January.....	6	8	14	5
February.....	12	3	6	10
March.....	3	1	..	3
April.....	4	1	..	..
October.....	..	2	..	..
December.....	..	..	1	4
	25	15	21	22

The winds will next claim our attention; and, on looking at the following table, we find that the easterly winds of last year have been fewer than those of 1842 by 9. The equinoxial gales did not make their appearance last year—neither did they in 1843, it will be remembered. The following classification of the force of the winds during the past year may not be uninteresting:—

Calm, 72 days; moderate, 221 days; breeze, 40 days; strong breeze, 10 days; stormy, 19 days.

And on looking into the details of this I find that the months among which these 19 stormy days are divided are January, February, April, July, October, November, and December.

WINDS.

Number of Days.

	EASTERLY.		WESTERLY.	
	1842	1843	1842	1843
January....	17	6 $\frac{1}{4}$	14	24 $\frac{3}{4}$
February..	8 $\frac{3}{4}$	15 $\frac{1}{2}$	19 $\frac{1}{4}$	12 $\frac{1}{2}$
March.....	4 $\frac{1}{4}$	17 $\frac{3}{4}$	26 $\frac{3}{4}$	13 $\frac{1}{4}$
April.....	19	8	11	22
May.....	13	19 $\frac{3}{8}$	18	11 $\frac{1}{4}$
June.....	12 $\frac{1}{2}$	18 $\frac{1}{2}$	17 $\frac{1}{2}$	11 $\frac{1}{2}$
July.....	13 $\frac{1}{2}$	7 $\frac{1}{4}$	17 $\frac{1}{2}$	23 $\frac{3}{4}$
August.....	11 $\frac{1}{2}$	11 $\frac{1}{2}$	19 $\frac{1}{2}$	19 $\frac{1}{2}$
September..	15	11 $\frac{1}{4}$	15	18 $\frac{3}{4}$
October....	5 $\frac{1}{4}$	5 $\frac{3}{4}$	25 $\frac{3}{4}$	25 $\frac{1}{4}$
November..	21 $\frac{3}{4}$	13 $\frac{1}{2}$	8 $\frac{1}{2}$	16 $\frac{1}{2}$
December..	9	6	22	25
	150 $\frac{1}{2}$	141	214 $\frac{1}{2}$	224

With respect to the temperature of the past year, we find from the following table that it has been lower than in 1842; the only months in which the mean exceeds that of the corresponding months of 1842 being January, November, and December. The mean temperature of the whole year, however, does not fall much more than a degree below that of 1842. The lowest degree of temperature (13 deg.) was registered on the night between the 14th and 15th of February; the highest (76 deg.) was registered on the 19th of August. In 1842 the highest degree of temperature was 81 degrees, on the 18th of August; the lowest was 14 degrees, on the 21st of October.

THERMOMETER.

	Mean.	Highest.	Lowest.
January.....	37.6	51.5	18.8
February.....	35.2	51.5	13.0
March.....	42.6	60.0	22.3
April.....	44.9	69.0	53.5
May.....	47.2	64.5	29.3
June.....	51.5	71.5	38.7
July.....	56.9	71.4	42.5
August.....	60.2	76.3	43.8
September.....	57.6	74.5	31.0
October.....	44.2	61.0	25.0
November.....	41.0	52.9	27.0
December.....	45.2	54.0	30.0

The mean pressure of the atmosphere of any year is so near that of any other that it is almost needless to put it on record. Thus the mean pressure for the last four years is as follows, viz.—

1840—29.868	1842—29.826
1841—29.724	1843—29.832

while the average mean pressure is found to be 29.800. But there are variations in the course of some years which, on account of their magnitude, deserve especial notice; such as, for instance, the extraordinary depression on the 13th of January, in the past year, when the mercury sunk to 27.983, which was lower than it had ever been in the memory of the present generation of meteorologists,

and lower than it probably ever will be again during our lives. For a more particular account of this phenomenon I must refer the curious in such matters to your paper of the 21st of January, 1843. The greatest height to which the mercury in the barometer attained in 1843 was 30.574, on the 23rd of September. The difference between this point and the depression in January is 2.591, or rather more than two inches and a half. It will be observed on reference to the following table that the mean pressure of December is higher than that of any other month.

BAROMETER.

	Mean.	Highest.	Lowest.
January .....	29.599	30.429	27.963
February . . . . .	29.721	30.244	29.043
March .....	29.875	30.397	29.302
April. ....	29.742	30.295	29.194
May .....	29.793	30.375	29.368
June .....	29.826	30.158	28.848
July .....	29.869	30.250	29.419
August .....	29.907	30.304	29.304
September .....	30.170	30.574	29.703
October .....	29.633	30.400	28.593
November .....	29.662	30.346	28.973
December .....	30.191	30.491	29.473

If we compare the following table of the weather with that of last year, we will find the difference sadly against 1843; for we had 21 fewer clear days, 10 fewer sunshiny days, and 37 more wet days. This, when taken in connection with such a low temperature, and 8½ inches more rain, is but a dark catalogue; more especially so if we consider the manner in which our hopes were raised by those who put their faith in *Cycles*. One of these published a book on purpose to shew us that 1842 was the first of a series of nine fine years; in the which book he recommends invalids "to make trial at least of one or two of these years before they resort to other skies more favoured by natural position." I pity any one who has been "thus induced" to try 1843; for a worse year for such invalids there has not been for some time, in this part of the country. To resume, we have had fourteen days on which hail fell, and there has been thunder on a like number.

	Clear through-out.	Cloudy, without rain.	Rain.	Frost.	Sun shone out.
January...	2	8	21	16	27
February .	2	7	19	12	23
March . . .	1	11	19	6	29
April. . . .	1	9	20	8	26
May .....	2	7	22	2	27
June .....	7	14	9	0	26
July. ....	0	7	24	0	26
August. . .	3	11	17	0	30
September	3	15	12	1	29
October ..	4	5	22	7	26
November	0	9	21	8	21
December	1	13	17	1	19
Total ..	26	116	223	61	309

Notwithstanding the dark catalogue just mentioned, notwithstanding the remarkable phenomenon with respect to the barometer above referred to, notwithstanding the earthquake in March, and the two comets in March and September (unexpected

visitors, both) the agricultural results of the past year have been tolerably favourable, as the stack-yards of the farmers will abundantly testify. How this came about may perhaps be gathered from a perusal of the following notes on each month, as copied from my Meteorological Journal.

Before the end of *January* birds were seen collecting straws, &c., for their nests. The grass seemed greener and more abundant than during many of the summer months in the preceding year. Crocuses and snowdrops flowered very early, viz., on the 18th, and all the spring-flowers mentioned as having been in bloom on the 24th of December in the preceding year were now in abundant bloom. Wheat crops were in good order. The snow disappeared from the mountains about the 19th, and did not return till the beginning of February.

But, of course, after all this we might naturally expect a pretty severe check; and, accordingly, I find in my notes for *February* that the frost, which set in so severely on the 4th and continued till the 20th, put a stop to all vegetation. The spring flowers were all injured by the severity of the night of the 14th, and, on account of the constant east winds, did not recover themselves till the end of the month. Wheat, nevertheless, was almost improved by the check—being too gross before. The foolish birds, which in January were thinking of beginning their summer, were obliged to give up their labour of love till the close of this month.

At the end of *March* the wheat crops were still looking very healthy—never more promising. There was a great complaint of want of water still—many ponds and wells having never regained what they lost last autumn. Pastures were not much improved since the frost of last month until the end of this month, when we had fine growing weather. Vegetation was, however, on the whole, pretty well forward for the season.

In *April*, the frost at the beginning of the month was so severe, and the rain at the end of the month so overabundant, that vegetation was much retarded and flowers and fruit blossoms much injured. Nevertheless, crops of grain progressed well, every pickle of seed having been good and fruitful on account of the dryness of the former year. The potato seed was well got into the ground; and now, again, the drains which had been quite useless since last summer once more exhibited signs of too much rain. Indeed, there was not such a wet April on record—the excess in the quantity of rain over the average being no less than four inches. Mushroom beds were found in the meadows during this month.

The remembrances of *May* are that it was the most ungenial May ever known. In Northumberland, the east winds were accompanied by rain, and many farmers had not got their potatoes in the ground. Here the weather prevented the sowing of turnips, except Swedes. No want of rain or water now. Mean temperature of the month below the average. Excess in quantity of rain and in the number of easterly winds. Indeed, the wind came from the east on 19 out of the first 24 days of this month. Tulips were three weeks later in flowering this year than last, notwithstanding their great advance before the year began.

The beginning of *June* was very wet, but after the first 9 days we had not as much rain as would reach the lowest mark in the rain meter. Many farmers began their hay harvest; and it would be well if all did so in June every year, for what they lost in length of grass they would more than gain in

the quality of the hay and in the aftergrass. July is always a wet, uncertain month—a greater quantity of rain falls in that month than in any other during the year; besides, it is a matter well worthy of consideration whether the grass is not likely to be more feeding when made into hay before it perfects its seeds, than when the blade is dry and the seed almost ripened. Those who were wise enough to cut their grass in June, not only got their hay in well, but the aftergrass got all the benefit of the rains in July, and was accordingly better than that of those *who would not cut till a certain day in July*, whatever the state of the grass and the weather might be. At the end of this month garden plants were suffering from the drought, but farm produce was not injured by it.

The character of July was well sustained this year—it was a showery and most uncertain month. It was a cold month also. The farmer had to fight his way with the hay, and to watch for happy moments. The crops were, nevertheless, after much anxiety, pretty well got in, and proved to be pretty abundant.

On account of the checks in the spring, and the want of clear sunshiny days in what should have been our summer, it was late in *August* before the grain was cut. The harvest did not begin in this immediate neighbourhood till about the 24th, which was sixteen days later than in 1842.

The fineness of the first two or three weeks of *September* proved of great advantage in the getting in of the grain; and as no complaints were made by the farmer of either quality or quantity, we may presume the results were very favourable in those respects also. Perhaps the best evidence of that will be found in the fact that during this month wheat was selling in the market at fifteen shillings the bag of three imperial bushels. At any rate it was very comfortable evidence for the poor, who also had potatoes at three-pence the stone. The whole month of September was indeed delightfully fine and almost repaid us for the cold wet summer. The crops of fruit were a failure, and apples and pears were sold at a very high rate—a wonderful contrast to the crops of 1842. All kinds of fruit were scarce this year, on account of the nipping winds in April and May. Before the month closed we had a very severe frost on the 29th, which completely destroyed the dahlia and other tender plants. This destruction has hitherto not occurred till the first week in October, but the extreme dryness of September was probably the cause of the arrival of the frost so early this year.

*October* was a showery month, thus changing characters with September. The wheat seed was well got in the ground hereabouts, though it seems that the farmers in Lancashire were not able to get theirs in at all, at least in many parts. The potatoes were generally complained of as a failing crop on account of dry rot.

*November* sustained its character well, and was really a dull, drizzly, dreary month.

*December* was chiefly remarkable for the mildness and wetness of the atmosphere. On the 5th the temperature was six degrees above that of the 5th of June, and we had only one day (the 2nd) on which the mercury sunk below the freezing point. The mean temperature of the month was above that of October. The temperature of the nights was, in many instances, as high as that of the days preceding; indeed, the difference between the temperature of the days and that of the nights was so small, that the mean of the night temperature for

the whole month was only seven degrees below that of the day—the difference in September was fourteen degrees. The air was full of moisture during the whole month. There never was such a plentiful display of paragraphs in the newspapers relating to such wonderful occurrences as thrushes singing, mushrooms being found in the meadows, birds beginning to think about their nests, nay, nests with eggs in, trouts rising to the fly of the angler, insects sporting in the air, and such like, as might be seen here in December last. For a wonder, the weather here in November and December was most miserably inferior to what those in the south and east seem to have enjoyed. This is very unusual.

Of course, said the croakers, we will suffer for this in January. While I am now writing (on the 5th of January) the thermometer is standing at 52 degrees in the shade!

It is rather remarkable and worthy of record that the seasons in the East Indies seem also to have been turned topsy turvy; for we find, by a paragraph which went the round of all the newspapers of the day, that there were showers of rain during the hot season, which was seldom if ever the case before; that the wet season was upwards of two months behind its time, and that when it did come it did not continue for its usual period, but that a great quantity of rain fell in a very short while. The usual effects of the wet season had not been felt by persons, nor by things inanimate—such as the mouldiness of leather-backed books, &c. The hot season was not so hot as usual, the days of extreme heat being very few. In fine, it is styled the *mildest hot* season on record for twenty years.

So it seems that if we have had summer heat in December and ice in June, ours is not at all a singular case.

JOSEPH ATKINSON.

*Harraby, near Carlisle,*  
5th Jan., 1844.

## ON DRAINING AND MANURING.

BY PROFESSOR JOHNSTON.

The following paper is the substance of a lecture delivered at Alnwick a few weeks since, and reported in the *Berwick and Kelsoe Warder*:—

After a few introductory remarks on the pecuniary advantages arising from draining, Professor Johnston proceeded, in substance, as follows:—

Many soils in this country are unfruitful by reason of the noxious matter in the subsoil. In ordinary ploughing you go three or four inches—or it may be more; and beneath is a reddish, iron subsoil, of so noxious a nature as to poison the roots of plants that penetrate to it. In this country there are many such subsoils. The most efficient practical remedy is draining. The rain sinks perpendicularly, washes the subsoil, and cleanses it of its noxious materials. When once drained, you can plough it deeper; and, after a time, even the unproductive yellow clay and other subsoils may with safety be brought to the surface. The subsoil plough acts as a cutter to cut it up, and allow the water to penetrate; but this would be of little or no use without draining. The clay would again cohere. Allow it a time to dry—to crack—and the soil will gradually become mellow by the admission of the air. You may hear many people object to

subsoil ploughing, because, as they say, they have tried it, and it did not answer their expectations. But, in general, you will find, upon inquiry, that the trials have not been made with the proper precautions. They have not, probably, allowed the subsoil time to become sufficiently dry. It sometimes takes one year, in some soils two years, and in others longer, before the central part gets dry and cracks. The roots of wheat penetrate six or eight inches—in better soils ten or twelve; but they ought and would gather support from a vastly greater depth, were the land properly drained and subsoil ploughed. After draining, however, the land which yields larger crops, must also be more liberally treated. The greater the crops taken from the land, the more of its substance is removed, and the deeper the roots penetrate, the more completely is it in the power of the farmer to exhaust his soil. This brings me to the subject of manures.

In new countries, where there is so much virgin soil, as in South Africa, New Zealand, and Texas, the land is cropped, and yields enormous produce without manure. The same takes place in Russia and Poland, where it is the custom to keep their manure till the winter, and then to cast it upon the ice of the rivers, that it may be carried away when the ice breaks up. This practice may be continued a long time—a hundred years perhaps; but the time does come, perhaps imperceptibly, when the crops will diminish, for there is no land but may be exhausted at last. In fact, this is already the case in some parts of Russia, where they cultivate a portion of the soil till it wears out (as was formerly the case in Scotland), and then they go to a new part. How is this exhaustion to be remedied? One common method is to plough deeper. The usual depth, in many districts, is from four to six inches. A friend of mine took a farm from the Duke of Portland, which had been exhausted. He was induced to take it because he knew it never had been ploughed more than four or five inches. He went ten or twelve inches deep, and got excellent crops. A gentleman in this country, who was desirous of having a Scotch tenant for a similar farm, was told by one who came to look at it, "Why sir, this land has never been ploughed; if you could only drain it all for me, I could afford to double the rent." In the Bannat they cultivate one layer of soil for about thirty years, and then bring up a new one. In Oldenburg, it is the practice to go down six feet in order to procure new soil, and the first crop of rape not unfrequently pays the whole expenses. But it will not suit in all cases to bring soil from beneath. Where the subsoil contains noxious ingredients it can only prove injurious to bring it to the surface.

Another method of reclaiming worn out soil is by the addition of manure. Thus crops may be grown and ploughed in green for the purpose of enriching it in vegetable matter, or farm-yard manure may be added, or bone or rape dust, or saline substances, &c.; but in order that these be effectual, we must understand how they act, for what purpose they are added; what change the land has undergone when they have been added; we must understand something also on the nature of soils. In my last lecture I briefly directed your attention to the subject. Look at any quarry, or examine the sea shore you will observe different beds of rock lying one over the other—limestones, sandstones, and clays—of various degrees of purity and hardness, generally

in great regularity. When these crumble down, they form soils which are distinguished by various names—sandy soil, calcareous soil, clay soil, &c.; but, under whatever name, *essentially* composed of sand, clay, lime, in different proportions in different soils. But, besides these three substances, soils contain a greater or less proportion of eight or ten other substances. Thus the following table exhibits the composition of three different qualities of soil; the first *fertile* without manure, the second with manure, and the third refusing, even when manured in the ordinary way, to return remunerating crops:—

COMPOSITION OF SOILS IN ONE THOUSAND POUNDS.

	Without Manure.	With Manure.	Very Barren.
Organic matter....	97	50	40
Silica .....	648	833	778
Alumina.....	52	51	91
Lime .....	59	58	4
Magnesia .....	8	8	1
Oxide of Iron ....	61	30	81
Oxide of Manganese	1	3	—
Potash .....	2	—	—
Soda .....	4	—	—
Chlorine .....	2	—	—
Sulphuric Acid ...	2	1	—
Phosphoric Acid ...	4	2	—
Carbon .....	40	4	—
.....	14	—	5
	1000	1000	1000

REMARKS—Organic matter consists of vegetable substances derived from decaying roots and stalks of plants—and of animal substances derived from the dung of animals and from farm-yard manure.

Silica—The substance of the sandstone.

Alumina—The substance of clay—not altogether, however; pipe-clay contains a large proportion of it, but it also contains much silica.

Magnesia—Present in all fertile soils.

Chlorine exists in common salt—it is a kind of gas—and a powerful disinfectant, &c.

The above table shews that naturally a fertile soil must contain a notable proportion of at least eleven different substances; and that, to render a soil fertile by art, we must add a manure which shall contain all those substances in which the soil is naturally deficient.

But that all these are really necessary in the soil is shewn by a careful examination of what the crops we raise actually contain. Observe this piece of straw; burn it; you will observe that it gradually disappears, leaving a small portion of ashes behind. This proves that it consists of two classes of substances—the combustible and the incombustible; the former is the greatest. In one hundred pounds of straw there are five, six, or seven pounds of ash. The white ash is the incombustible part. Wood contains less than straw—being but half a pound of ash to the one hundred pounds. This applies to all plants. Thus ash, however small, as in the case of wood, is as essential to the growth of plants as the combustible or organic parts. The more inorganic matter you take from the soil, the more it is exhausted: one thousand pounds of hay takes off three pounds. Let us glance for a moment at the proportion of inorganic matter in some of the more common crops:—

INORGANIC MATTER IN ONE THOUSAND POUNDS OF  
HAY.

	Rye Grass.			Clover.			Lucerne.		
				Red.	White.				
Potash .....	8.8	..	19.9	..	31.0	..	13.4		
Soda .....	3.9	..	5.3	..	5.8	..	6.2		
Lime .....	7.3	..	27.8	..	23.5	..	48.3		
Magnesia.....	0.9	..	3.3	..	3.0	..	3.5		
Alumina.....	0.3	..	0.2	..	1.9	..	0.3		
Oxide of Iron.....	—	..	—	..	0.6	..	0.3		
Oxide of Manganese —	..	..	..	..	..	..	..		
Silica .....	27.7	..	3.6	..	14.7	..	3.3		
Sulphuric Acid ...	3.5	..	4.5	..	3.5	..	4.0		
Phosphate .....	0.3	..	6.6	..	5.0	..	13.1		
Chlorine.....	0.1	..	3.6	..	2.1	..	3.2		
	52.8		74.8		91.1		95.6		

Different plants carry off different proportions of these essential ingredients. To render a plant healthy, it is essential that the soil should contain all these elements. That which is present in the smallest quantity cannot be dispensed with. It is as impossible for a plant to grow without all the necessary ingredients, as it is for a joiner to make a box without the glue or the nails, as well as the wood. I need hardly now enter into the effect of removing the crops. Exhaustion consists in removing one or other of the substances essential to the healthy growth of the plant. For instance, the following table—

## PROPORTION OF INORGANIC MATTER.

	Potash Salts.		Lime Salts.		Silica.
Oats—straw grain....	34	..	4	..	62
Barley—straw grain..	9	..	26	..	55
Rye straw .....	19	..	16	..	64
Pea .....	28	..	64	..	8
Potatoes .....	86	..	14	..	6
Potato tops .....	4	..	60	..	36
Turnips .....	88	..	12	..	—

—shows that a crop of potatoes would extract from the soil 86 of potash, 14 lime, and 6 silica. But the silica would accumulate. Oats extract 34 of potash, 4 of lime, and 62 of silica; if you continue this, the silica (which is necessary for the stem) will be exhausted; but there may remain potash and soda; and so on of the rest, each sort of plant produces a different kind of exhaustion. By cropping successively and adding no manure, you, of course, exhaust the land generally—you bring it into the state of the second soil in our table, which will not grow crops without manure; or into that of the third soil, which, with ordinary manuring, will not give a remunerating return.

You must not remove too much of any *one* thing; for, by repeated cropping with the same plant, the soil will no longer grow a crop of the same kind. Again, what is the effect of returning the crops to the soil? The same substances are returned, and the land is kept nearly in its original state. But, return a part only, then the exhaustion would take place, not so speedily indeed, but as effectually.

Farm-yard manure consists of a liquid and a solid portion. Besides the solid there is a liquid which accumulates in pools, &c., which contains a certain portion of all that is readily soluble in the manure. But this soluble part of the manure has been derived, either directly or indirectly, from the crops reaped from the soil, and by them from the soil itself. If this be not returned to the soil, it must to a certain degree be impoverished. Yet how much of this is yearly wasted! What a great waste there is of what is absolutely necessary as the solid matter!

All over the country this is allowed to run away and is lost. You prevent nature from building up a plant by depriving her of the materials. You rob your country, your landlord, and yourselves, by such thoughtless waste. I am fully convinced that there is more of this liquid manure allowed to waste than would produce all the corn we at present import from foreign countries. I have said that even if no solid manure it is insufficient, unless nature replaces (as under certain circumstances she does) the soluble saline substances which have been extracted from the soil. This leads to an explanation of the use of saline manures. The sea supplies them more abundantly in this than in most other countries. The ocean dashes against the rocks—the crest of the waves is white with foam—the winds carry away the spray, drift it along in clouds, and sprinkle it over the surface of the land. Of what does this salt spray consist? This appears in the following table:—

## WATER OF THE NORTH SEA, 1000 PARTS CONTAIN—

Common Salt .....	24.84
Chloride of Potash .....	1.35
—Manganese .....	2.42
Sulphate of do. ....	2.06
—Lime .....	1.20
Phosphate of Lime and Iodine .....	a trace.

On what part of the country does this drifted spray fall most abundantly? It is carried from the sea to the nearest high lands. There it beats against the side of the hill, and is in part arrested. The winds climb over the hill top, and over the other hills beyond, the saline matter still floated by the hand of nature, and leaving here and there depositions of its treasure. Let us apply this to the elucidation of some facts. Salt has been recommended as a manure, and in some places it has raised great crops. In many districts, again, it has been quite useless. The fact—the seeming anomaly—is easy of solution. If the district is exposed to the sea, it gets enough of salt from the spray that reaches it. A. lives on the side exposed to the sea, and is therefore abundantly supplied. B., who lives on the other side of the hill, or in the valley, supplies salt, raises abundant crops, and recommends it to A. A. uses it and finds it fail. The reason is obvious. Nature has been kind to A., but she does not play into the hands of B. The hills of Lancashire and the Yorkshire hills, that form the great back-bone of England, need on their eastern and western faces no dressings of salt, while in the valleys sheltered by them from the sea breezes, excellent results may be obtained by its use. Another mode by which nature may repair the natural waste of saline matter in the land is by springs from beneath, which abound, more or less, in lime, soda, or potash. The rain that falls upon the earth, passes into the crevices of the rocks, between the various layers, and oozes out in springs, which are charged with soluble matter, and gives to the soil some of those substances which it needs. The inundations of the Nile and Ganges act on a similar principle. Their waters spread over the land, and supply those ingredients which the crops take away. Irrigation also contributes, in some measure, to the same restoration of the fertilizing elements of the soil. The water which issues from drains, as I said before, washes away the noxious matter of the subsoil, which becomes *wholesome when exposed to the day*. Such water, then, should be used for irrigation. This is not a merely theoretical statement, for it has been proved on the estate of Lord Hatherlton.

Animal manure consists of flesh, skin, and bones: I speak not now of the fluid substances. Does carrying off the stock do harm to the land? You must carry off those substances which go to constitute the bodies of those cattle, the inorganic matter of their bones and their hair, on the same principle as plants carry off the inorganic matter they contain. But in this case the exhaustion will be more slow. Take the mere fattening of cattle—their bones are already complete, and but a small quantity is here carried off—merely the fatty matter that is added to the stock. Oats contain 6 lbs. of fat, wheat 4 lbs., and clover 4½ lbs.

I wish you to carry away with you this principle, that the manuring of land is intended to restore

what the crops carried off. The practical question is, what ingredients does my land want? You may add farm manure and not bring it into good condition; it may make it grow some one crop, but not another. In the rotation of crops, you may add twenty tons in four years, but this may not contain enough of some one thing which the land wants to make it grow the crop you desire. But 40 tons, the quantity you add during the rotations, may contain enough, and thus every eight years you may get one good crop of the kind you wish to raise. On this principle is explained the fact that when clover fails if sown every four or five years, it will give a good crop every second rotation.

YORKSHIRE AGRICULTURAL SOCIETY.

TRIAL OF IMPLEMENTS.

A number of ploughs and scarifiers having been reserved by the Judges for trial, a novel mode of comparing their respective merits was adopted, which seemed to give general satisfaction to all parties; and as the subject is one of general interest, the result of the trial of the ploughs is given in a tabular form. Of the scarifiers, the Uley Cultivator was decidedly superior to any other implement of the kind exhibited. The numerals in the table indicate the degree of excellence: V. is intended to denote that in the particular marked at the head of the column, the plough in question was as good as could be wished.

The trial took place on a clover stubble, and the furrow required to be turned, was five inches by nine. The draught was ascertained by Clyburn's dynamometer, for which the premium was awarded at this meeting. The first premium was awarded to No. 1, and the second to No. 2.

R. M. JAGUES  
PETER STEPHENSON } Judges.

No.	OWNERS' NAME.	RESIDENCE.	KIND OF PLOUGH.	DRAUGHT.		Furrow well turned.	Bottom well cleaned out.	Work regular.	Easy to hold.	Width of Furrow.	Depth of Furrow.
1	Barrett&Ashton	Hull.....	Iron Plough with two wheels	3	2	V.	V.	V.	IV.	9 in.	5 in.
2	Scarrah .....	Crakehall, Bedale..	Ditto with one wheel	3	2	V.	IV.	V.	IV.	9 "	5 "
3	Barker.....	Dunnington, York..	Wood Swing Plough	4	..	III.	II.	..	III.	9 to 11	2 to 5
4	Ditto .....	Ditto ditto ..	Ditto ditto.....	..	..	not complete.	..	..	..	..	..
5	Cheetham .....	Doncaster .....	Wood Swing Plough	4	..	..	III.	V.	V.	9 in.	5 in.
6	Barker.....	Dunnington, York..	Ditto Plough with two wheels	..	..	not complete.	..	..	..	..	..
7	Mrs. Cartmell..	Liverpool .....	Iron Swing Plough	4	1 14	..	..	..	..	9 "	5 "
8	Cheetham ....	Doncaster .....	Wood ditto .....	3	2	II.	III.	IV.	V.	9 "	5 "
9	Scarrah .....	Crakehall, Bedale..	Iron Swing Plough	3	3 14	IV.	IV.	V.	IV.	9 "	5 "
10	Barrett&Ashton	Hull.....	Ditto ditto .....	3	2	III.	IV.	III.	IV.	9 "	4 "
11	Ottley .....	Hampole, Doncaster	Wood ditto .....	4	..	III.	IV.	III.	IV.	9 "	5 "

## WHAT MUST THE FARMER DO?

## TO THE FRIENDS OF PROTECTION TO AGRICULTURAL PRODUCE AND LABOUR.

GENTLEMEN,—The present formidable combination, styled "The Anti-Corn-Law League," suggests the question, "What must the Farmer do?" The openly avowed object of the League being, by a bold and well-directed combination of men and money, to ensure the abolition of all protection for agricultural produce; as between this League and the farmer it is not a question of sliding scale or fixed duty, but protection or no protection.

It may be considered great presumption in a man, but little known to the party he is addressing; but being much interested in the great question at issue, and viewing the extraordinary vigour and concentration of the League, as contrasted with the total want of combination, and tardy movements of the party attacked, I am emboldened to use my humble efforts to cause at all events, a concentration of the friends of agriculture, without which, I fear local and divided efforts will fail. The evils attendant upon divided or uncombined efforts, are, that in publishing their separate and varied views, they weaken the general cause, and strengthen their opponents, who are united as one man upon one undivided point.

My proposition is, that by advertisements, meetings be called in every county in the kingdom, to be held the second and third week in February, of the friends of protection to agricultural produce and labour: at which meeting a committee be chosen, and that committee to elect a deputy to attend a general meeting of deputies in London, the third week in March; to take into consideration the most effectual means of counteracting the attempts of the Anti-Corn-Law League, and to establish a society for the "protection of agricultural produce and labour."

And, as a precaution against disunion, no political discussion be allowed at either the local or general meetings, otherwise than that connected with the protection of agricultural produce and labour.

Having thus far proposed a plan of action, I now presume to treat of the general question.

The first point suggested, is, can the farmer of England compete with the foreign agricultural countries? I say it is impossible (without repudiation), and for these reasons:—

**First. THE PRICE OF LABOUR.**—That the price of labour is four times more in England, than in the corn countries of Prussia, Poland, and Russia, and as labour constitutes more than one-half of the cost of the produce, the price of labour (if maintained) is a barrier to free trade. Average labour per day, in England, 1s. 6d.; Poland, 3d.; Prussia, 5d.; Germany and France, 7½d.

## WAGES OF FACTORY OPERATIVES.

EXTRACTED FROM THE REPORT OF THE FACTORY COMMISSIONERS.

	At per day of 10 hours.	s. d.		s. d.	
		s.	d.	s.	d.
England . . . . .	69 hours for	11	0	1	7
America . . . . .	78	10	0	1	3
France . . . . .	72 to 84	5	8	0	8½
Switzerland . . . . .	78 to 84	4	5	0	6½
Tyrol . . . . .	72 to 80	4	0	0	6
Saxony . . . . .	72	3	6	0	6
Bonne in Prussia . . . . .	94	2	6	0	3¼

Show this to the English labourer, what will he say when told that for the blessing of "cheap bread,"

he is to receive 3s. per week instead of 9s.? Why even in France, where labour is so much better paid than in Russia, Prussia, or Poland, by a statistical table just published, out of a population of 33,000,000, 18,000,000 never eat bread, and 31,000,000 never eat meat! (*Reforme, Jan. 1844.*) And, as may be supposed, in Prussia and Poland, not having the fruits of France to aid them, they but drag through a miserable existence, with a scanty supply of black bread. Even the farmers, in many cases, are but little better off than the labourer, he being the slave or worse to the Jew speculator; not as the English farmer (at present), with good local markets for his *wheat*, as well as other produce.

**Second. TAXES.**—That the land and its produce in England, pays in taxes more than *three* times the entire charge of taxes and rent in Russia, Poland, and Prussia. The tax on land, being 25 per cent., equal to per acre, Prussia, 3½d.; Poland, 2d.

**Third. RENT.**—England, the average rent per acre, 19s.; Poland, 5d.; Prussia, 1s. 3d. These are the three *main* causes, why the English farmer cannot compete; neither would the sacrifice of the *entire* rent enable him so to do: but, to effect the object sought, not only four-fifths of the rent, but at least two-thirds of the *main* charge, the price of labour must be given up! In this lays the whole gist of the question, the "price of labour."

If the class seeking this reckless measure could be honest enough to *tell* us what they really mean, the public, and particularly those too easily duped from the seductive motto, "Cheap Bread," the labouring population, would be able to judge the merit of the question: not as they, the League, speciously would have it appear, to benefit the poor; but by equalizing the price of bread in England with that on the continent, they obtain the pretext for equalizing the price of labour.

That by a free trade they would equalize the price of wheat to within 2s. 6d. per quarter there can be no doubt, the fact is the prices must assimilate to within the cost of transit; and that difference does not (taking the average freight and insurance from all our out ports) exceed 2s. 6d. per quarter: in proof of which, suppose you purchase three cargoes of wheat at Mark Lane, by sample, all of equal quality free on board, at the respective ports of Hull, Limerick, and Dantzic; the freight from Hull, 1s. 8d.; Limerick, 1s. 10d.; Dantzic, 2s. 10d. The three cargoes arrive the same day in the port of London, and the following market day you sell by drawn samples the three cargoes: what is the charge per quarter upon each cargo? The freight from Dantzic is 2s. 10d. to 3s. 3d. per quarter, sound dues 6d. insurance not 3d. per quarter; in proof of which I have a price current and monthly circular now before me, of Messrs. Beanne and Brothers, Dantzic, June 17th, 1843. "Vessels are getting rather scarce, whilst the demand increases, 2s. 10d. to 3s. 3d. has been paid to London." Now the only charge upon Dantzic wheat to which the cargoes from our own out ports are *not* subject to is the sound dues, 6d. per quarter.

If the three cargoes are *not* sold, but landed in granary, still each cargo is subject to the same charges, the difference still remaining the same, only upon the freight and sound dues—and that difference, I contend, does not *exceed* 2s. 6d. per quarter. Upon this important point the public have been greatly misled by various pamphlets and speakers, attempting to shew that the expense of transit is from 10s. 6d. to 14s. per quarter; thence a sufficient pro-

tection without a duty. But in this 10s. 6d. to 14s. they have included those charges to which English wheat is subject, shipped from our own ports; freight, insurance, port dues, delivery, metage, waterage, factor's commission, rent, turning, screening, &c. Therefore, confining ourselves to the real difference of transit, 2s. 6d. per quarter, it is evident in a free trade the prices must approach to within this difference.

The question then is—is 2s. 6d. per quarter, any protection without sacrificing *landlord and labourer*? No, but by having equalized the price of bread, they obtain the excuse for equalizing the price of labour, that they may the more successfully compete with their foreign opponents in *manufactures*. Neither can we be surprised at this bold attempt to pauperize the country, when we consider the great proportion labour bears to the cost of every article. I know of no manufactured article of which the cost of material constitutes one tenth part of the sale price to the consumer, and in many not one-twentieth.

And that the Anti-Corn-Law League really seek this reduction in the price of labour, I need only refer to the declarations of their leaders and paid lecturers; one of them, Mr. Bright, September 29th, said, "If English yarn went to Russia and had to be sold at the same rate as the Russian Yarns, he, the Russian, not paying the duty imposed by Russia, it follows that we *must*, by some means or other, *make* our goods cheaper by the amount of duty, and to do that, it is *absolutely necessary* that the wages of operatives in this country should be reduced!"

Now what is the plain English of this? Why, that the wages of the English spinner must be reduced below the Russian's! which is barely 4d. per day.

"What must the farmer do?" By every means in his power make the English labourer (spinner and all) *know his position now, and what this League is attempting to make it*. Do this effectually and the game is up. Mr. Cobden would shortly have to exclaim, "Othello's occupation's gone!"

Again, "what must the farmer do?" Why, what is worth doing at all, is worth doing well. It is possible that this, or some future government may entertain the free trade question in corn as a matter of expediency to allay agitation; and since modern governments allow themselves to be thus governed, combine and show your strength constitutionally. The doctors tell us in inflammatory cases counter irritation is good. Go then at once for free trade at home, before you allow any further free-trade with the foreigner. Look for instance to your barley! why, in common sense, should you allow (as you have done) foreign substitutes to destroy the consumption of your national beverage? In the 12th of Anne, 1713, with a population of only 5,320,000, the quantity of malt consumed was 3,774,900 quarters; in 1842, with a population of 26,870,000, the consumption of malt was only 4,302,000 quarters; and taking into consideration the lax mode of collecting the duty in the reign of Anne, there can be little doubt the real quantity consumed at that period far exceeded the present. What has caused this decrease but the encouragement of foreign substitutes, wine, spirits, tea, coffee, &c.? Of late years reductions are continually taking place in the duties upon these substitutes, whilst that upon malt is maintained to the extent of yielding a revenue of 4,400,000 per annum! The abolition of the Malt duty would be of immense importance to the farmer, inasmuch as he has less to fear from foreign competition in barley than any other grain.

CONSUMPTION OF MALT, TEA, AND COFFEE.

	MALT.		TEA.		COFFEE.	
	Bushels.	Duty s. d.		Duty pr. ct.		Dly. d.
1713	30,200,000	0 6				
1789	26,869,000	1 2	14,534,601	12½	980,140	10½
1809	22,118,143	4 4	19,860,134	96	9,251,837	7
1830	34,196,841*	2 7	30,720,685	..	21,728,000	6
1842	34,418,544*	2 0	37,391,012	..	28,583,931	4

\* Including Ireland and Scotland.

AVERAGE PRODUCE OF LAND IN ENGLAND AND WALES.—1838.

	QRS.	BUS.
Wheat.....	2	5
Barley.....	4	0½
Oats.....	4	3½
Rye.....	2	7½
Peas.....	2	7
Beans.....	3	1¾
Potatoes..	280 bushels.	

1843.—Estimated value of produce per acre of land 7l.; equal to about 300,000,000l. per annum.

QUANTITY OF LAND IN THE UNITED KINGDOM.

FROM MR. WM. COWLING'S EVIDENCE GIVEN BEFORE THE SELECT COMMITTEE ON EMIGRATION.—1827.

	Acres Cultivated.	Acres Uncultivated.	Acres Unprofitable.	Total.
England.....	25,632,000	3,454,000	3,255,400	32,341,400
Wales.....	3,177,000	530,000	1,105,000	4,752,000
Scotland.....	5,365,000	5,950,000	8,523,930	19,738,930
Ireland.....	12,125,280	4,900,000	2,416,064	19,441,344
British Isles....	389,630	166,000	569,469	1,119,159
Total.....	46,522,970	15,000,000	15,871,463	77,394,453

ESTIMATE OF THE PRODUCE OF THE MANUFACTURES OF GREAT BRITAIN.

	Exports in 1840.	Home consumption.
Cottons.....	£24,661,179	£35,000,000
Woolens.....	5,747,562	14,000,000
Hardware.....	5,652,517	11,000,000
Leather.....	412,127	13,000,000
Linen.....	4,124,742	8,000,000
Paper, Furniture, Books.	506,048	14,000,000
Silk.....	790,435	6,000,000
China, Glass, Earthenware.....	991,126	4,000,000
Jewellery, Plate, &c.....	204,192	3,000,000
Miscellaneous.....	4,167,938	25,000,000
	£47,257,776	£133,000,000

Of which was exported to our colonies about.... 20,000,000

To foreign nations.....£27,257,776

But to confine myself more immediately to the question I must refer to the work of Adam Smith, page 106; he states truly, "the whole annual produce of land and labour of every country naturally divides itself into three parts, the rent of the land, the wages of labour, and the profit of stock; and constitutes a revenue of three different orders of people: to those who live by rent, to those who live by wages, and those who live by profits. These are the three great original constituent orders of every civilized society, from whose revenue that of every other order is ultimately derived. Are we then to

allow at one fell swoop the destruction, or nearly so, of the first of these great constituted orders, and hence the second, to the third, blown as it were into such importance by the steam engine.

Although I would be the last to treat lightly the importance of the manufactures of this country, yet knowing that all the machinery in the world cannot make food or command it in return, I condemn any scheme which tends to deprive the country of the means possessed within itself to supply food for its population. But from the general character of our soil, it can only be done by great energy combined with science and great outlay of capital, which the proprietors and farmers are now applying in every district of the kingdom. It is everywhere evident that the produce of the land has made great advances, though equally evident not in proportion to the unexampled increase of population, or in proportion to the increase of our manufactures, but it must be remembered the manual labour of the field cannot to any extent be substituted by machinery, to which the manufacturer owes all his gigantic strides.

Besides the taxes on land are *direct* and *heavy*, those on the manufacturer *indirect* and light. The policy of which I doubt, but agree with Voltaire, who observes, "the refined industry of the merchant should pay more than the rude industry of the labourer."

The supply of food is a concern of itself, and nothing can be more fallacious, than to apply the common analogies of trade to it.

Who for instance, would not prohibit or restrict the exportation of corn in a season of scarcity? and that scarcity from bad harvests would be avoided by free trade in corn is a fallacy, for we should be exchanging the bad season at home for the bad season abroad, with ten-fold worse consequences.

In conclusion, I beg to refer to the opinion of a good authority, Adam Smith, page 107, as to the confidence which the manufacturer is intitled to. "The proposal of any new law or regulation of commerce which comes from this order, ought always be listened to with great precaution, and ought never to be adopted till after having been long and carefully examined, not only with the most scrupulous, but with the most suspicious attention. It comes from an order of men, whose interest is never exactly the same with that of the public, who have generally an interest to *deceive*, and *even to oppress the public*, and who accordingly have, upon many occasions, *both deceived and oppressed it.*"

I will not go farther into the subject at present, or offer any opinion upon the question of fixed duty or sliding scale, deeming those questions more fitting for discussion at the central committee.

Your obedient servant,  
W. FORD.

Lawn End, South Lambeth, London,  
January 27th, 1844.

TO THE EDITOR OF THE FARMER'S MAGAZINE—Sir,  
—I lately read with considerable interest, in the December number of your magazine, a paper by a Mr. Biggs "on the possibility of growing wheat and other crops successively and profitably on the same land without exhausting the fertility of the soil." Jethro Tull, who lived and wrote a century ago, no doubt thought this quite practicable, and much as I believe many parts of his system deserve our careful imitation

in reference to the complete cleansing and reduction of the soil which he insisted upon, I cannot think the means he used were, by themselves, adequate to the end he sought. But now that chemistry is come to our aid, by whose assistance we very easily ascertain the deficiencies and the injurious qualities natural to our various soils, I will not take upon myself to say that Mr. Biggs's theory may not ultimately prove correct in practice. Before it does, however, to any extent, a knowledge of chemistry must be more widely disseminated amongst the agricultural body; and as a step towards so desirable an end, may I solicit the favour of a copy of "Boussingault and Sprengel's analytic tables" from either yourself or one of the numerous readers of your useful magazine? These tables were referred to by Mr. Biggs, and I think their publication would benefit many.

I also wish to know what quantity of chalk-lime is most advisable to apply per acre on hot, dry, gravelly land; and whether Mr. Smith of Deanston, has published any practical work on draining; and if so, whether it is attainable in London.

Perhaps some of your correspondents would kindly favor me with answers to these inquiries, in which case I shall feel much obliged to them, and also to you, Mr. Editor, for being the medium of their communication. I remain, Sir, your obedient servant,  
A CONSTANT READER.

Witchampton, January 26th, 1844.

#### NORTH CORNWALL EXPERIMENTAL CLUB, FOR THE ADVANCEMENT OF AGRICULTURE.

The members of this club dined together at the Tree Inn, Stratton, on the 5th inst. There was a large party present, including most of the clergy, landed proprietors, and respectable farmers of the neighbourhood; and several from a distance.

Goldsworthy Gurney, Esq., the president of the club, presided at the dinner; William Bray, Esq., of Grove Park, vice-president. On the removal of the cloth, the president produced specimens of wood, which had been taken from some wood drains which had been cut through during the previous week at his estate at Hornacott. The first consisted of several pieces, varying from a quarter to an inch and a half in diameter, and were in a good state of preservation: the fibres were perfect, and the bark unaltered, which showed them to be birch. He said he had ascertained that the drain from whence they had been taken, had been made nine years since,—that it was perfect as a drain, when cut through, and that water was running freely through it. The next specimens were taken from another part of the same estate; and from information obtained from some elderly people acquainted with the spot, the drain must be upwards of half a century old at least. When opened, the drain was running, and the wood, which was lying in the position it had been originally placed in, retained its form. The fibres, however, were partially decomposed, and on being pressed with the fingers were easily reduced to powder;—the bark was not so much affected. He said he had produced these specimens to show that bush, or wood drains, if properly constructed, were sufficiently durable in this district to make it worth while for the renting farmer to adopt them in thorough draining his farm, should his landlord withhold his help. Notwithstanding there was a difference of opin-

ion, generally, as to the value of wood-draining, there was, he thought, sufficient evidence extant to warrant its use, where stone could not be had, or tiles were too expensive for the purpose of thorough draining on some of their coarse land. He observed he had, in large heaps, with brush-wood, mixed burnt clay into hard noddles of brick, similar to that used on the Great Western Railway for covering its surface, and had broken and filled some drains with it some years since, which worked well. The brick lumps were broken to about the size of stone used for the roads,—the larger portions were laid at the bottom of the drain, and the smaller pieces on the top. He considered this a most durable material, cheaper than wood, in most of the clay districts of that neighbourhood, in which thorough draining was so much required, and well worth the attention of the agriculturists of the north of Cornwall. He said the expense of burning clay in summer on the spot for filling drains did not exceed a penny per land-yard, and this was much cheaper than wood at the price it was usually sold in that neighbourhood.

A discussion was kept up for some time on the best kind of wood, size, &c., to be used for draining, should such be chosen for the purpose; in which it appeared the majority were in favor of alder and birch green wood, of not less diameter than half an inch, not exceeding one inch and a half.

Mr. BRAY produced a sample of mow-burnt hay, for the purpose, he said, of directing the attention of the club to the subject of fermentation connected with hay-making: he was anxious to have it analyzed, with a view of ascertaining what change had taken place in it as compared to that of a different character found in the same rick. He hoped the enquiry might lead to some practical information as to the best stage of fermentation to which hay should be carried for the use of cattle.

Dr. VACEY promised to analyze it, and to report upon it at the next meeting.

Mr. BRAY said, he wished to communicate the fact that he had used common salt, and found it a remedy against the wire-worm in that district; he was desirous of ascertaining to what extent it was valuable as a remedy, compared with that of mechanical pressure of the soil, as practised in the midland counties; and hoped some member of the club would try the experiment this season. He should do so himself, and would be glad if some one would do so also on a different soil. The wire-worm was increasing in this district, and if salt really destroyed them, it would be desirable to use it, rather than adopt mechanical pressure, which latter might only protect the plant without destroying the worm.

Several members were of the same opinion, and promised to join in the experiment.

No member having any communication further to make,

Mr. GURNEY rose to call the attention of the club to the subject for the evening's discussion proposed last meeting, namely, that of "Manures soluble in rain water." He said nothing was more disheartening to the practical agriculturist than the frequent failures of some of our best manures. He had, in connexion with some friends, made many experiments with a view to account for the uncertain action of similar manures on similar soils. Nitrate of soda was wholly soluble, guano was half soluble, the other half insoluble. Humus was insoluble, so was sea-sand and bone-dust; but each became soluble often by decomposition in the soil. Some known phenomena produced by the humidity and quantity of water and state of its solution in the atmosphere on certain occasions,

had led to the following experiment, made with a view to ascertain whether manures soluble in water were not sometimes, by heavy rains, passed through the soil. On a piece of ground thoroughly drained, and the drains running together in one exit main, he sowed some common salt, and had watched the weather. About four hours after, the next heavy rain, when the drains began to run, he had tested the water coming from the drain with nitrate of silver, and found that it threw down a heavy precipitate; it continued to do so for two days, when it ceased to throw down a heavy precipitate, and only showed the presence of the small quantity of muriate of soda generally observed in rain-water near the sea. Mr. GURNEY now, by a set of plain and interesting experiments, proceeded to show the manner in which the water from the drains had been treated, and to describe the action of the tests he had used. The soil, in every case, must be regarded as a filter, and would retain all feculent matters suspended in water. He begged to call particular attention to the term solubility, that they might not confound it with mechanical mixture or solution of aggregation in water. He proceeded to show, by experiment, the difference. He said, chalk and water might be considered an example of mechanical mixture, the fluid had a milky appearance, and by some would be considered in solution. It was not so; most of the chalk would settle at the bottom, if allowed to stand long enough; some would remain permanently suspended, but a very small portion,—the latter was in a state of solution of aggregation, the former only in mechanical suspension. If to the mixture of chalk and water be added a small quantity of spirits of salts, or nitric acid, the chalk would be instantly dissolved, and the water become perfectly clear and transparent. The latter was in a state of perfect solution. Mr. GURNEY now, at some length, dwelt on manures generally, and showed most satisfactorily that *all* were more or less soluble. Amongst the rest he said that stable manure was more soluble than generally supposed. He had reason to believe from experimental trials that three-fifths of the fertilizing properties of fresh stable-manure made in the usual way, were perfectly soluble in water. He had mixed it with water, and filtered the solution very carefully, and found from application of the solution to growing plants, that it contained a large portion of the fertilizing elements. That which remained behind was chiefly vegetable matter, capable of resolving itself into humus, insoluble until it was acted on by fermentation, or the *vis vite* of vegetables. He had, with considerable effect, been in the habit of throwing his stable manure fresh every day over his growing plants, meadow land, and clover leys, and let it remain a few days to be washed by the rain, and then raked off and taken to the compost heap. He had recommended this practice to several of his friends, and had so used it himself, and in no instance had it failed. A gentleman who had often failed in producing a crop when he applied two hundred of nitrate of soda per acre, at once, had never failed when he had divided it into six doses. Similar success had followed the use of guano, where the ordinary quantity had been divided into two parts, and applied at different periods. He here stated, at considerable length, the proportions of soluble and insoluble matters in manures, separately, and distinguished between the quantities and qualities. The quantity respectively was no measure of its amount of fertilizing quality.

A long and interesting discussion followed. At the end of the meeting, Dr. VACEY said he should at the next meeting call attention to the *chemical and physical condition of Bude sand*, and also to that found and

used as manure along the north coast of Cornwall.

The Rev. Mr. WRIGHT said he proposed to follow Dr. Vacey, by a further consideration of manures, if there was time at the next meeting.

The next dinner was fixed for Friday, the 2nd of February, at two o'clock, at the Tree Inn, Stratton. Ballot for new members at half-past one.

After the president had left the chair, several members remained, and with three cheers for their next merry meeting, separated in great good humour.—*West Briton.*

## ON THE IMPROVEMENT OF SMALL FARMS.

BY WILLIAM BLACKER, ESQ., ARMAGH, IRELAND.

(From the 6th number of the Transactions of the Yorkshire Agricultural Society.)

SIR,—Having promised to give you some account of the state of agriculture in the estates of the Earl of Gosford and Colonel Close, which are under my care, I have felt anxious to fulfil my engagement; but the creditable execution of the task you have assigned me, is, by no means so easy as you may have supposed: for, in the first place, it is difficult to enter into details in which you have personally taken an active part; and secondly, when the story comes to be told, there will be found, I am afraid, nothing in it of novelty or of effect, to justify you in laying it before your readers, as having any peculiar claims to their attention. In this latter respect, the blame must rest upon yourself, for I have only been induced by your solicitation to undertake it.

It is unnecessary to enter into any minute description of the prevailing mode of cultivation formerly practised on the properties above-mentioned;—the general characteristics of Irish agriculture, with very few exceptions, still applied to both estates, and the want of manure, and its necessary consequence, a number of grain crops taken in succession, impoverished both the land and its occupiers. Where such ignorance prevailed in regard to the advantage of keeping the land constantly in good heart by a proper rotation of crops, it may naturally be expected, that the advantages of draining should be equally unknown. To remedy these two defects, the want of manure, and the want of draining, without overcoming which any improvement of importance was impossible, and to suggest other alterations in the system the tenants had been pursuing, I addressed to them a small pamphlet,\* in which the benefits likely to arise by following the plan recommended to them, were pointed out in a manner likely to attract their attention; to give some idea of the nature of which I make the following extract upon the subject of increasing their stock of manure, as this is a point which even in the best farmed districts, appears to me to be even now not always attended to as strictly as it deserves. The new light thrown upon draining since then, by Mr. Smith of Deanston's pamphlet, renders any extract upon that subject unnecessary, and, by strictly attending to his directions, the stiffest and most tenacious clay will, by degrees,

and with the assistance of lime, become fit for the growth of turnips, or any other crop.

"The only way to do this is, in my mind, by introducing such a system of agriculture as would bring the entire of the small farmer's holdings into a productive state, in place of allowing nearly the half of them to remain nominally in grazing, but in reality producing nothing. And as this cannot be done without manure, and manure cannot be had without stock, the consideration naturally arises,—How can the greatest quantity of stock be most economically maintained upon your farms, and under what management can the largest quantity of manure be derived therefrom? Now, by referring to the experience of all good farmers in all countries, and under all circumstances, it is ascertained, beyond dispute, that by the practice of sowing green crops, such as clover and rye-grass, winter and spring vetches, turnips, mangel-wurzel, &c., the same ground which, in poor pasture, would scarcely feed one cow in summer, would, under the crops mentioned, feed three, or perhaps four, the whole year round,—by keeping the cattle in the house, and bringing the food there to them. And the manure produced by one of these cows so fed, and well bedded with the straw saved by the supply of better food, would be more than equal to that produced by three cows pastured in summer, and fed in winter upon dry straw or hay, and badly littered.

"Here, then, are two assertions well worthy your serious attention. First,—That three cows may be provided with food in the house all the year, from the same quantity of ground which will scarcely feed one under pasture for the summer; and secondly,—That one cow, so fed in the house, will give as much manure as three fed in the field. I call these important assertions, for if they are really founded in fact, then any of you who may now be only able to keep one cow, would by changing his plan, be able to keep three; and each one of these producing as much manure as three fed in the way you have been hitherto accustomed to adopt, the result must be, that you would have nine times as much manure, by the new method, as you have hitherto had by the old. Now, as I do not think there can be a single individual among you so blind as not to see at once the great advantage it would be to have such an immense addition to his manure heap, it appears to me, that the best thing I can do is, in the first place, to endeavour to impress firmly upon your minds, the conviction, that this fact, so much entitled to your attention, and yet so little attended to, is, in reality, a truth that may be relied on, and may be practically adopted, without any fear of disappointment. It is upon this foundation that the practicability of almost every improvement I mean to suggest in the cropping of your land, must ultimately depend; and it is, therefore, indispensable to the success of any arguments I may offer, to place it before you in the clearest point of view, and remove from your minds every doubt whatever on the subject. To draw the necessary proof, therefore, from what comes under your own observation, every day of your lives, and which must, therefore, have more weight with you than anything else I can say, I refer you with confidence to the exhausted miserable pasture upon which your cattle are now almost universally fed, two or three acres of which are often barely sufficient to keep one cow alive for the summer months, but by no means to afford her a sufficiency of food. Now, one acre of good clover and rye-grass, one rood of vetches, and three roods of turnips, making up in all, two acres, which are now allotted for grazing one cow in

\* This pamphlet has been since extensively circulated in England, and may be had at Ridgway & Co's., Piccadilly, and at Groombridge's, Panyer Alley, Paternoster-row, London.—ED. TRANS.

summer,—taking a stolen crop of rape after the vetches,—will afford ample provision for three cows the year round. For you all know, that an acre of good clover will house-feed three cows from the middle of May to the middle of October; and with the help of a rood of vetches, you will be able to save half the first cutting for hay, to use during the winter; then when the first frosts, about the middle of October, may have stripped the clover of its leaves, the early, sown rape, (which ought to be put in, ridge by ridge as the vetches are cut, and the land well manured), if the seed has been sown by the middle of July, will be ready to cut and feed the cattle until the turnips are ripe. Here, then, you have plainly provision secured until towards the middle of November, and we have to calculate what remains to feed the cattle until the middle of the May following; for this purpose, there is a rood of turnips for each cow. Now, an acre of the white globe and yellow Aberdeen turnip, ought to produce from thirty-five to forty tons per acre: but supposing one half to be of the Swedish kind, let us calculate only on twenty-eight tons to the acre, which is not an unusual produce, even if they were all Swedish, and see what that calculation will yield per day for one hundred and ninety days which is rather more than six months. If an acre yields twenty-eight tons, a rood will yield seven tons, which being brought into pounds, will amount to fifteen thousand six hundred and eighty pounds; and this divided by one hundred and ninety days, will leave eighty-three pounds of turnips for each cow, every day, which, with a small portion of the hay and straw you are possessed of, is a very sufficient allowance for a common sized milch cow; and over and above all this, you have the second growth of the rood of rape coming forward in March and April, which, in itself, would feed all the three cows nearly three weeks.

“Here, then, the facts of the case are brought before you for your own decision; and I fearlessly appeal to yourselves: is it true, that two to three acres, (I make my calculation on two only), are frequently allotted to graze one cow during summer? And again; is it true, that an acre of clover and grass seed, a rood of vetches, and three roods of turnips, with the stolen crop of rape after the vetches, will fully supply food for three cows the year round. I defy any one of you to reply to either of these questions in the negative. The straw of the farm, in any case, belongs to the cattle; but in the latter case, where turnips are provided for food, it is chiefly used for bedding; and the additional quantity of grain which will be raised by means of the increased quantity of manured land, will always keep pace with the increase of the stock, and provide the increased quantity of bedding required. I think, therefore, I am warranted in considering my first assertion proved, viz., that the ground generally allotted to feed one cow, will, in reality, supply food for three; and I have now only to offer some calculations as to the accumulation of manure, which, I hope, will be considered equally conclusive.

“During the summer months, your cow, which is only in the house at milking time, (and perhaps not even then, for the practice is sometimes to milk her in the field), can afford little or no addition to the manure heap, being upon the grass both day and night; and even in winter and spring, whilst there is any open weather, they are always to be seen ranging over the fields in search of food, so that I think you cannot but admit that, upon a calculation for the entire year round, the animal is not in

the house more than eight hours of the twenty-four; and it is only the manure made during this period, which can be reckoned upon; therefore, upon this supposition, which I think is sufficiently correct to show the strength of my argument, if there is any truth in Arithmetic, one cow fed, as I calculated on, in the house, for the entire twenty-four hours, will yield as much manure as three cows that are only kept in the house for eight hours—the quality of the food being supposed the same in both cases. And this would manifestly prove my assertion, viz., that one cow fed within, would give as much manure as three fed without; and therefore, when three can be kept in the one way, as I have already shown, for one kept in the other, it is as clear as three times three make nine, that the result of the calculation will be just as I have stated, viz., that the farmer will obtain, by the change of system, nine times as much manure in the one case as he would have had in the other.

“Now, if after all that has been said, (which seems to me, at least, quite convincing), any of you should be so astonished by the quantity of the manure thus proved to be gained, as still to have some misgivings on the subject, and be inclined to think that matters would not turn out so favourable in practice as I have shewn in theory, I would wish any such person to consider one very material point which I have not yet touched upon; for in the foregoing, the argument is founded entirely on the time the animals are kept within, viz.; it is stated, that one cow, kept within for twenty-four hours, will give as much manure as three cows which are only kept in for eight hours; the food being assumed to be the same in both cases; but it is quite evident, that if the cow kept within, should be fed with turnips, and bedded with the straw which the others are fed upon, leaving them little or no bedding whatever, that the calculation must turn decidedly in favour of the animal which is well fed and bedded, both as regards the quantity and quality of the manure; so that it appears the estimate I have made is decidedly under the mark.”

From the foregoing extract, it will at once be apparent, that my object was to introduce the Flemish system of agriculture as nearly as practicable. I claim, therefore, no merit for having made any new discovery in agriculture; and the only credit I can take to myself is, for having devised a plan of bringing into *practice*, what had been long previously urged in theory without any successful result. The means which I adopted for this purpose, were first to secure the services of an intelligent agriculturist, accustomed to the practice of the best farmed districts in Scotland, and thoroughly acquainted with the most improved cultivation of green crops, cleaning the ground, and every operation of the farm, and the management of every necessary implement. This person's duty was to go from farm to farm, and to point out what was wrong in the system pursued, and shew what ought to be substituted in its place. It will appear, perhaps, almost incredible to many of your readers, who may be accustomed to farms of 500 to 1000 acres, of which there may be ten, fifteen, or twenty, in a considerable estate, to hear that there are upon the Gosford Estate, more than 1000 tenants. Of course, it may be easily imagined, many held very small farms of five to ten acres; and that many occupiers of these small holdings, cultivated in the manner described in the commencement of this letter, must have been in great poverty, and many unable to pay their rent when due. To such as these, the

agriculturist's visits were first directed, with power to supply whatever assistance was necessary, either in manure, seeds, or money, to enable the tenant to follow his instructions if so disposed.

People who could not well be worse than the state they were in, were naturally inclined to try any plan that promised to make them better; and accordingly, considerable numbers were induced to make trial of the new plan of proceeding; and the success attending the change being very soon plainly perceivable, persons in more independent circumstances, gradually followed in the same track; commencing with the sowing of clover, which had previously been little known, having been almost universally sown where the ground was exhausted, and of course produced no crop, so that it was generally supposed to be quite unsuited to the soil and climate; but when it came to be sown with the first grain crop after the manure, the contrary was soon proved, and the superior produce of land under clover, cut and given to cattle in the house, when compared to the scanty pasture afforded by worn out ground, soon brought this crop into general use: the manure was increased, and the succession of one corn crop after another, was, in a considerable degree broken through.

The introduction of turnips was a matter of great difficulty. The manure, though increased, was still hardly sufficient for the growth of potatoes required by the population; and it was only by slow degrees, that even a few, by increasing a little every year, were brought to cultivate as many as afforded sufficient winter feeding for their cattle; and notwithstanding the decided proof given in every such case, that the more turnips cultivated, the more potatoes they were able to grow, even this was insufficient to induce the universal growth of this crop; and even amongst those who had actually experienced the benefit of its cultivation; it was no uncommon thing, if they had any pressing demand, to portion a daughter, or send a son to America, or whatever might be the occasion, for them to put all the manure they had acquired, under potatoes, as being the more marketable commodity, and with the most complete disregard to future consequences, to give up the growth of that crop to which the accumulation of their manure had been owing. There were not, therefore, wanting numberless instances of such a nature as to try the temper, and almost weary out the patience of any one, however well disposed or anxious he might be to benefit them.

Still, however, there were some, whose good conduct and improving circumstances gave encouragement to persevere; and the statements of persons of this description, at the Market-hill agricultural meetings, where they naturally carried off the premiums offered by Lord Gosford, excited, when published, a degree of attention from the public, which plainly showed the interest universally felt in the success of every plan, holding out the most distant prospect of improving the condition of that numerous and interesting class, the small farmers of Ireland. But, in proportion to the interest thus felt, the public expectation has been raised, and the idea has been taken up, I am afraid too generally, that the improvement of all the tenants in the estates in question, must be pretty nearly, if not entirely corresponding with that of the premium men, whose statements were published, which is certainly by no means the case. I cannot blame myself, however, with having ever countenanced this belief; having been careful,

whenever opportunity offered, to state the contrary. At one time, I certainly was so sanguine as to think, that the value of the turnip crop had been so fully understood by those who had tried it, that no danger of its abandonment, by the most inconsiderate, any longer existed; and I look forward with confidence, to its becoming in a short time universal. But having now been unable, from bad health, for three years in succession, to pay the same attention as formerly, I find that great numbers have during that period, fallen off, and from the cause stated, namely, the desire of raising a sum of money at once, have, as at first, been induced to apply their entire stock of manure to their potatoe crop. At present, however, the deterioration of their own circumstances, and the improvement in the circumstances of those who steadily pursued the plan they had adopted, appears to me to have worked a salutary conviction of their error; and from what I can perceive, the turnip cultivation will be augmented this year, with better prospects of permanently establishing itself than ever, as it seems now to proceed from a sense of the advantage from having the crop, and the loss sustained by not having it, arising from their own experience and observation, which they never generally possessed before, and the introduction of guano manure, has come opportunely in aid to render an increased cultivation practicable.

It will, no doubt, surprize many of your readers, to learn the difficulty of introducing the cultivation of a crop without which they themselves think it would be impossible for any farmer to attempt to hold land. But the extensive demand for potatoes, as being the chief food of the population, when duly considered in connexion with the character of the people, which is remarkable for an undue preference for present gain, whatever may be the risk of future loss, will readily account for what would otherwise be found hard to imagine. But notwithstanding all the difficulties which stand in the way, when I see the improved circumstances of those who have steadily persevered and the number who, from observing this, are gradually taking it up of their own accord, throughout the neighbourhood, I feel certain, that the general introduction of this crop, is but a matter of time; and that, in a very few years more, it will certainly become general; and I feel convinced, that by the use of the same means, any other agricultural improvement may be brought about; and without some such means being taken by landlords to enlighten the minds, and improve the habits of their tenantry,—*the spread of improved cultivation will be slow indeed.*

The attention of landed proprietors in England seems at present beginning to be turned to *this fact*; and wherever the plan I have advocated has been tried, its success appears much more rapid than here from the absence of those opposing causes to which I have alluded; and as there are many parts of the south and west of England, and even Scotland, where much improvement is wanting, I cannot help strongly recommending the appointment of an agriculturist in all such cases, as the most certain means that can be adopted for the general improvement of the country.

I have restricted my observations, in the foregoing, merely to the introduction of clover and turnips, as they are the crops which form the chief sources of house-feeding the stock, and securing that supply of manure, without which land can never be made productive, nor farming profitable. But the use of the agriculturist is not confined to one crop or the other, but extends to every operation of the farm. The im-

provement in ploughing,—the extirpation of weeds,—the squaring and enlarging of the fields,—the use of proper implements,—the economy in the employment and feeding of horses,—and above all, the effectual drainage of the land. In all these respects, the introduction of an active agriculturist, well supported by the landlord and agent, will improve the practice and habits of the tenantry in any unimproved district, more in ten years, than would take place in a hundred, if things were left to take their own course.

Where I to go into greater minutiae than I have done, I should exceed the bounds suitable to a publication like yours. Even in this hurried sketch, I fear I may have already overstepped the limits which I ought to have confined myself to, and I hasten to conclude by subscribing myself, dear sir, yours truly,  
WILLIAM BLACKER.

Armagh, March, 29th.

REPORT OF AN EXPERIMENTAL TRIAL OF SIX VARIETIES OF PRIZE WHEAT.

By Mr. JAMES WALDIE, Millisle, Wigtownshire.

Having, by permission of the directors of the Highland and Agricultural Society of Scotland, obtained, through their seedsman, Mr. Lawson, five varieties of seed wheat, being portions of those which gained the society's premiums at Edinburgh, in October, 1842; and having also, with the view of following up more fully and accurately the tenor of the suggestions of the judges (who awarded the premiums), procured a quantity of Hopetown, or what is here called Hunter's improved wheat, direct from Haddington market, in order to test the whole with more minuteness, as being all procured from the same part of the country, and raised in the same climate, and that also in preference to any of the other varieties which have been grown one or more years in this district; and which latter, from various experiments made by the writer, have been found not so safe a criterion to calculate upon a comparative trial as the seed procured from the Lothians, for the changed seed invariably produces a better return, and generally ripens a few days earlier. With these preliminary avancements, I proceed to detail the ultimate results.

Four of the varieties, viz., Chidham, Danzig-woolly-eared, Pearl, and Hopetown, were white wheat, and the Belgian-new-red and Blood-red, as their names indicate, were red wheats.

Twelve adjacent ridges of land were ploughed for the comparative trial, and two contiguous ridges of twenty-one feet each in width, and equal in all respects, were allotted for the sowing of two bushels of each variety, on a thin, light, clay soil incumbent on a porous subsoil, and comprehending an area of two roods and eighteen poles imperial—the preceding crop having been potatoes, and manured with a mixture of the dung of horses, cattle, and pigs, coal-ashes, and a little sea-weed, all carted from the village of Garlieston, and applied thereto at the rate of twenty-five tons twelve hundred-weight per imperial acre.

All the wheat were sown on the 17th of November and harrowed under the same circumstances; and all the varieties braided equally on the 9th December, but the woolly-eared and Hopetown, for some weeks after, scarcely exhibited so rich a verdure as the others, which appeared without any distinguishable difference.

It was found, however, in the course of the ensuing spring, that the two red did not tiller so well as the

white wheat, and especially the Blood-red, which retained a thinness throughout, particularly on the sides of the furrows. Had the soil been more tenacious, the red wheat would, in all probability, have succeeded better.

With respect to coming into flower, a chance head of all the varieties of white wheat could be seen shooting into ear by the end of June; still none of the kinds alluded to could be said to be in ear till the 1st of July, when all the white were pretty regularly shot out; and the weather being peculiarly favourable, nearly the half of the ears were in flower, but those of the woolly-eared appeared somewhat to predominate; while at the same time, a decided lateness in the red varieties was strikingly perceptible, and ultimately, the Belgian proved to be seven days later in coming into flower than the white varieties, and the Blood-red four days later than the Belgian.

After the middle of July, the weather proved wet and ungenial, during which period rust was strikingly apparent on the heads of the woolly-eared, while the Pearl seemingly altogether escaped; though on the Chidham and Hopetown, a very slight tinge might be said to be discernible. The red varieties were not in so forward a stage as to exhibit rust till the weather again cleared up very opportunely; but it was abundantly evident that in the event of a continuation of humidity for a few days longer, the woolly-eared would have sustained irreparable injury. Hence it is obvious that, while woolly-eared wheat will, in all probability, yield a good crop in a favourable season, it is, notwithstanding, a risk to cultivate such a variety in a moist and versatile climate.

In point of ripening, the woolly-eared was ready for the sickle on the 25th of August, but the Pearl, Chidham, and Hopetown, were not ready till the 1st of September. From the time of coming into ear, the Hopetown appeared to lag some three days behind the Pearl and Chidham; and the heat having become intense, these three varieties were all ready and were cut down at the same time. The red varieties, from the last-named cause, also ripened quickly, and were ready for the sickle on the 4th of the same month.

A continuation of fine weather enabled each variety to be stacked and thatched separately in excellent order.

The final results of the return, after being lately thrashed and dressed, are herewith annexed:—

	Weight per bushel.		Weight of marketable Grain.		Weight of Drawings.	Weight of Straw.
	lb.	oz.	imp. st.	lb.	lb.	imp. st.
Chidham . . . .	63	13	84	13½	29½	162
Pearl . . . . .	63	7	85	11½	23	161
Danzig-woolly-eared . . . . .	59	13	84	8	48½	160
Hopetown . . . .	61	8	93	12½	27½	174
Belgian, new-red . . . . .	60	4	80	5	13¾	146
Blood-red . . . .	61	7	78	13½	26½	121

From the circumstance of the Blood-red having been thinner on the ground than the other varieties, it sustained more damage from game; and it may be safely calculated that half a bushel of grain was destroyed, from that cause, more than on the other ridges, which were also partially damaged. Portions of the above-named varieties of wheat were sold through a commission-agent; and it may be remarked that all the white varieties exhibited fine samples, and a portion of each separately brought 21s. per thirteen imperial stones at Whitehaven. The two red varieties

only brought 18s. 6d. for the same weight. The white found purchasers for seed, and the red for grinding.

In conclusion, my impression is, that Hopetoun (or Hunter's) and Chidham are the varieties best adapted for the climate of Wigtownshire, which is mild and moist—the two former as being most productive in point of yield, and the latter, like the other two, not being apt to lodge, and as producing a finer sample, and consequently more likely to sell for seed in the proper season.—*Quarterly Journal of Agriculture.*

### ON THE SOLUTION OF BONES IN SULPHURIC ACID FOR THE PURPOSES OF MANURE.

By THE DUKE OF RICHMOND.

(From the Journal of the Royal Agricultural Society.)

To Ph. Pusey, Esq.

MY DEAR PUSEY,—I have not yet received the details of the experiments tried by the Morayshire Farmers' Club with sulphuric acid and bones, but I know that the result has been most satisfactory. On my own farm, which is light sandy soil, I tried one acre with it, another with guano, and a third with stable-yard dung. Early in November I had a quarter of an acre of each drawn and weighed: the heaviest crop was from the land manured with the sulphuric acid, though it did not cost me above 11s. or 11s. 6d. an acre.

I understand also that the turnips came into rough leaf sooner on that acre than on any of the others.

Believe me, yours sincerely,

London, Dec. 9, 1843.

RICHMOND.

#### NOTE.

The experiment contained in this letter bears out those of the Morayshire Farmers' Club, the details of which appeared in the last Journal, and affords good hope that this, the most important saving which was ever held out in the use of manure, will be found generally applicable. For those details I must refer to that paper, merely mentioning now, that in one trial a bushel of bones, to which sulphuric acid had been applied, exceeded in its effects six bushels used in the common way. As this is the first instance, I believe, in which chemistry has assisted practical farming, it may be interesting to examine the theory on which this application is founded. Bones may be roughly stated to consist of fat, of jelly, and of an earthy matter, called phosphate of lime. When they were first employed as manure, it was doubtful, of course, to which of these substances they owed their beneficial effect, and many persons were unwilling to purchase bones which had been boiled, and had consequently lost their grease. It was soon found, however, that boiled bones were as good manure as those that were unboiled. There still remained in the boiled bones two substances, either of which might be their active principle. But Sprengel states that he found bones which had been not only boiled, but burnt, still act as manure; and Mr. Hannam has tried the same experiment with the same result. Now as fire drives out of the bone the solid jelly which holds it together, there remains only the earthy matter behind, thus proved to be the manuring substance. This being phosphate of lime, chemistry suggested

that since the lime was in so small a quantity, the phosphoric acid united with it must be the true manure contained in the bones; and that if the lime were taken from it by sulphuric acid, the phosphoric acid thus set free would be greatly strengthened in its immediate activity. This the Morayshire farmers carried last year into effect, and the Duke of Richmond in the present year, the result wonderfully according with the predictions of chemical science. We cannot even now regard this discovery as completely established; but as it promises a very great saving to farmers who buy bones largely, I hope that the hint will be followed up until certainty has been attained. Hitherto the dissolved bone, or gruel, as one farmer calls it, has been mixed with large quantities of water, and applied as a liquid manure; but the use of any liquid manure is so laborious and inconvenient, that I should greatly prefer, as a trial at least, to mix the dissolved bones with some dry earth or ashes, which might be used by the ordinary method of drilling.

PH. PUSEY.

### DISTRESS FOR RENT.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—Your paper is *sui generis*. It stands alone as the organ and advocate of the tenant farmers. So mixed up are the agricultural journals with the patronage of the local landlords generally, that when a question arises in which there are adverse and conflicting interests, it is very difficult, almost impossible, to get a fair field and no favour to advocate the claims of tenants. In one sense, and looking theoretically, it ought to be so. The interests of tenants and landlords ought to be one and indivisible; but, unfortunately, in practice it is often otherwise. No doubt there are many landlords, I hope a large majority, who do consult the interests of their tenants as well as their own; but the minority is sufficiently large to render it necessary that tenant farmers should have a champion, powerful, intellectual, and persevering, to advocate their claims. The circumstances of the present time are eminently propitious to speak out in favour of the tenants, for without their assistance the common enemy must have prevailed, and one of the certain results of the triumph of the leaguers would be an universal reduction of rents. The tenant farmers have fought, and successfully, in favour of protection—the landlords would have been utterly powerless without them. They have fought for the existing corn laws, and with the existing corn laws for the existing rents. Gratitude, justice, nay, expediency demand that if there be any serious grievances under which the tenants labour, the landlords should now redress these grievances. The greatest grievance is, undoubtedly, insecurity of tenure—the want of leases securing to them the profits of their improvements, and of their expenditure in enriching and rendering more productive their farms; but there is another grievance nearly akin to it, and almost equal in injurious effects—viz., the present law of distress for rent.

All landlords cannot be angels; and even if they were, they would not be free from the misrepresentations of stewards and others. Irresponsibility is a dangerous thing, and it is neither just nor wise that it should ever exist in the relations of social life. Neither landlords nor any other class of men should have all power on one side, without those who are eventually interested having some check on the other. Our ancestors thought so who fettered the monarchy with

constitutional ministers, whom they made responsible, and without whom they would not permit the monarch to act; who made the legislation of the aristocracy powerless without the consent of the Commons; who gave the subject a Habeas Corpus, to prevent all wrongful imprisonment; and who demanded and obtained the great charter, that no freeman should be taken or imprisoned, or disseized of his rights, privileges, and franchises, without the verdict of a jury of his peers, and the law of the land.

Now, how squares the law and practice of distress for rent with those principles? The landlord can seize and sell, and utterly destroy the tenant, paying himself all, and giving other creditors nothing, and no hope or possibility of ever getting anything whenever a default of payment of rent occurs. There may be bad seasons, the tenant cannot help it—there may be inadequate prices, the tenant cannot help them—there may be a thousand disappointments from the bad faith of others, which the tenant cannot help; yet no matter what may be the cause of the tenant's temporary inability to meet his rent—no matter what he may have sunk in the soil, to be returned, as he hopes, after many days—he can be sold up, laid prostrate, and ruined, at the sole will of a present or absent landlord, or a knavish, selfish, or prejudiced steward.

Farmers' clubs ought, I think, to take this matter up; they should protect themselves by inducing parliament to alter the law of distress for rent upon tenants at will. Those who have leases have some chance of repairing their hard fortune by subsequent years; tenants at will have none—when sold up the latter are turned out.

—“The world before them, where to choose  
Their place of rest, and Providence their guide.”

Gratitude, justice, humanity, demand that this state of the law should not continue. Landlords should not, in such cases, be permitted to distract for more than one half-year, and come in for the remainder of their claims *pari passu* with all other creditors. The present power of distress is fearful, awful, and most unjust. It is not wise to have “a giant's strength,” any more than it is equitable “to use it like a giant.” You, who have battled so long and so ably for the tenant farmer, will not refuse to allow your influential and impartial journal to bring this monster grievance before the world, and by so doing you will not only confer a great benefit upon tenant farmers, but also especially oblige your sincere admirer and constant reader,

CINCINNATUS.

Yorkshire, Feb. 8, 1844.

### COMPARATIVE TRIAL OF MANURES WITH TURNIPS.

By MR. JOHN HOGARTH, OF AKELD, NEAR WOOLER.

The first trial was made on a light gravelly soil, incumbent on sand mixed with gravel. The turnips were the imperial yellow, and, as they suffered much from mildew, were an inferior crop. Indeed, as far as my experience goes, this kind suffers most of any from this disease.

Manures.	Quantity per acre. tons. cwt.	Cost per acre. £. s. d.	Produce per acre. tons. cwt. sts.
Guano . . . . .	0 4	2 5 0	14 1 6
Pigs' manure, at 3s. 6d. per ton..	12 0	2 2 0	14 0 6
Compost, at 1s. 11d. per ton..	16 0	1 11 3	14 3 4

Being resolved to have the soil as similar as possible, I had the manures placed in twelve adjacent drills, taking forty square yards to each lot of ground.

The guano was mixed with equal parts of fine river sand. The pig manure with equal parts of ashes obtained from the servants' depôts. The compost was of a more complicated nature; but as its constituents are attainable in every situation I shall give the method and expense of mixing them.

Cost of carting 14 cubic yards of mould, road-scrappings, ditch-scourings, or any earth free of stones . . . . .	£0 5 6
Cost of 1½ stone of salt (rock or marine), per cubic yard of earth, 14 yards, at 5½d. per yard. . . . .	0 6 5
Cost of 7 cubic yards cow, horse, or fold dung, at 2s. 6d. per yard. . . . .	0 17 6
Cost of turning 21 cubic yards of earth and dung, and mixing them intimately, which 21 yards weighed about 16 tons. . . . .	0 1 10
	£1 11 3

In future, I propose using the dung in equal parts with the earth, thereby saving the expense of laying it on the drills, and of using about twelve or thirteen tons; and I purpose also of increasing the quantity of salt to two stones per cubic yard.

A trial was also made with Swedish turnips upon a gravelly loam, incumbent on a strong subsoil mixed with stones.

Manures.	Quantity per acre.	Cost per acre. £. s. d.	Produce per acre. tons. cwt. sts.
Guano . . . . .	2 cwt.	2 12 5	24 6 1½
Dung salted. . . . .	9 tons.		
Bone-dust . . . . .	1 qr.	2 19 11	23 2 6½
Sulphuric acid . . . . .	40 lbs.		
Dung salted. . . . .	9 tons.		

The guano cost 11s. 3d. per cwt.; dung, 3s. per ton, exclusive of salt; bone-dust, 20s. per quarter; sulphuric acid, 3d. per pound. The quantity of salt, one stone per cubic yard; carting, about 2s. 11d.—*Quarterly Journal of Agriculture.*

### GREAT AGRICULTURAL MEETING AT MARKET-HILL.

(FROM THE NEWRY TELEGRAPH.)

SIR,—In compliance with your wish, I continue, as formerly, to send you the account of the Earl of Gosford's Farmer's Dinner, which took place on the 6th December 1843. His Lordship presided in person, and very judiciously desired that all cheering, except were particularly ordered, should be dispensed with, and all complimentary toasts should be excluded which did not in some way appear connected with the objects of the meeting, which were all of a practical nature. I observed, also, upon this occasion, that the guests were of a more practical character than on any former occasion, including D. R. Ross Esq., M.P. for Belfast, one of the largest sheep farmers in Ireland; R. B. Tennent, Esq., a Scotch gentleman, who wished to take this opportunity of making himself acquainted with the system of farming here, preparatory to following the profession of a land agent, or factor, as it is termed in Scotland; Mr. Murphy, Editor of the *Farmers' Gazette*; Mr. Skilling, manager of the model farm, Glasnevin;

Mr. M'Kean, of Ballyharridan; Rev. Mr. Kirkpatrick, of Ahorey; Mr. Nathaniel Greer, of Ballynalinch, near Richhill; Mr. Moody, of Lisseraw; Mr. M'Ewen, of Killaboda, and a great many others from the adjoining estates; besides Mr. M'Kee, of Markethill, Mr. Blacker, and the principal tenants and premium men upon the Gosford estates—all men able to give, and anxious to get information; and your readers will find, on perusal of this report, they will not be disappointed in any expectation they may have formed of meeting with valuable and useful matter, however high those expectations may have been raised.

Dinner being over, his lordship gave the usual toasts, and then called on the judges to read their decision in regard of the several prizes which were competed for, after which,

His Lordship called on Mr. Blacker, as the business of the premium list was disposed of, to open the discussion of the different subjects which had been selected for the evening.

MR. BLACKER—Mr. Lord—The subject which stands first on the list is the collection and preservation of farm-yard and liquid manure, and the nature and effects of guano, as an assistant thereto. The collection and preservation of manure is a matter which I have often taken occasion to press upon the attention of the small farmer, and my only apology for so doing again is, that I am afraid before us are many yet who have not given the subject the attention it deserves; and until this effect is produced, it must be admitted that I am not only justified but that I am imperatively called upon, again and again to direct attention to this matter, which is certainly one of great moment, and yet in general very little thought about. To put it in a point of view which may perhaps excite some little interest, I may, I hope, be allowed to mention that, as a magistrate, I have been frequently called on to put the law in force against sundry unfortunate creatures, it may be, reduced almost to starvation, who have been caught breaking into a potatoe pit, and the owner calls for the utmost punishment the law can inflict upon the poor wretch who has thus been robbing his children of their subsistence. But though he is indignant at seeing others *carrying away* the potatoes which he intended for the support of his family, how is he less criminal himself when he stands by and sees the *manure carried away*, without which his future supply of this necessary food cannot be raised? Nay, he is perhaps the most inexcusable of the two; for the poor wretch may be driven to carry away his potatoes by distress, whereas, he stands by with the utmost indifference looking on, whilst the rain, the wind, and the sun are carrying away one-third or perhaps one-half the strength of his manure heap. If the people who act thus would ask their wives whether they would give as much for the tea leaves they have wet three or four times as they would for that which had not been wet at all, they would be told, that the best tea after being wet two or three times is good for nothing. What must be the effect then on manure that is wet two or three hundred times. I maintain, that every man who has his manure heap on the slope of a hill, where the rain, and the water from the roofs of his houses, after every shower, runs through it, is guilty of this charge and is robbing himself and his children of perhaps a great many more potatoes than the poor person has done whom he prosecutes. Again, I say that a man is robbing himself and his family in like manner, who lets his cattle range about in search of food, in place of giving them their food in the house. There can be

nothing more clear in arithmetic than this, that one cow fed in the house for the whole twenty-four hours, will make as much manure as three cows will do that are only kept eight hours in the house, which is as long, in the average, as cows are within, where there are no green crops. This is just as clear as that three times eight make twenty-four. Another way in which a man may rob himself and his family, is by allowing the liquid manure to be lost, in place of keeping it closely corked up, as it were, in a tank, or applied to enrich his manure heap or compost, and as it escapes, to catch it again and again, and always throw it on the top, and let it sink down through the mass, in place of running merely at the bottom, and perhaps flowing on a patch of ground below it. Again, a man robs himself and family, who carts out the manure in the potatoe planting season, and leaves it perhaps for one or two days exposed on the ridge, before it is covered, to sun, wind, and rain, until it loses half its value. There are so many who are faulty in this respect, that I think I can scarcely do a greater service than call attention to it. Nevertheless, I am happy to say, there is ten times as much care taken now in this respect as there was ten years ago; and even flax water is beginning to obtain the notice it deserves, and people are beginning to either water their crops with it, or put earth into the flax-hole, or what is much better, pour it on a heap of compost, where the rain water will not run through it. As to guano, I am inclined to think very highly of it, but cannot yet speak decidedly as to the length of time it continues to operate, but so small a portion can scarcely be expected to have such a permanent effect as farm-yard manure. I have experienced, however, in Baleek Park, that it has given a good crop of oats, and also a good crop of flax, both on ground manured with it last year for potatoes. It has been proved, however, to give excellent crops of turnips, by means of which it will produce farm-yard manure in abundance. Many persons have been induced to apply it in too large quantities. I should say  $1\frac{1}{2}$  lb. to 2 lbs. to the English square perch, according to the state of the ground, was sufficient, and the crop should be put in early, so as to give time for the root to swell. If late sowed, or too large a quantity used, it appears to me to force too much to tops. Half-and-half with dung and bones, appears to me best, but experience will soon teach us what method to take; but I should wish to propose for trial the mixture of a portion of common salt. In some late experiments, one cwt. of guano mixed with one cwt. of salt has been found very nearly equal to two cwt. of pure guano; and chemists affirm that a portion of salt will correct the fault of forcing the plant to leaves, and contribute to enlarge the root.

Mr. Blacker having concluded, his lordship gave "The health of Mr. Skilling, who has acquired so high a reputation from his management of the model farm at Glasnevin, under the National Board of Education."

MR. SKILLING gave to Mr. Blacker a statement as to the management of manure, which will be found in the appendix; and said, national as well as local societies consider it bad to be wedded to any system of agriculture not beneficial to the farmers, and I have always myself endeavoured to adopt that which makes the most money. Having looked around the world, I have found that house-feeding is the best system to pursue. It was first promulgated by Mr. Blacker, to whom the country is more indebted, for its agricultural improvements than to any other man living at the present day. It is one of the most important of modern discoveries, and if not successful it is not his

fault. When I adopted the house-feeding system my neighbours laughed at me, and predicted that my cattle would die; others said the cattle would give no milk; but their predictions were not verified. I lived near to a village, through which I led my cows twice a day to water. They had a good appearance as they were well fed; and they ran through the village wild and full of spirit. I fed them on mangel wurzel, and when other cows were dry mine were giving milk. During three years I kept three cows, and sold £6 worth of butter each year from each cow, besides having a sufficiency for a family of six persons. The National Board of Education determined that, together with a literary education, they would also teach agriculture, and I was fortunate enough to be employed by the Board, and brought from a farm of  $4\frac{1}{2}$  acres to one of 62 acres. I have placed before the world the established system in its full beauty—got a cow-house erected, and kept my cows in it. When I took the land in the neighbourhood of Dublin, I did so under disadvantageous circumstances, but the contiguity of the market equalised the value of the land. The farm was taken at £5 per British acre. I immediately adopted the system spoken of, and offered to the Board to pay the rent of the farm and keep a ploughman for the purpose of instructing the pupils. My rent is £257 7s. 8d.; general expenses from £150 to £200 per year, making in all an expense of about £400 for 50 acres and 20 perches. I keep 16 cows, which, on an average, make me £15 10s. per year, each. I have estimated correctly that a cow fed in the house will make 25 tons of liquid manure, which will be sufficient for an acre of ground. I can, on an average, keep a cow on every two British acres of land, if no horses are kept; but if horses are kept, it changes the ratio in the same proportion as Irish to English acres. Such are the advantages that accrue from the system of house-feeding. There may be difficulties in keeping cattle in houses, but people should have patience, and not let difficulties overcome them. The advantages that arise from house-feeding are, a larger quantity of manure and much more milk; and such being the case, it would appear strange that men should continue to practice the old plan, eventually bringing discomfort to themselves, and ruin to their families. But it may be objected, that in a very large farm, say 1,000 acres, how may a cow-house be erected sufficiently large to accommodate so many cattle as would be necessary. But the difficulty can be easily obviated. Let a number of cottages be erected on the farm, and beside them let cow-houses be built, so that the persons residing in the cottages can take care of the cattle in the houses next to their own. Let the young cattle be in one house, the milch cattle in another, the fat cattle in another, and so on, and it will be found at once that the system is quite convenient, and as applicable to a large farm as a small one. When my present farm was in pasture, I have ascertained that it pastured eighteen cows in summer, but now it feeds sixteen cows and three horses, all the year round, and I have as large a proportion of grain crops on the same land as most other people besides. An animal used to pasture is brought into the house and tied up, perhaps injudiciously confined—is kept filthy—not regularly cleaned—a large quantity of some particular kind of food is thrown before it, and this repeated, cloy the appetite, and the animal becomes satiated, and refuses its food. It is perhaps neglected in water—by and by it loses milk—gets out of condition—and the whole experiment is a failure. Success, therefore, is only se-

cured by skill and attention. Cows that are properly house-fed must get altogether another kind of treatment. The house itself must be airy, well ventilated, and kept perfectly clean. The animals must be well curried and brushed, at least twice a day. There ought to be one particular person to superintend and pay attention to the feeding, and one of the first and most important parts of his duty is to ascertain the appetite of every beast. Cows, like other animals, will eat less or more, and they ought to be supplied accordingly as they require it, being kept rather with an appetite than otherwise. As soon as the animal has eaten its food, all refuse should be immediately taken away, and nothing suffered to remain in the stall before it. Should it seem delicate, or careless in eating, let the food be at once removed, and if in health it will be anxious for the next feed, if not, you may consider there is something the matter with it, and take steps accordingly. This is one of the great advantages of house-feeding. An animal at pasture may be far gone in disease, indeed, past recovery, before it is observed; but in the house you perceive the first symptoms, and can apply the remedy in time. The times of feeding are also of great importance, and ought to be strictly observed and regulated. The cattle will know the hour of feeding as correctly as the clock tells it, and will be disappointed and fretted if neglected. This neglect is prejudicial both to milking and fattening. The kinds of food given is also of the utmost consequence. No matter how nutritious, there ought to be a variety—a change if possible for every feed. I shall simply state a mode of feeding which I have found eminently successful; I give six feeds in the day, summer and winter, beginning at six o'clock in the morning, and ending at nine in the evening, viz., at 6, at 8, at 12, at 3, at 6, and at 9. They get water in their stalls at 10 in the morning, and at 5 in the afternoon—they are likewise turned out one hour, from 10 to 11, where they exercise and drink if they choose. The kinds of food I use are chiefly the following:—in summer, at 6, feed with perennial or Italian rye grass and clover; at 8, with cabbages or leaves; at 12, with cut hay and straw mixed (this feed is to prevent the action of too much green food on them; a cow in health ought never to be purging; if she is, both milk and flesh are running off); at 3, upon vetches; at 6, upon mangel wurzel leaves, rape, cleanings of ditches, or other refuse of the farm or garden; at 9, clover or grass, or this may again be a dry feed, if the state of the bowels require it. In winter, at 6, first feed with steamed food; at 8, with turnips raw; at 12, with cut hay and straw; at 3, with mangel wurzel, raw; at 6, with steam food; at 9, with hay and straw; water must be given, or offered, and plenty of salt used in the steamed food.

Mr. Skilling having concluded, his Lordship gave "The health of Mr. Ross, M.P. for Belfast, and the other visitors who had honoured the meeting by their company."

Mr. Ross, after returning thanks, concluded by proposing, in terms as complimentary as they were well deserved, "The health of their Noble Chairman, the Earl of Gosford, the patron of the Market-hill Farming Society."

His lordship briefly replied.

Mr. Blacker then called on Mr. Small, as the successful competitor for the best tillage farm, to state his practice in regard to manure.

ALEX. SMALL, of Shanecracken, said—I am a plain farmer—I am indebted for a simple plan by which I

am able to double my usual quantity of manure. At a convenient place in my yard I sunk a pit, paved in the bottom, and secured it all round, so as to prevent any liquid from leaving it. This pit holds about 50 loads—into it I put all the rough manure from the cattle, and gather all the weeds from my farm, and over every 5 or 6 inches of dung and weeds I put a light covering of good soil, to prevent evaporation; and into this pit I have conducted by paved channels, all the liquid manure from the cattle and farm-yard. This pit has occasionally to be emptied to the dung-hill. I prefer this simple plan to using a tank for liquid manure alone, as it enriches and rots all the rubbish and weeds I can gather, and I have as much dung at November as I formerly had at the May following.

Mr. RENNOX was then called on, and said—Having made some experiments with guano, and comparing it with farm-yard manure, I find the guano to have the most produce. We sowed Swedes on it the 14th of May, and had 41 tons to the acre; and the same kind sown at the same time on farm-yard manure produced only 38 tons to the acre. We also sowed Dale's Hybrid, the 16th of May, and the produce was 43 tons to the acre. We sowed the same kind later, about the 24th of June, and the produce was 38 tons to the acre. Those were both sown on guano; and, from experience, I find that it agrees best with early sowing, as the late sowing grows most to tops, and the bulbs small. All those turnips were weighed tops and roots. We put at the rate of 3 cwt. to the acre, mixed with five times the quantity of ashes. The soil that those turnips grew on was all alike. It has also a good effect on top-dressing, but it would require to be used in this way in damp weather, for in dry weather it is liable to rise. I have this year applied 5 cwt. of guano to my turnip crop, and I must confess that my faith was weak concerning it. I put it on in the following manner:—On one part I put one-half dung and one-half guano, which grew the turnips very large, on another part I put about 3 cwt. to the acre, which grew them still greater to the tops; on another part about 5 cwt. to the acre. On this last lot the tops were extremely large, but I think the bulbs were lesser sized. I do think the best system of applying guano is, to mix one-half of farm-yard manure with one-half guano, and to have the turnips sown as early as possible.

Mr. BLACKER having introduced the subject of guano, said, Mr. Byers, of Mowhan, Mr. M'Clinchy, J. Gillilan, and several others present, were witnesses of its efficacy, as a manure. The company seemed quite satisfied in regard to it, both as a top-dressing for clover and meadow, in spring, bringing the former a fortnight earlier, and much heavier than it otherwise would be; and also for every other crop with which it had been tried. Mr. B. then alluded to liquid manure, and called on,

Mr. HERD, who said:—I have tried liquid manure in different ways. In the first place, I applied it on old meadow land, which gave little or no grass, and what was of a very bad quality. The manure being put on in the winter months, every fresh watering made the meadow look green, and in the mowing season there was double the quantity of hay, which was altogether changed in quality from what it was before, as was also the aftergrass. I applied it on a clover field, in the winter months, and I mowed the first crop for the cattle on the 28th of April, immediately after applying the liquid manure. I mowed the second cutting on the 2nd June, still applying the manure after every cutting, until I cut the same

part four different times. There was some pasture afterwards on both parts of the field. I tried it on the heracloum, but the quantity being run out, there were seven yards of a drill got none, and the difference of that part from the rest of the crop was very apparent.

Mr. BLACKER said:—My Lord,—The next subject in the list for discussion is the proper rotation of crops. This is a matter which has often been strongly recommended to the farmers, both great and small, in this neighbourhood, but hitherto, I must say, not with the entire success I could wish. It is indeed, admitted generally, that to take the heart out of the land before you are prepared to renew it by manure, and thus leave it lying unproductive during the intervening period, must be very bad farming of course. The practice of taking successive corn crops, although sometimes still practised, is no longer defended—likewise, the sowing clover and grass-seed with the first crop on manured land, is that usually adopted, and the preservation of the clover and grass for house-feeding the following season is almost universal—still these improved habits have been carried into practice upon each field separately, and the appearance of the face of the country partakes still of the irregularity and confusion of the old system. There is some little difficulty and management in bringing the entire farm into a regular course where the different portions of the manured land have been scattered over the whole in small patches, which is almost universally the case, but by endeavouring to plant the whole of the potato and turnip crops together at one side of the farm, the thing is easily accomplished—for, suppose, by the increase of your farm-yard manure, or the addition of guano, the one-fourth part of the farm can be manured, for those crops at one side of it, the thing is then in a certain train of accomplishment. The following year the next one-fourth is planted in the same way, and the land last manured is sown with grain, and laid down with grass-seeds and clover; the third year another one-fourth is manured, and the fourth year the remaining one-fourth is manured—thus completing the entire rotation; and the farmer in the fifth year again plants his potatoes which he first commenced. Any one may imagine the damage done to clay land, by turning cattle out on the soft stubble in October, as is a common practice, with a weight of one to two cwt. on each foot, poaching the land in every direction. In order to prevent the necessity of this, only about one-half of the manured land should be laid down in clover and grass, and the remainder left in Italian rye-grass, with a little reserved for vetches. The Italian rye-grass will serve after the clover has been killed by the frost, and this, with cabbage, or kail, or rape, planted in the north side of the potato-ridge, will give ample food until the turnips are ripe, and leave the stubble to be ploughed down as it ought to be. Upon the subject of the advantage of a proper rotation of crops and house-feeding, I know no one more capable of instructing us than Mr. Murphy, the talented editor of *The Farmer's Gazette*.

His LORDSHIP then proposed the health of Mr. Murphy, the talented editor of *The Farmer's Gazette*.

Mr. MURPHY said he would assist in carrying out these highly praiseworthy objects, his Lordship and Mr. Blacker (whose exertions in the advancement of agricultural improvement had given him a claim, and one which was fully acknowledged, to the respect and admiration of the empire) had in view in thus gathering their respectable tenantry around them. Green crops being, for the most part, culti-

vated in drills, afford an opportunity of pulverizing the soil, thereby obtaining the advantages formerly sought by means of a naked fallow, namely, an exposure of the matters which the soil may contain to the meliorating influence of the atmosphere, and also of the extirpating weeds, and consequently rendering the whole of the nourishing powers of the soil available for the crop. The system of rotation to be pursued in any given case must be determined by the nature of the soil. Thus the four-course shift and sheep husbandry have been found adapted to the sandy soils of Norfolk, whilst in the stiff clays of the south of England a course of seven or even nine years is preferred. A farmer in the company now assembled has informed me that he has tried the four-course system, which he finds well adapted to his land; but in general it has been found, and that, probably, for reasons which I shall by and by state, that the quick return of the same crops to the same land is unfavourable to the produce; that, in fact, the land becomes "tired" or "sick" of certain crops, especially of clover; but this objection may be obviated by sowing down only one-half of the grass-land with clover, and the other half with grass alone—Italian rye-grass, for instance—and by this arrangement clover will only recur once in eight years. This system requires that one-fourth of the farm be manured annually, and this, by house-feeding cattle, and economising the liquid manure, may be easily accomplished. A farm in the five-course shift may be cropped as follows:—1st. Manured green crop, say one-half turnips and mangels, and the other half potatoes. 2nd year, corn laid down with clover and grass. 3rd. Grass mown for soiling and hay. 4th. Ditto. 5th. Corn on the two year old lea, with a "stolen" crop of transplanted rape or winter vetches on the stubble, which should be manured. Where flax is cultivated, a portion of the land which produced corn on the lea the preceding year should be devoted to it, which being manured well for transplanted rape after the flax, will be nearly in as good a state for a corn crop the following season as the potato land. Experienced farmers are everywhere agreed, that a rotation and alternation of crops is necessary, both to the healthful state of the land, and a profitable return for the labour bestowed upon it.

His LORDSHIP then proposed the health of Mr. Blacker.

MR. BLACKER then rose and said:—My Lord—We are now come to that part of the proceedings of the evening which, if I am not much mistaken, will prove the most interesting of all—namely, the discussion upon the cultivation and proper management of the flax crop. The low price of all other agricultural produce gives to this subject great additional importance, for there is no denying that it is the most remunerating crop, where it proves even tolerably successful; and there seems to be no crop whatever as yet so imperfectly understood, though almost every one piques himself upon understanding the management of it better than his neighbour. This seems to be decisive, that whatever advantages old lea may possess, and I don't deny that it does possess many, yet they are by no means indispensable to a good crop, and the loss by keeping land three or four years under pasture, if set against the produce of the flax crop when broken up, would, in my mind, very much reduce the profits, or, perhaps, absorb them altogether; but these are not the only contradictory facts I can point out. Mr. Greer, who is a high authority, says the best flax is on wheat or oat stubble, and yet the whole country is against

him, for the seed is almost universally sown upon potato land. Again, some denounce lime as injurious, which is a prevailing opinion, and yet I recollect Mr. Rennox having, a few years ago, a crop after potatoes planted on lime and soil (and which had never had any farm-yard manure in the memory of man) worth 20*l.* the English acre, gross produce; and Samuel Loudon has had a produce of excellent flax of 41 stones from two bushels of seed sown, which is not very far from double the common yield. My own opinion (as I have often stated it) was, that the most important consideration of all was that there should be a long interval of time between any two crops of flax; and I rode expressly to inquire from Loudon when his field which had produced so well had borne flax before, and was told part had not been in that crop for seventeen years, but that another part of the field, of just the same quality, had been in flax about four years ago, upon which I concluded the great yield had been on the former portion; but to my surprise, I heard that the part which had been recently in flax was by much the best of the two. But it is not merely in the cultivation of this crop that we seem to have much to learn. We seem to be fully as much in the dark as to the *after management*. Sir James Stronge, who got the premium for the second best quality of flax produced at the Belfast show, which is a pretty good proof that it had been managed with considerable skill, informs me that a few bundles of it which, by accident, were left longer in steep than the rest which had been sent to Belfast, proved to be, beyond all comparison, superior to the parcel which got the premium in every respect. Mr. B. concluded by calling on Mr. Byers, of Killycain.

MR. BYERS said:—My Lord, I may remark with reference to the sowing of flax, that I would approve of it being thinly sown, as I consider that in that case by means of the influence of the sun and atmosphere acting on it, the plants come to a state of greater perfection, and the fibre in consequence thereof becomes much stronger. I think that about two bushels and one peck, or two and a-half at most, of sifted riga seed would be quite sufficient for an English acre of ground. In the next place, with regard to the fittest and most proper time to pull the flax. After having bestowed considerable attention to the subject, and examined it in all its bearings, I think that it in a great measure depends on the nature of the soil, and that no fixed rule can be given which would be applicable to all cases. Flax grown on weighty clay land, sown early in April, will admit of being pulled in a less ripe state than that sown at the same time on light tilly soil. This opinion is built on the fact of the flax growing in a weighty soil arriving at a state of maturity in a more gradual way, and getting strong in a shorter time than that sown on light land. That sown on light land starts up much sooner, and is therefore much softer in its fibre, and must, consequently, be permitted to remain until it be more ripened. I shall next advert to the watering of flax. I would strongly recommend the farmer to make the hole in which he would steep his flax in either a blue or red clay, at the same time taking care that no spring rises out of the subsoil, nor any leakage be permitted from the flax-hole, and that also water which has remained a considerable length of time in the hole, is much preferable to that which may have been recently put into it. It may be well to observe that the flax should be put into the hole, if possible on the day on which it is pulled. The practice which I adopt at this stage of the proceeding,

in order to ascertain the proper time to take the flax out of the water, is to take a bundle out of the hole in the morning, and allowing it to remain in the air about twelve hours, I take a small quantity out of the centre, and by drawing it through my fingers, pressing it very slightly, see if the husk or outward covering of the flax slides off, which, if it does, and presents a glossy appearance, I then break the stem about four inches apart, and if the timber freely separate itself from the flax, I think that it has then been sufficiently watered. My reason for letting it remain twelve hours out of the hole previous to my adopting the above process is, that some flax gets soft after having been taken out, whereas other flax gets hard. After the flax has been sufficiently watered, and taken out of the hole, it should, in the spreading, be carefully shaken, so that the stalks may be separated from each other, as the mucilage produced in the process of steeping would, if not properly guarded against in this way, cause the straws to adhere to each other, when on the grass, thereby preventing the atmosphere from acting on each fibre, and consequently not only causing the flax to be different in colour, but also very considerably injuring the quality. If possible the flax should be turned on the grass, when about half prepared for lifting.

Mr. Andrews, of Baleek, was then called on for information as to saving the bolls of the flaxseed.

MR. ANDREWS rose and said:—In this present year I had seven bushels of flax sowed on about 2½ or 3 acres; and I have of the bolls 22 cwt. of meal, which I consider equal to 33 cwt. of bran, allowing 1 cwt. of meal to be equal to 1½ cwt. of bran. Mr. Andrews then read the following account, shewing the extra labour and expense of rippling, &c.

	£.	s.	d.
To rippling, 10 men at 10d. per day . . . . .	0	8	4
To attending ripples, 3 men at 10d. per day . . . . .	0	2	6
To horse drawing to the mill . . . . .	0	2	6
To turf for drying, 2 loads . . . . .	0	3	6
To miller's fee for drying and grinding . . . . .	0	16	6
To horse for drawing home . . . . .	0	1	0

Expense . . . . .	1	14	4
Value of flaxseed meal, 22 cwt., at 6s. 9d. per cwt. . . . .	7	8	6

Leaving a profit at present of . . . . . £5 14 2

Mr. A. continued:—I don't think it does any injury to ripple off the bolls, but I took care to make the rippling and the pulling proceed at the same rate, so that the flax was taken without any delay to the steep. Horses are very fond of the meal and thrive well on it. Last year I reared two calves with it, giving them only milk for a short time at first, and afterwards feeding them with flax-meal gruel.

#### PRODUCE OF THREE STATUTE ACRES OF FLAX.

100 stones at 15s.—£75; each stone calculated to produce 5½lbs. of dressed flax—in all 550lbs.—spun to 30 hanks to the pound will produce 16,500 hanks. About 158 females will be employed 12 months in spinning, at the rate of 2 hanks per week (6 working days); wages for spinning each hank about 1s. 8d., or nearly 7d. per diem for each spinner. This quantity of yarn would make 210 webs of cambric pocket-handkerchiefs, each web containing 5 dozen. About 18 weavers could be 12 months weaving this quantity, allowing each man a month for each web (17½ weavers exactly); wages per web 2l., or from 9s. 6d. to 10s. per man per week. About 40 females would be employed 12 months in needle-work (hemstitch or veining); each could do one handkerchief on each

working day; wages 8s. per dozen, or 8d. per day. The goods, when finished, would be worth about 2l. 10s. per dozen.

	£.	s.	d.
158 spinners, 12 months or 52 weeks at about 3s. 4d. per week . . . . .	1,360	6	8
18 weavers 12 months at 24l. per annum . . . . .	432	0	0
40 needlewomen 52 weeks at 4s. each per week . . . . .	416	0	0
216 persons employed.			
Amount of wages . . . . .	2,217	6	8
Cost of flax . . . . .	75	0	0
	2,292	6	8
Value of 1,050 dozen handkerchiefs, at 5l. 10s per dozen . . . . .	2,625	0	0
Profit . . . . .	£332	13	4

If this country could be made to produce silk, or cotton, or wine, what zeal and enterprise would be awakened to take advantage of such a discovery; and the government would be applauded for every exertion it might make to promote the cultivation of such valuable crops, and realize such an addition to the productive industry of the community; and yet the improvement of our soil, by drainage, for the production of wheat and flax, equally, if not more valuable products, and both suited to our soil and climate, seems, by some strange inconsistency, to be thought deserving of no kind of national support; and that the increase and improvement of their cultivation should be left entirely to the unassisted endeavours of landlords and tenants, however unequal their united exertions may appear to the full development of the capabilities of the country, whilst the public are crying out for food and employment.

#### APPENDIX.

##### MR. SKELLING ON MANURE.

The subject for present consideration, the collection, preservation, and management of manure, is one of the greatest importance to the agricultural community of every country, and must be a paramount object with every good farmer, every successful cultivator of the soil; no economy, no superior management, no scientific or practical knowledge, no system yet discovered or likely to be discovered will supersede the necessity for a liberal and constant supply of this important ingredient to our soils. It ought, therefore, to be a great object with every cultivator, how he shall best collect the largest quantity, of the best quality, and apply it in the most judicious manner. That a great deal of misconception, error, and ignorance prevail on this subject, is quite evident, and by the farmers not alone of Ireland, but also of every part of the United Kingdom. Were I asked what is the chief cause of the poverty or embarrassments of farmers? I should answer, the want of manure—the poverty and low condition of their land. Much has been done latterly, in every part of the United Kingdom by draining, deepening, and otherwise permanently improving the soil; much has yet to be done in that way, and I trust will shortly be accomplished. A permanent improvement however, once well done, will serve for a number of years—a lifetime, or a century; but it is not so with manure, a constant and never-ceasing supply is absolutely necessary to insure fertility; and in proportion as these are dealt out liberally or otherwise, will land of every class and quality make an ample or scanty return. Much can be

done by superior management and cultivation of the soil, but our chief hopes of abundant crops must depend upon the supply of manure. It is rather singular that at this time of day such difference of opinion and different practices should prevail, even in the best cultivated districts, on a subject that we should suppose every farmer ought to be intimate with; and a subject so immediately connected with his success in life. At a time when agricultural improvement and superior knowledge are obviously making rapid progress, and finding their way into all, even the remotest parts of the country, we should suppose this vital question, the collection and management of manure, should be prominent; first discussed, and best understood. But do we find it so? I fear not. I doubt there is a lamentable ignorance, as I know there is a culpable neglect and erroneous practice prevailing among the great majority of our farmers on the subject. With all my great respect for the extensive cultivators of the sister countries, and of my own, I am constrained to say, that I believe the great majority are going on a very objectionable system of management which chiefly produces their embarrassments in the want of manures as well as other matters. A great number depend on grazing. Another party go too far, and depend on grain crops. Another is confined to an alternate course of both. In my mind, neither of these systems is calculated to bring the land to its most productive state, or make a fair return to the manager. In all such cases there must be a lamentable want of manure; money must be expended on extraneous substances, or the land will come to a state of poverty. In grazing the land will not deteriorate; but it never returns one half what it ought, either to the owner or to the community. There is one system which I would rejoice to see adopted generally, not only in this, but in other countries—a system that would remedy all the evils so long and generally felt by the want of manure—would supply at all times, and in all situations, an abundance of this necessary ingredient, bringing the land into the highest state of cultivation, rendering the farmer independent of all extraneous manures; and in a great measure equalising the value of land in different parts of the country. I mean the system of *maintaining a sufficient quantity of stock on the farm, house-feeding this stock summer and winter, and raising green crops for that purpose*. This is no Utopian scheme, no new idea; it was first promulgated a number of years ago by Mr. Blacker; it has since been tried by the test of practical experience, and wherever it has a fair trial it has proved eminently successful. Like any thing new the system has been assailed by ignorance and prejudice, but eventually it must and will succeed; its own intrinsic merits guarantee its final success. I have with much anxiety watched the progress of this system during a number of years. I am happy to say it is making a slow but sure advance in public favour, particularly where superior knowledge and improved cultivation have found their way, and it is equally applicable to a large or small holding. The old mode of collecting manure was to commence at November, when the cattle and horses were housed, to throw out their dung generally before the door, and let it lie exposed to the weather during the succeeding winter months, washed by the rain, and bleached by the atmosphere; the liquid finding its way to the nearest gripe or water-course. In the spring it was drawn out for the potato crop, and stretched over as large a space of ground as possible. Bye and bye an improved mode was adopted; the dung, when thrown out of the

cow-house and stable, was, at intervals, carted out to the fields, and mixed with a spit of cold, heavy, and dirty earth, off an end ridge, in sufficient quantity to neutralise and stop the putrefactive process; this was turned once or twice over before the spring, and for potatoes scattered as before. In both cases there was a total disregard of liquid manure. The drainings from the cows, the horses, the pigs, the scullery or kitchen, were allowed to evaporate or run to waste. I recollect twenty or thirty years ago some of what we considered our crack farmers, who were in the habit of carting out what dung they had been able to make to the field intended for potatoes in the early winter, and there mix with earth and quick lime. This compost was turned over perhaps three times before using, every turning inducing a new fermentation, and allowing a vast escape of gaseous matter; in May, when they came to plant their potatoes, they found the dung heap had dwindled down to half its former magnitude; it was dry and loose, somewhat of the consistence of turf mould, and possessed of much the same nature and properties. The only advantage they had gained by all their trouble was this—it was perfectly manageable, easily loaded, being quite light, easily drawn, and what the farmers in general considered a first-rate advantage, easily scattered and stretched over a considerable space of ground. Now these same farmers have long since left off this method; not that they were aware of having outraged any chemical principle, or scientific law, but from practice and experience they found their manure had deceived them; it was almost effete; their potato crop was short, their second crop worse, and their ground more exhausted and dirty. At present, if they draw out their dung at convenient times, they take care to mix it with light rich earth, or dried peat, and in moderate quantity; they dispense with the lime if they have any brains, nor do they turn the heap so frequently, evaporating its gasses; this they have found to produce better crops, and come nearer their purpose. I trust they will still improve in their practice, and cease drawing out their dung to the fields until they can plough it into the land and cover it up. I have never considered it the best mode of managing manure to draw it out and mix it in the fields, and there let it remain for months withering and wasting before it is used. Such dung must be inert to a certain degree, and cannot have the same stimulating effect on the soil or vegetation as strong or fresh dung from the home-stead. Such a course is, perhaps, often unavoidable on large farms, or where the housing is inconveniently situated. If liquid manure could be conveniently and frequently carried out to saturate these compost heaps, it would marvelously improve their quality, and remove these objections, but I am afraid such work would be too troublesome and expensive for farmers in general to adopt. There is a mode of managing manure which has been tried by many, and with great success, and which I consider, where practicable, immensely superior to the former; that is, as the dung is sufficiently made and saturated, to draw it out, spread it, and immediately plough it into the ground intended for green crops. This plan has succeeded particularly well for potatoes. The fresh strong dung immediately induces a fermentation and heat in the ground, acts on the inert matter in the soil it comes in contact with, and renders it soluble, acting both as lime and dung in preparing the food of plants; the carbonaceous matter and earths in the soil retaining the gases, and preventing escape or evaporation. These views may seem novel, but they

are founded on actual experience and observation; and are at least worthy of a fair trial on so important a question. It may be argued, and with some justice, that on the large farms of Scotland and England, where materials are comparatively scarce, labourers few, and wages high, it is difficult to make a sufficiency of manure in all seasons; but in Ireland no such disadvantages exist; we can have no such excuse; our farmers in general are small, we have plenty of hands, labour is cheap, a variety of soil, abundance of peat, and above all, in every season a most luxuriant crop of weeds over the whole face of the country; in the fields, the ditches, on the roadsides. This latter is no inconsiderable advantage, were the people to avail themselves of what nature and their own bad management have thrown in their way; were the docks, thistles, and other weeds, which are found on almost every farm and on every road-side in such abundance, cut green or in flower, and before they ripen their seed, bedded under the cows and added to the dung-heap they would make a most important addition to it, not only in the organic matter they contain, but the large quantity of inorganic, the saline substances which they extract from the soil and subsoil by their roots, and retain in their leaves and stems, and which are so necessary to the growth and development of every crop. So sensible are the farmers on several parts of the continent of the advantages of these substances, the salts of lime, magnesia, potash, and soda, that they sow tap-rooted plants for the purpose of extracting and bringing up these substances from the subsoil into their stems and leaves. The plants are then ploughed down, or covered in green, and are found particularly fertilizing. In regard to collecting manure and forming of dungheaps, a great variety of practices prevail, and some of them, I fear, very erroneous. The mode of forming the heaps and their situation are of great importance; it should neither be on a hill where the liquid will run from it, nor in a hollow, where much water will accumulate and remain; neither should it be on a declivity, where rains may wash it; it ought to be immediately adjoining the office-houses, where the dung and litter of cows, horses, and pigs, with the ashes from the dwelling-house, could be conveyed with the least possible trouble and expense. Sewers also should be constructed to convey the urine and liquids from all the houses, including the scullery and water-closets, along the side of the dung-heap, so that these liquids could be scattered over it every day, and accommodation for loose earth, peat, &c., afforded to absorb the extra liquid, and be alternately added to the heap with the dung. The space ought to be capacious, sufficient to hold the manure of all parts of the establishment for at least six months. It is not in the fields the best dung-heaps are to be made; it is here, in immediate contact with the houses, where a variety of substances, liquid and solid, are continually accumulating and fermenting together. Another reason why the dung-heap or pit should be capacious, is, there ought to be but one at every establishment, a reservoir for every kind of substance; it is a gross error to have the cow-dung in one heap, the horse in another, the pig in a third, and the refuse of the dwelling-house in a fourth, with the loose rich earth and decaying vegetable matter in sundry heaps, or in ditches through various parts of the farm; all should be collected together, blended in one decomposing mass, and thoroughly mixed. It is an axiom, established by science and practice, that the greater the number and variety of materials in any dung-

heap, the more powerful and efficient will be the manure; the pit should be sunk 12 or 14 inches below the surface, and if the subsoil is absorbent, lined with brick, cemented or well puddled with retentive clay, to preserve or to prevent the escape of any fluid. The proper time to commence the collection of manure is in June, or immediately after the last of the former season has been used for turnips. If the cattle is house-fed, and all weeds and refuse of the farm rendered available, *the summer is the chief time for making the manure*, but in order to do the thing efficiently a daily attention will be required. On anything of a large farm a man should be employed at this work alone, collecting the dung from the different houses, the weeds from the ditches and roadsides, earth and peat, if convenient, and bringing all to the main heap to be mixed as required; every day the fresh urine and slops in the reservoir should be scattered over the heap, and the liquid manure at the opposite side, either drawn out to be applied to crops, or returned to the dungheap; a man so employed would make a better return for his wages than any other labourer on the farm. In respect to the liquid manure, this is a grand point to be observed; all manure, of whatever kind, will become liquid, and, eventually, gaseous, it must be so before it becomes the food of plants, and the nearer that state is, the sooner it will accomplish its ultimate purpose; but the manure in decomposing is not reduced to its elements in the process, new compounds are formed; the oxygen and carbon form carbonic acid, another portion of oxygen and hydrogen form water, and the remaining hydrogen and nitrogen form ammonia. Besides these compounds, (particularly if the dungheap is composed of a variety of vegetable matter) a considerable quantity of the salifiable bases, in combination with acids, and in solution in water, as soluble salts are present; if the urine has been regularly thrown over the dungheap, it immediately decomposes; and here are another set of ingredients, the phosphates and salts of ammonia in solution, which joins and enriches the already formed liquid which runs from the dunghill. Now, it is well known that carbonic acid, ammonia, and water, with the various resinous salts in solution, are the true food, nourishment and sustenance of plants, and these same compounds, when absorbed and acted on by heat, light, and air, undergo other chemical changes, and produce all the multitudinous variety of the vegetable world, which again is the sustenance of animals. These facts ought to startle the farmer, and make him reflect that the black fætid fluid which oozes from his dungheap, and is wasted away to the gripe, or suffered to evaporate in the air, is the true food and sustenance of plants, already prepared, cooked (as it were) for their use; and this is the reason why the same substance acts so instantaneously and effectually on almost every plant to which it is applied in its pure state. These considerations should induce him to hoard this liquid like gold in the chest; this is the essence of his manure, the spirit of the dungheap; when this is gone, what remains is comparatively inert and useless; he should, therefore, collect it constantly and carefully—carry it out to enrich his crop, or return it to the dungheap; he should never forget that a dungheap which has the liquid manure in it, and one that has lost it, are very different subjects, and will act differently on his crops. A quantity of rich earth ought always to be near the dungheap, and to cover and prevent the escape of gases, and spread about to absorb the liquid that might run off. Another sub-

ject in which much difference of opinion prevails, viz., whether organic manures ought to be decomposed before using, or ploughed into the ground recent and fresh? With all deference to the opinion of Sir Humphrey Davy, and other modern writers who agree with him, and recommend the latter plan, I entertain a different view. I would prefer the well-rotted dung, and were I called on to raise a crop for my life, I should use it. I think the idea of using rough or fresh dung, and the recommendations to do so arose from the manner in which such substances were, and are still, I fear, usually treated, suffered to lie so long exposed to the atmosphere, fermenting and giving off its fertilising qualities, and allowing the liquid to run to waste; but if the dungheap be treated in a proper manner, no such loss can be sustained. There is one very important observation to be made here, wherever there is a quantity of straw and other accumulations of vegetable, and even animal dung, there will be the seed of annual or other plants. If this be used fresh and undecomposed, the seed will be fresh, will start in the spring, will dirty the land and the crop, and perpetuate the farmer's annoyance; but no such thing can happen when the heap is decomposed, the heat generated by the process and continued, and the new fermentation induced repeatedly by the fresh urine and liquid thrown constantly over it, will dissipate the germ of every such seed, and, practically, we find the well-rotted dung always produces a clean crop. The gardener is no mean authority on this as well as on many other agricultural subjects; we invariably find him and the steward at loggerheads about the dung. The former will always select the best corner of the dungheap, that part well rotted, pulpy, and full of liquid, cutting with his spade like soap. Such highly concentrated and powerful substances he finds necessary to force the large and repeated crops he is required to produce. The steward again complaining, that besides taking too much, he (the gardener) selects the best, and leaves the refuse for the farm. In the use of rough or fresh dung and compost, the land is more likely to be cheated, than by using the well-rotted concentrated manure from the original heap. With regard to tanks for catching or saving the liquid manure, they may be useful and necessary to a certain degree, but certainly not to the extent sometimes used and recommended on the continent. Where peat, light earth, and other substances are used to absorb it, and these thrown on the heap alternately with the dung, I think it a better plan to preserve it, but if the liquid be required for the vegetables of the farm or garden, or for top-dressing lawns or other grasses, a very simple contrivance may be made at the under part of the dunghill to suit all the purposes; but one thing must be particularly observed, that the tank ought never to be on the same side as the dungpit, or in communication with the sewer which contains the fresh urine and liquid from the houses; it ought always to be on the opposite side, and where it will catch the liquid which has passed through the dung heap. The alkaline qualities of fresh urine will undoubtedly be injurious to vegetation if applied in that state; it ought always be allowed to ferment, or be thrown over the dungheap where fermentation is going on, and where it will immediately join the process, be decomposed, and run in with the other liquid manure in its most powerful state; this may be used with safety and the best effects no matter how concentrated to almost any crop. The using it in its fresh and caustic state has some-

times raised a prejudice against it. Of late two very important substances have been discovered and used as substitutes for farm-yard manure—I mean bone dust and guano, they are entitled to rank far above any others of the recently prepared manures on account of their well ascertained steady effects in producing, particularly green crops; guano, from its suiting every soil and almost every crop, when judiciously applied, is calculated to produce a revolution in the agricultural world, in raising turnips and other green crops in our worn-out soils already in cultivation, and inducing the improvement of our waste and hitherto unproductive lands; in these respects the discovery and use of this substance is an important era in the history of farming. No farmer can be excused now who wants a sufficiency of green crops for his cattle, a comparative trifle in the purchase of guano will produce him a crop of turnips, and will start him in a new and profitable course of management. To the cultivator who commences the first year in a poor farm without manure, or wishes to extend his cultivation and provide for the keep of additional stock, this manure is invaluable, sets him at once upon his legs, and places him in a proper and advantageous position; but being so placed and provided with a sufficiency of food for an adequate number of cattle, if he house-feed and mends his dungpit he will not again require guano or any other extraneous manure, but will have quite sufficient for all his purposes, and of a quality superior to anything that ever was or is likely to be discovered.

#### DIRECTIONS FOR MAKING BUTTER.

The cows should not be heated or tormented in any way; housed at night, and fed on green food.

In milking—put one eighth of an ounce of fine ground saltpetre in a vessel that will contain about eight gallons, and the milk to be drawn from the cow on this—less or more of saltpetre in proportion to the size of the vessel to be filled. The dairy should be perfectly clean and cold, of equal temperature, *very little light*, and no sun should get on any part of it, a good current of air to pass through. Strain with care into coolers perfectly sweet and dry, and the whole to be kept thus from two to four days, and then all the milk to be churned, and *not* skimmed, as is customary in the south. After churning, the milk to be withdrawn, and the butter divided and placed in two pans of *pickle*, made from pure water and fine salt. The butter to be *well worked* with the *hand* alternately, and frequently changing the *pickle* until all the milk is worked out, and the grain becomes *quite close* and firm—when it is to be cured with the very finest stoved or lump salt and sugar. The proportion of one ounce of refined sugar to fifteen ounces of salt to be perfectly dry, and to be well worked into the butter with the hand, the quantity of curing materials to depend on the time and labor given by the dairy woman, in working and beating butter after the salt and sugar are applied. This should continue until all *pickle* is driven out, and then packed close down in the cask. The cask should be well seasoned for a week previous with strong *pickle* frequently changed, and must be strong and air-tight. The size no consequence if filled and sent off in a week. If not filled at one churning, the butter to be covered with *pickle* until the next, but no cask to contain more than one week's butter. If butter should at any time appear pale in color, a little grated carrot juice may be put into the milk, which will not injure either milk or butter. All butter

should be at the place of shipping one day prior to the steamer sailing, so as to run no risk of going forward. P. S.—The destructives of butter are air and light (this also applies to milk), therefore it should be prepared and forwarded to market with the utmost despatch. This with cleanliness and mill-ness of cure, will ensure high prices at all times, and a single trial of this system will convince.—ROBERT REA & Co., Dyers' Hall Wharf, Upper Thames Street, London.

Sept. 23rd, 1843.

MR. PETERS' REPORTS.

I have to state that there were fourteen acres of turnips on Park last year. There are about thirteen acres this year, exclusive of these after the rye (about 2½ acres). The ground that we are now sub-soiling was wheat, after potatoes, and is meant for turnips next year. We are subsoiling with two horses, and one of our common iron ploughs, without the mould-plate, and a share fitted out for the purpose—depth about 12 inches. The three halfacres of turnips in the moor were put in with bone-dust and guano—the guano at the rate of 3 cwt. per acre, on two half acres, and the bone-dust at the rate of 14 bushels per acre—the guano at 14s. per cwt., and the bone dust at 3s. per bushel (6d. less than the charge at Tehidy mill) makes the expense per acre alike, and equal to 42s. per acre. The guano has a decided superiority, in so far as the appearance of the turnip crop may be taken as a test.

Our small farmers and cottagers are progressing in their improvement—more slowly, no doubt, than could be wished, but certainly faster than could have been anticipated, considering the difficulties to be overcome. Drill-turnip cultivation has become general. House-feeding, I have no doubt, will soon be so, as there are now many converts to the system. We kept 8 feeding bullocks, 4 cows, and 5 work-horses, in the house during last summer, at Park Farm, and upon little more than one-third of the ground that would have been required to graze them. Our crops upon this farm have given ample evidence of the benefit to be derived from improvement being very much followed this season. I have tried the effects of guano in different ways, and with the best results in its favor. Our turnips are a very fine crop, when, 3 years ago, there was nothing growing but stunted furze and heath. One little experiment deserves notice. I gave one of our cottagers on the new allotment of waste land, 4 lbs. of guano, value 6d. He applied it in a drill 48 yards long, where the land was newly broke up from short heath, without other manure. Two of the drills alongside of it, put in with dung, were dug at the same time, when it was found that the drill with the guano produced 12 gallons of potatoes, and the two with dung produced only 14 gallons. The value of the potatoes produced from the 6d. worth of guano being from 2s. to 2s. 6d., or at the rate of from 16l. to 20l. per acre, the value of the manure 4l. per acre. This was as fair a trial of the value of that manure as could be, for the land would have produced nothing without it. At a rate of 2l. 2s. per acre, I have raised excellent turnips on very poor land. Its effects afterwards are doubted, but we are certainly not entitled, at that rate, to more than one crop, which of itself lays the foundation for future fertility.

(EXTRACT.)

*Mr. Bruce's letter as to his proceedings on Lord Leitrim's Estate, where he is agriculturist.*

Brook-Lawn, 28th Nov., 1843.

SIR—Enclosed I send you a statement of the crops the people had who obtained the premiums for house-feeding on Lord Leitrim's estate. I have taken it accurately from themselves, and got each to put his name to it, which I considered was the best way to give satisfaction to the people present at your meeting.

No. 1.—*Patrick Keerigan, Currycramp.*

I hold 6 acres of land, at £6 16s. 2d. a-year; I have 2 acres and 2 roods of potatoes, 1 acre of turnips, and about 30 barrels of oats; I house-fed 3 cows, 3 calves, and an ass; I made 3 firkins of butter (not sold); I have 2 pigs, value about £6 10s. I have to support a family consisting of 11 persons; and I consider I have 20 barrels of potatoes to sell.

PATRICK KEERIGAN.

No. 2.—*James M'Gennis, Rousheyname.*

I hold 4 acres 1 rood and 20 perches of land, at £6 3s. 6d. a year; I have 2 acres of potatoes in arable land, and 3 roods in reclaimed bog, of which I have reclaimed 2 acres; I have 1 acre of turnips, and 10 barrels of oats to sell; I have made 3 firkins of butter during the Summer, two of which I sold at £3 18s.; I house-fed 2 cows and 2 heifers; I have 13 of a family to support, and I calculate I will have 10 barrels of potatoes to dispose of; I sold 3 pigs at £9 15s., for which I paid £4 15s., leaving me a profit of £5.

No. 3.—*Conor Heslin Cloncoo.*

I hold 5 acres of land, at £6 a-year; I have 2 acres of potatoes, 3 roods of turnips, 20 perches of flax, and I calculate that I have 24 barrels of oats to sell; I house-fed 3 cows and a jennet; I have made 3 firkins of butter (not sold); I consider I have 15 barrels of potatoes to sell.

CONOR HESLIN.

N.B.—The above is all Irish plantation measure.

*A Letter from a Tenant of Mrs. Gilbert's from East-bourne, on Liquid Manure.*

Tevington, Feb. 13, 1843.

SIR—I do remember your visiting me, and recommending me to water the Italian rye-grass with liquid manure, which I tried with great success. I am certain that I have got above double the crop, and it comes a great deal sooner in the Spring. It follows the rye in England. I never could have kept two cows on three acres if it had not been for the assistance of your book. I have never had any of the vetches that you mention in your book, which I should like to try, but cannot get them in England. I have tried mangel wurzel, turnips, cabbage, clover, tares, rye, and Italian rye-grass, all which answer well for stall-fed cows. I think a cow club would be a fine thing, which I hope we shall be able to raise before long. I am, sir, much obliged to you for your assistance.

To W. Blacker, Esq.

JOHN DUMBRILL.

*Mr. Robert Murray, the Agriculturist's, Observations on the subjects selected for discussion.*

SIR—If you will take the trouble to look over these few remarks, you may, perhaps, find something worthy of observation:—1. On Manure.—It is a well known fact to every practical observer that the more attention that is given to the manure heap, so much the better; and the richer the quality and the fuller the quantity, the greater will be the owner's advantage over his neighbour, who has but a

small quantity, and of inferior quality. But a good manure heap can only be obtained by a full stock of cattle being kept upon the farm, with plenty of fodder, both in Summer and Winter, and, at the same time, plenty of straw to keep the cattle dry. It is the large quantity of straw that makes the manure, and I need not insist on the advantages of keeping land in good condition. I consider that potatoes and flax are both scouring crops. They may realize a few pounds of money, but they leave nothing behind for the farm-yard. Both the crops are attended with very considerable expense. The flax crop is a very uncertain one, and should be used on a limited scale upon a small farm. With respect to liquid manure, I consider it most essential to a farm to preserve the liquid manure, and to use it early in the spring for top-dressing, as it has a powerful effect on the growth of grass. By making a compost of earth and scrapings, with a little dung at the same time, and saturating the composition from time to time with the liquid manure, an excellent top-dressing for grass land or for grain crops is made. With respect to guano, it is a manure I am not much acquainted with. However, I have tried it partially. One-half I top-dressed in spring, and the other half after the first cutting, and in both cases an addition to the weight of the crops is the consequence; but I had no additional cuttings from it, only a fuller crop. I tried it on vetches, and found it of use to them. It was the latest sown that the guano was applied to, and there was a fuller crop upon the land. I used it for turnips, with a composition of house-ashes, about nine parts to one of guano, and it did very well, but the crop was a good deal grown to tops. I tried two drills with a double quantity of ashes, and watered them with flax-water, and still they are deficient.

2. Thorough draining is a most important part of farming. If the land is wet, whatever manure is put upon it is in a manner lost. If you get one crop from it, that is all. By proper draining and culture, that is, by drying and cleaning the land, along with a sufficient quantity of manure, lime, and dung, and sowing it with clover and grass-seeds; when it is clean and dry, and full of good manure, a farmer may expect a full return. With respect to subsoiling, it is most important to a good farmer after draining. By subsoiling with four good horses in the plough, or good spade labour where a plough cannot be got, it will break the crust, and open the bottom of the land for the reception of the surface-water and the introduction of the air. Of course it gets into a loose rich mould, equal to the growth of any crop that suits the farmer.

ROBERT MURRAY.

SIR—I have weighed a square perch, English measure, of the turnips sown on the artificial manure, forwarded by A. K. McKinnon, Esq., from the Isle of Skye, and find the produce 3 cwt. 2 qrs.; and I have measured a perch alongside of them on farm-yard manure, which yielded 3 cwt. 3 qrs. I did not put on near so much of the manure, sent by Mr. McKinnon, as it now appears he recommends to be applied.

WM. HERD, Steward at Gosford.

To Wm. Blacker, Esq.

TO DETECT COMMON SALT IN NITRATE OF SODA AND SALTPETRE.—Take the sample to be analysed, and after having dried it before the

fire, rub it to a fine powder, and having weighed accurately fifty grains, put them into a small flask capable of holding about two ounces of water, and having a neck four or five inches long, now add half an ounce measure of nitric acid, and half an ounce of water, roll up a piece of blotting paper and lightly stop the mouth of the flask, now place the flask into a pair of scales and add weights in the opposite scale until they are balanced, take the flask between the thumb and finger, just above the bulb, and hold it over a candle or lamp until the salt is dissolved, removing it from time to time if the effervescence is rapid; the glass between the thumb and finger should only be slightly warm; now return the flask to the scales, and note the number of grains lost; every three grains lost are equivalent to five of salt in the sample. Pure nitrate of soda, or saltpetre, are not acted upon when heated with nitric acid, but when salt is added, an effervescence takes place on account of the escape of chlorine gas. It is recommended to the inexperienced to try two or three experiments with a known quantity of pure saltpetre and salt.—*B. Laves, on Manures.*

## SPADE HUSBANDRY.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—In your number for the present month, at page 143, is an article on spade husbandry, and the employment of surplus labouring poor; and agreeing as I do with W. S. in his account of the increased productiveness of the soil, from an occasional digging, as also the necessity of employing the surplus labouring poor, am induced to offer some remarks bearing on those subjects, which, if thought worthy a place in your journal, are much at your disposal.

Among the clergy and gentry are many very charitably disposed persons who annually distribute vast sums of money for the amelioration of their poorer brethren's needy circumstances, who, doubtless, are willing to bestow some trouble, as well as money, for their general good: to whom I would suggest that a too general and indiscriminate gratuitous distribution of money among them, if long practised, will engender carelessness, idleness, and vice; rather than promote forethought, industry, and economy; so much so, that the mendicant will take the place of the honest, hardy, independent spirit, formerly the pride of our agricultural labourer. A remedy for which I conceive to be partly within the reach of the clergy and gentry alluded to.

I will suppose a person distributing gratuitously 50*l.* per annum among the large families and those able to work. Instead of giving money, set them to drain, dig, sow, and cultivate a field at full wages. The 50*l.* so laid out (if with judgment) will yield a profit; at any rate it will return to him in part, to be again paid for more labour, and so, like their coal funds, may be made to perform a greater amount of good than its first amount could accomplish. And thus all the evil consequences of idleness might be avoided. The poor, feeling they earned their living, would study economy, industry, and forethought; the misery of idleness be more dreaded, and independence would triumphantly pervade their minds in the place of mendicity, the end of charity be answered, and the public benefited. The amount frequently given by individuals would amply suffice to employ the whole surplus poor of a parish: but where the population is more numerous, unity of purpose

might accomplish the same end by subscription, placing the detail under proper management.

I would further suggest, that by these means the benefits of spade culture might be (under good management) made manifest throughout the kingdom, and thus accomplish the two-fold object of employing the poor and benefit to agriculture.

The prediction of Jethro Tall, who wrote on agriculture may not be misplaced here: he says, "Probably if ever agriculture attains perfection, it will be by spade husbandry."

I have the honour to be one of your constant readers.

ESSEX.

## CHEMICAL SCIENCE, AS APPLIED TO AGRICULTURE.

A lecture on the above interesting and important subject was delivered by Mr. Higgs, at the Westminster Literary and Scientific Institution, on Thursday, the 18th ult. He commenced by noticing the vast changes which are continually taking place in the natural world, entirely independent of the agency of man. From the disintegration of the original rocks by the abrasive power of water, the particles of matter are carried out to the mouths of rivers, forming deltas, similar to that of the Nile at the present day. Here an alluvial soil is formed, on which the grasses thrive, and other minor vegetation ensues: these, by decay, enrich the soil, by the decomposition of vegetable matter, and prepare it for successive races of the higher order of plants. By what we consider mere chance, the acorn and other germs become deposited; and, after a few revolving years, the stately oak flourishes his lofty branches, and the scene is diversified by the elm, the chestnut, and other timber of noble growth, on a spot where desolation formerly reigned. All this takes place without the aid of man, but he has power to accelerate, retard, or modify these changes. To accelerate the growth of plants and vegetables, he has only to place them in situations, and under circumstances, favorable to their development; and to retard them, he has only to adopt means unfavourable. A striking exemplification of the retardation of vegetation is the circumstance of wheat found in the tombs of the Egyptian pyramids, which, when brought to this country, was sown, and a crop raised from it, after laying dormant for perhaps 5000 years. In the application of chemistry to agriculture, there are two distinct matters to be taken into consideration, independent of geographical situation; viz., the soil, and the crop to be raised. The component parts of the soil must be ascertained, as to the organic and inorganic substances contained therein, of which, by analysis, the intended crop is known to be composed; and thus, by proper manure, the necessary food of the plant may be supplied. He then described Johnson's analysis of wheat straw; which contains, in 1000 parts—Organic matter, carbon, 485; hydrogen, 52; oxygen, 339½; nitrogen, 3½; ash, or inorganic matter, 70—and this ash, divided into 100 parts, contains 81 parts of silica, and the remainder is potash, soda, lime, alumina, magnesia, sulphuric acid, phosphoric acid, and chlorine. It was this silica which gave the glossy appearance to the outside of the straw, and also imparted its strength, and he jocularly observed, that, from this large proportion of the principal constituent of glass, at some future time, the lady's old straw bonnets might be converted into mirrors to view their pretty faces in. The vegetable acids are—the acetic, pyro-

gallic, metagallic, lactic, and kinic, and the whole food of plants consisted of carbon, water, and ammonia, the latter being formed of nitrogen and hydrogen. The decomposition of animal and vegetable matter forming a rich brown mould, contained the principle of vegetation called humus; it is insoluble in water, but undergoes slow combustion when in contact with oxygen, giving out carbonic acid, and forms the food of plants. Although, in every instance of manuring, and the growth of the crops, chemical processes have been adopted, and carried on, it has been, until within a comparatively few years, with the entire ignorance of the agriculturist, who, following the plans of his fore-fathers, was satisfied with the effect, without seeking the cause; but, latterly, chemistry had done so much for agriculture, and investigation had been so awakened, that he (the lecturer) was satisfied much important discovery would yet follow, and it was calculated, to a certainty, that, by chemical means, properly carried out, four times the amount of food might be raised in this country than is done at present. The perfection of chemical science was shown by the manufacture of salts and gems, precisely similar to those of nature; yet, though the component parts of organic bodies were equally well known, it was beyond the power of man to form even the meanest vegetable; this was reserved for that power which seemed to say—"Hereto shalt thou go, but no farther." The lecturer then described the properties of the gases, already known to most of our readers. Oxygen, discovered by Priestly, in 1774; hydrogen, the lightest of all the gases, being fifteen times lighter than atmospheric air, discovered by Cavendish, in 1776; and nitrogen, by Rutherford, in 1772. He stated that plants took up carbonic acid from the soil by the pores in the roots, and from the atmospheric air, by the under surfaces of the leaves, which were full of capillary tubes: thus rendering it pure, and fit for animal respiration, the lignine or woody fibre of the plant being principally carbon, with water solidified with it. To show the porous nature of wood, and from which, by capillary attraction, the juices ascended the trunk and branches, he took a piece of beech about fifteen inches long; and, having wetted one end, he blew through the other, and the water came out in bladders. A variety of other experiments were performed in illustration of the lecture; such as, burning a taper in oxygen gas, the production of hydrogen from the decomposition of water, the union of hydrogen and oxygen to form water, &c. Sugar, lignin, gum, starch, and other inorganic parts of vegetables, are all compounds of carbon, and hydrogen, and oxygen as water. He placed a portion of lignin in a glass, and a portion of sugar in another; and, on adding sulphuric acid to each, the water was evolved, and a black mass of carbon only remained. He described the component parts of bone dust, which contains 51 per cent. of phosphoric acid, so necessary in the food of animals, to give strength to the bones, which, without it, would be flexible, and guano, a manure lately so extensively imported from the South Seas; it is an excrementitious substance, voided by sea birds, whose food is fish, and consists principally of the phosphates, oxalates, muriates, and sulphates of ammonia, the nitrogen of which is so essential to the vegetable kingdom. He concluded by observing, that it was impossible in a single lecture, to do justice to the importance of the subject, but he had endeavoured to condense the various matter, and give his hearers general information of the phenomena of the process of vegetation, and the chemical laws by which it is regulated. The lecture was attentively heard, and Mr. Higgs received the thanks of his audience.

## UNDERLETTING AND CREDIT SALES IN WALES—THEIR EVIL EFFECTS.

Amongst the chief, though unobtrusive and silent causes of the distress and discontent which prevail in South Wales, are the pernicious customs of underletting and credit sales of stock,—one custom affecting the better class of labourers, the other the farmers, who have not sufficient capital to work their farms, and these constitute the great majority of the farmers of South Wales.

First, with regard to the custom of underletting: the common practice of the farmers there, on taking a farm of say 150 acres, with perhaps two or three labourers' cottages upon it, is to let off a field or two each to his labourers who live in these cottages, and who generally eagerly grasp at such an offer at almost any rent, as it in some measure renders their position more permanent, and gives them a degree of respectability, as compared with other labourers, which they did not before possess. In this manner a farmer will often let off as much as 20 or 30 acres of his farm, and almost always at double the rent which he himself pays to his landlord. This custom, in some measure, explains a difficulty experienced regarding the rental of land there, and a discrepancy in statements made. For instance, these better class of labourers, decently clad and having the appearance of small farmers, pay 25s. or 30s. (as the case may be, or even more) an acre for my land, and it is very poor land, on the hill side. A labourer, who thus gets half-a-dozen acres of land to his cottage, works all day at his master's farm at 10d. a-day wages, his wife usually cultivating his own small plot of land, except in the most laborious work. This 10d. a-day the master-farmer retains in his hands for his rent. The labourer usually keeps a couple of pigs and a cow. By living very hardly, and never spending a shilling, he contrives to subsist on the produce of his half-dozen wretchedly cultivated acres, whilst the whole of his wages go to pay his rent and to help the farmer to pay his. The farmer, by this means, by underletting some dozen acres, always of the most inconvenient and worst portions of his farm, contrives to get the labour he requires done for the rent of it. The labourers are thus attached to the soil, they feel they have some little at stake, and they work hard to maintain their position. When they can live, there can be no class of subjects more peaceably disposed and valuable; but, when all their hard work will not give them a sufficiency of barley bread and potatoes and buttermilk, there can be no men more desperate and dangerous. Superior to the common labourer on weekly pay, they see themselves perpetually on the brink of losing their position, so hardly struggled for; their tempers are soured, and they rapidly become a morose, vindictive, and dangerous population.

The custom of credit sales affects the farmer. In South Wales, sales by auction of farming stock are continually occurring. Not a month passes, at this period of the year, without six or eight taking place in different parts of each county. One auctioneer has sold, during the past year, at least 200,000l. worth of farming stock. This may give some idea of the extent to which this custom is carried. At these sales, the usual announcement made, is, that eight months' credit will be allowed on good security being given. The majority of the farmers in South Wales are men without capital, and who scrape on from year to year as they best can. When the Michaelmas rent-day arrives, the farmer often has not the means of paying his rent, and then the system begins. Off he goes to one of these credit sales of stock, and purchases three or four

oxen on credit, for which he has to pay at least 20 per cent. more than their value. If a young farmer, he gets his father or his father-in-law to be security for him. With his newly-purchased oxen, he walks off to some fair and sells them for what he can get for them, usually at a considerable loss, having given more for them than they were worth; and with the 40l. or 50l. thus realized, he pays his rent and retains his farm. The landlord, having pocketed his rent, goes off to England, says the complaints of the farmers about high rents are much exaggerated, he has had every shilling of his rent paid, and he knows from personal observation, and from this fact, that the country is in a satisfactory state, and the farmers are very well off. We now go a step further; the credit has expired, and the oxen are to pay for; the farmer has no money, so he starts again. Off he goes to another credit auction, buys more stock at 20 per cent. above its value, on credit; his father or his friend is again security for him, and these oxen he sells at a loss to pay for the oxen, from the produce of which he paid his rent. At length the net becomes closer and tighter; he can no longer work round this system; in steps a lawyer and arrests him for one of these debts; his stock is then seized, and in its turn adds another to the list of credit sales of stock; and, after deducting the landlord's rent, the debt, and the lawyer's costs, nothing is left, and the poor farmer is turned out a beggar, ready to start again if he can get any farm at any rent, or he sinks into a labourer. This is the melancholy, but true picture, of the condition of half the farmers of South Wales—a condition originating in poverty, and kept up by rapacity. This is the food on which Rebecca exists.

## EXPERIMENTS WITH MANURES.

TO THE EDITOR OF THE DUMFRIES-SHIRE AND  
GALLOWAY HERALD.

SIR,—In your last number is an extract from the *Quarterly Journal of Agriculture*, containing the results of 13 different experiments with as many different kinds of manure for turnip crops, by R. Monteath, Esq., of Carstairs. The results of the trials with guano corroborated the experience of myself and several of my neighbours, who have found that guano produces a better crop of turnips, and at less expense, than either dung or bone dust. But what startles me in these experiments of Mr. M.'s, and which I would like to see accounted for, is the failure in some instances—the *more than failure*—of dung in producing a crop of turnips. For instance, one portion of ground manured with 4 cwt. guano alone per imperial acre produced 11 tons 8 cwt. turnips, while another portion manured with the same quantity of guano and 28 cubic yards of dung, produced only 7 tons 13 cwt. Here the dung seems to have had the effect of *diminishing* the produce 3 tons 15 cwt., or 33 per cent. per acre! Again, 25 bushels of bone dust alone produced 9 tons 6 cwt., while 20 bushels of the same material, combined with 28 yards dung, produced only 7 tons 2 cwt., whereas the produce from 20 bushels bones alone ought, in proportion to the produce from the 25 bushels alone, to have been 7 tons 9 cwt. Here again the application of dung appears to have been without any effect, to say the least of it. Now it would be very desirable to ascertain of what kind this dung was when applied to the land—whether in a rough undecayed, or a decayed state; and also whether the

whole of the land on which the experiments were made was of exactly the same kind of soil, had been under the same kind of management, and received the same preparation for the turnip crop; for the total inefficacy of dung in producing a green crop is certainly an anomaly in the history of agriculture.

The application of gypsum, too, both alone and combined with dung, appears to have been a failure. This species of manure has not, I believe, been very extensively used in this part of the county. I have, however, before me a letter from a gentleman in the neighbourhood of Dumfries, universally acknowledged to be second to none in the south of Scotland, as an active, intelligent, and successful agriculturist, in which he says, "In 1842 I tried gypsum on potatoes, sowing it on the top of the usual quantity of dung, and the result was 43 cwt. per acre more than where dung alone was used, at an expense not exceeding 12s. 6d. I also (merely for a comparative trial) put in for Swedes, bones alone at a cost of 3l. and 3l. 15s. per acre: guano and gypsum mixed, at 2l. 9s. per do.; guano alone at 2l. 4s. per do.; and gypsum alone at 12s. 6d. per do. And the crop raised from the last (gypsum alone) was superior in quantity to some of the others, and, taking the cost into account, *far superior to any of them.*"

By giving this a place in your valuable paper, you will perhaps induce some of our practical agriculturists to suggest a solution of the difficulties here pointed out, and you will oblige your obedient servant,

H.

*Lochside, Jan. 23rd.*

## A SHEPHERD'S LIFE IN NEW SOUTH WALES.

The duties of a shepherd in New South Wales are exceedingly simple. A flock usually consists of from 400 to 500 ewes, or from 600 to 1000 dry sheep; three flocks being folded at one station. The shepherd is required to take his sheep from the fold in the morning, not later than one hour after sunrise, to keep sight of them on the pastures throughout the day, and to bring them back at sunset to the fold. They are then counted over and left in the charge of the night watchman, whose duty it is to take care of the flocks in the fold until the morning, when each flock is again counted and delivered over to the shepherd. In the lambing season on well-managed establishments, the ewes about to lamb are withdrawn from the flock and kept separate, under the care of either the watchman or of some other person appointed for the purpose, for a few days, until the lambs are strong enough to travel with the flock. At shearing time the flocks are brought in rotation to the home station to be washed and shorn. It is then the shepherd's business (unless he be also a shearer) to follow the sheep and take care they are kept as free as possible from any kind of dirt, until the fleece is in a fit state to shear, which, in general, is the case about the third or fourth day after the washing. From this account of the ordinary duty of a shepherd in New South Wales, it will be seen that almost any one is capable of taking charge of a flock. Sheep are subject to very few diseases; and with the treatment of these either the master or the overseer will be conversant. In such cases the shepherd has only to follow diligently the directions he may receive from those under whose superintendence he is placed, and if possessed of common intelligence he will soon be capable of

acting for himself. In fact, a weaver or button-maker, after a few months' experience, will generally prove a better shepherd in New South Wales than the man who, having been brought up a shepherd in England, may have acquired habits and prejudices exceedingly difficult to shake off, however unsuitable to the new position in which he is placed. In proof of this, it may be noticed that some of the best superintendents of sheep in the colony are natives of London, Manchester, or Birmingham, and that few professed English or Scotch shepherds are entrusted with the care of even a single flock. The duty of a watchman is as easy as that of a shepherd; he sleeps by the fold in a watch-box, trusting to his dogs to awaken him in case of the approach of a native dog, or any other cause of alarm; he counts the sheep in and out, and shifts the hurdles. Nor is the life of a shepherd at all irksome to those who have been accustomed to sedentary occupations. On the contrary, such persons have, in various instances, become strongly attached to it, which will not seem surprising when it is considered that it is a life of very great ease and freedom from care. Indeed, it is commonly remarked of the shepherds that they are more healthy and seem much more cheerful and contented than any other class of farm servants. The wages of a shepherd or watchman have been of late about 30l. a-year, on an average, and from 7lb. to 10lb. of meat, 10lb. of flour, 2oz. of tea, and 1lb. of sugar per week; or, in the place of tea and sugar, milk. 20l. a-year is, however, as much, as in the present low price of wool, can be given, with profit to the sheep-owner; and out of this sum a man of frugal habits may lay by a considerable sum yearly, more particularly should he learn to shear, by which he may put a few pounds into his pocket every summer, in addition to his wages; and still more so, should he, by care and good management, get charge of a breeding flock, and obtain a prize for rearing a large number of lambs. Again, if he be the father of a family, with two or three sons, from twelve to fifteen, or seventeen years' old, he may, after a short time, take charge of a station; the sons going out with the flocks, while he acts as watchman, in which capacity he will have many hours unoccupied during the day, which may be employed in improving his cottage and making his house comfortable. He may also cultivate a garden, or even a small field of corn, whilst his wife would find full employment in domestic matters, the rearing of poultry, &c.; and should there be daughters of sufficient age they will be sure to obtain good situations as servants in respectable families.—*A Summer at Port Phillip, by the Hon. Mr. Murray.*

TO DETECT ADULTERATION IN BONE DUST.—Take a sample and pick out all the pieces of bone that can be distinguished, weigh out fifty grains of the residue, place it in a flask similar to that described before, and add half an ounce of water; place half an ounce measure of nitric acid into another flask, and place both into one scale and balance them accurately; now add the nitric acid by degrees to the flask containing the bones, and when all action has ceased, return the two flasks to the scales and note the weight lost; every grain lost is equal to two of chalk; boil the solution in the flask and pour it out into a clean basin, wash what has not been dissolved in clean water, and, on examination, the sand or brick-dust will be apparent; this can be dried and weighed.—*B. Lawes, on Manures.*

## AGRICULTURAL CHEMISTRY.

A COURSE OF TEN LECTURES BY PROFESSOR BRANDE, F.R.S., AT THE ROYAL INSTITUTION, DELIVERED JANUARY 27TH.

(From the *Civil Engineer and Architect's Journal*.)

## LECTURE I.

The Professor commenced by observing that he entered upon this course of lectures with great diffidence and anxiety, and at the same time with a great deal of pleasure. He was aware that the subject of agricultural chemistry is one that is attracting a great share of attention, and that it is in the hands of eminent chemists and skilful practical agriculturists; he was also aware that a great deal has been held out as to what chemistry may do, and can do, and will do in this very important subject; upon this subject he would endeavour to bring before his hearers, in plain and intelligent language, the main subject which the agricultural chemist ought to attend to—in fact, the practical agriculturist; because he did not hesitate to say that every farmer—every practical agriculturist, ought to be acquainted with at least the principles of agricultural chemistry.

He entered upon the subject with pleasure, because he was appointed by Sir Humphrey Davy, many years ago, to deliver a course of lectures to the then existing Board of Agriculture, at the time that he retired from the office of Professor of Agricultural Chemistry to that body. He had still the notes and memoranda which Sir Humphrey gave him upon that occasion, and he looked back to them with much pleasure as containing the germs of almost everything that has been done in agricultural chemistry since that period. The business of the practical farmer is, in fact, very simple. It is, to raise from a given extent of land the largest quantity of the most valuable produce, and to do that in the most economical way, both as regards time and money, and further, in such a manner as permanently to impoverish the soil as little as possible. It was his business to show what aids are derivable from chemistry in reference to the accomplishment of this highly important object. The subject of agricultural chemistry, if we consider it as bearing upon the improvement of land in its practical rather than its theoretical bearing, has now of course become a matter of the greatest importance. Our population increases rapidly upon our territory, and unless means be found to increase the produce of the land, emigration or other difficulties must occur to a great extent; and he thought it was perfectly obvious that a great deal of cultivated land in this country may be brought into a higher state of cultivation, and that a great deal of uncultivated land may be brought into a state of practical cultivation. There is something very extraordinary—though being every day before our eyes, we do not regard it as such—in the growth of a seed. If we take, for instance, a seed of turnip, or rape, or wheat, we find that in the course of a certain time, and under particular circumstances, it produces a plant or a tree. Nothing, for example, can be more remarkable than that, in the course of a few weeks, a small seed becomes a perfect plant; nothing can be more astonishing, if we look at it in all its details, than that a small acorn in a few years grows into the stately and majestic oak. The question we have to examine into is, "How is all this to be effected?" and to this end it is obvious that we should consider the changes in the seed itself, which is a matter of great importance. We find, when the seed is placed in a congenial soil, that it soon expands, and then the germ

begins to grow; it puts forth a rootlet, and after a time it makes its way downwards, and the stem makes its way upwards. During these changes there are very curious chemical alterations going on in the constitution of the seed itself, to which he would hereafter call their attention. Here we find that as soon as the young plant has taken such nourishment as it could get from the seed, it becomes dependent on the soil which contains the root, and upon the atmosphere to which the branches are exposed. From the soil there is a considerable quantity of matter taken, and the leaves also imbibe a considerable quantity from the air. These agents, therefore, we have to create.

First, as to the soil—we have to consider it as the mechanical support of the plant, and in this respect the texture of the soil is a matter of importance. Then we find that it derives nourishment from the soil in three ways:—1st, we have to examine the *inorganic* constituents which the soil gives to the plant—and if we take the stem, or the leaves, or any other portion of a plant, it will be found that it contains a quantity of saline, or earthy, or other particles which we call inorganic matter, which it cannot take from the air, and which therefore it must take from the soil; 2nd, there is also a quantity of *organic matter* taken up from the soil; and 3rd, it will be found to be undergoing changes through the influence of the air affecting both itself and the atmosphere. These are some of the principles to which the learned professor observed that he should have to revert in reference to the soil.

Next, in reference to the state of the air. Having determined what are the elements of the plant, and which it cannot get from the soil, we must search the air, and having ascertained its constituents, ascertain how far they contribute to the growth of the plant. It is extraordinary, but nevertheless true with regard to plants, that the nourishment they derive from the soil is very insignificant compared with what it obtains from the air. Take an oak, for instance; in the course of a certain number of years it will contain perhaps several tons of wood. Now, it is quite clear that the oak must have derived this either from the soil or the atmosphere. Has it impoverished the soil?—taken anything from it? Certainly not; on the contrary, we find that the soil, so far from having imparted organic substances, has in fact gained them, and there is an increase of the organic matter in the soil, arising from the shedding of the leaves, or the accidental fall of a branch, &c. It is obvious, then, that this great acquisition of matter must have come from the atmosphere. The atmosphere is a continual source of food to the plant; and as the plant cannot go about like an animal to search for its food, the atmosphere is continually wafting about the plant; and no sooner is the nourishment extracted from one portion of atmosphere, than a fresh portion brings fresh nourishment, which the plant greedily devours.

Without the soil, it is true, the plant could not get those inorganic constituents to which he referred. If, for instance, we find in a plant lime or phosphoric acid, it is clear they must have come from the soil; but the carbon, hydrogen, and oxygen come from the atmosphere—not entirely, but principally—and in such quantities as not only enable the tree to grow, but, as he said before, by the shedding of the leaves, &c., to enrich the soil: and we do find, actually, that by the growth of trees the soil is considerably enriched, as far as organic matter is involved.

Having, then, examined how far the soil and the air are concerned in these matters, we are next to look at

what will be brought before you as the ultimate and proximate elements of a vegetable. By ultimate elements, we mean those ultimate elementary substances which cannot be decomposed: by proximate elements, their secondary arrangements and results—sugar, starch, gum, &c., and the approximate elements of a vegetable.

Then there is another subject I must bring before you, viz., what are the functions of the different classes of plants; and lastly, how far mechanical and chemical expedients may be resorted to, to render barren soils fertile, and fertile soils continuously so. We shall find that the roots and the leaves of plants effect peculiar functions—that the roots take up certain matters from the soil, and that the leaves and all the green parts of the plant are energetically employed in taking up an immense quantity of nourishment from the atmosphere. We are all aware of the beautiful provision by which the vegetable is made to take up, as it were, the refuse of animals. We may say that we are deteriorating the air as far as we ourselves are concerned, but we are impuring it for the growth of plants. We are like organs engaged in infusing into the air what is proper for plants, which they take up, thereby again rendering the atmosphere fit for our use.

Under the head of the mechanical and chemical expedients to be resorted to for rendering barren soils fertile, and fertile soils continuously so, we shall, of course, come to a number of facts connected with the influence of manures and the different operations of tillage. Looking at soils, in the first place, they must of course originate in the action of the air, water, heat, and light, or of those agents commonly designated under the term of "the weather" upon the earth; and as the different rocks or strata which form the crust of the earth are some exposed in one place and some in another, giving thereby a different constitution to the soil, we see the important bearing of geological science upon agriculture.

Originally the surface of the earth consisted entirely of hard rocks, which by the influence of moisture and other agents, have gradually become disintegrated and fitted for the growth of plants. It is obvious, therefore, that the nature of the soil must greatly depend upon the character of the rock upon which the soil rests—though not always so, in consequence of the soil from one rock being sometimes carried to a rock of a different description. In examining a geological map we find immense tracts of chalk, red sandstone, limestone, clay, coal, and so on, all of which give rise to different soils; and it is important to consider this branch of the subject, for it explains to us how one system of amelioration which answers in one place does not succeed in another.

The different strata give rise to what are usually called the different rocks, the term "rock" being usually applied in agriculture to the base on which the subsoil immediately lies. The subsoil is the matter supposed to be derived directly from the disintegration of the rock itself: then upon the top of the subsoil comes the superficial soil, which in its mineral contents will agree with the rock and the subsoil, but which is nevertheless greatly different, in consequence of the animal matter which falls upon it, and the long exposure to the air, moisture, heat, and light.

"I propose," said Mr. Braude, "first to lay before you a short account of the inorganic constituents of the soil, and endeavour to show how the preponderance of one or other of these constituents gives a different character to the soil—in other words, what is meant by a sandy soil, a clayey soil, a marly soil, a

chalky soil, &c. And in reference to these matters, I shall endeavour to limit myself to such an account as presses immediately upon agriculture."

There are four substances usually called earthy bodies which are met with more or less in all fertile soils, and it is highly essential that an agriculturist should be acquainted with their particular characters and peculiarities. They are silica, or siliceous earth; alumina, or aluminous earth; lime, or calcareous earth; and magnesia—all of which are resolved by the chemist, in their purest state, to the form of a white powder. Chemically speaking, these substances are all metallic oxydes, and not as was formerly supposed, simple bodies. With regard to silica—that very important and abundant ingredient in almost every soil—it has this curious constitution, that it is composed of equal weights of a metallic body and oxygen.

He would have his hearers particularly to bear in mind the following proportions of the four earthy bodies which he had just referred to—all of them consisting of a metal and oxygen, viz:—

Eight parts of oxygen combine with eight parts of the metal silicium, to form sixteen parts of oxyde of silicium, or silica.

Eight parts of oxygen combine with nine of the metal aluminum, to form seventeen parts of oxyde of aluminum, or alumina.

Eight parts of oxygen combine with twenty of the metal calcium, to form twenty-eight parts of lime.

And eight parts of oxygen combine with twelve of the metal magnesium, to form twenty parts of magnesia.

The professor then observed that he would pass through, as quickly as he could, an outline of the properties of these bodies. To commence with silica. Silica exists in nature in a great variety of forms, absolutely or very nearly pure. We find it in rock crystal quite pure; very nearly so in flint, which contains in addition some slight colouring matter, which we do not perfectly understand, and perhaps about one per cent. of foreign matter. If you heat flint or rock crystal to a red heat, and then plunge it in water, it immediately becomes opaque, and can then be readily rubbed down to a fine powder. Another very abundant source of silica is to be found in the white pebbles which are so often met with in the beds of streams. And we also find a considerable quantity of silica in the form of sand, of which we cannot take a better specimen than the white sand from the western extremity of the Isle of Wight, or from Lynn, in Norfolk. It is a curious fact with regard to sand, if we examine it microscopically, we find it to consist partly of minute crystals, and partly of small, rounded particles, so that a part may be regarded as the crystal of flints, and part as small pebbles. It would appear that crystallized sand arises from decomposed granite, granite consisting of three substances—quartz (which is afterwards sand), felspar, and mica.

The extraordinary property which strikes us as being very important with regard to silica, is its utter insolubility in water and in almost every thing else. You may keep even the finest sand you can obtain in water for any length of time, and yet not the smallest portion will be dissolved. Silica, however, does find its way into plants, and into some in considerable quantities—in common straw, for instance, corn, and grass, we find a great quantity of this insoluble substance; and it becomes a curious question to ascertain how silica is rendered soluble and finds its way into plants. Silica is indeed of the utmost importance to the texture of plants—if we take a

stalk of wheat we shall find that it is silica which gives it firmness, enables it to bear the ear in due season, and imparts to it all those properties which belong to the more perfect and better kinds of straw. But though silica is insoluble in water, it is readily soluble in potass, soda, lime, and other alkalis. In some strata we observe silica presented to the roots of plants in a soluble form; but if we dissolve silica in an alkali, and then throw it down again, we find that in some case it may be thrown down perfectly insoluble and sometimes quite soluble. Sometimes it is taken up in a soluble form, and sometimes retained in an insoluble form. No doubt, the silica in straw has been soluble, now it is perfectly insoluble in water. Glass is a compound of silica and soda, yet glass is insoluble in water, for we know that it is employed as a vessel for holding water. This arises from the mechanical texture of the glass; for if we rub glass to a fine powder, we find that it does become soluble in water. This application of silica to the soil becomes a very important question; because there is no doubt that certain crops fail, not for the want of silica, because there shall be plenty, but for the want of it in a soluble state. Now some agriculturists actually mix pounded glass, or another substance which I shall show you presently, with their manure, and employ it with great success. If, instead of common glass, they take another compound of silica, viz., glass with more soda, they have a substance which readily dissolves in water. The lecturer here exhibited a solution—called by the ancients “liquor of flints,” and then proceeded to observe, “I can at pleasure separate the silica from it in a particularly soluble or in a particularly insoluble state.” He then proceeded with the following experiment:—In a glass containing the “liquor of flints” he added a large quantity of water, and in another glass he had some of the liquor in a more concentrated state: to each of these solutions, he added a little of almost any acid. In the strong solution, silica was thrown down in the form of a jelly; and by adding more water, he showed that it would not redissolve the silica. In the weaker solution no such result was obtained; although he added as much acid as to the other, yet it remained perfectly clear. “In the first state,” said Mr. Brande, “I need hardly tell you silica would be perfectly inert in the growth of plants—in the other state it would be readily taken up. We find also, though common glass in its usual state does not appear to be acted upon by the air and water, that it does yield when acted upon by those agents for a long time. Pieces of glass are often met with in a field, of all kinds of colours, and so soft that they will give way to the nail.”

There is another curious agent, which has the power of acting upon silica, and of carrying it at once away, and when he came to analyze soils, he would show this substance—it is its fluoric acid. Now it would appear that we have to consider silica first as a mere mechanical ingredient of the soil—that is, giving to the soil a certain looseness of texture possessed by all sandy soils: and then, also, with reference to the component parts of the crops growing upon the soil.

Another substance to which he adverted, is the argillaceous earth or alumina. It is an ingredient in all fertile soils, and from it they derive some very important properties. In the first place, all clays contain alumina: and he need not advert to the importance of clay in soils, and to the functions which alumina performs in them. It is a very hydrometic substance, that is, it has a great attraction for water,

which it absorbs and retains in great quantities. It is the only substance which gives plasticity when mixed with other bodies; and whenever we have a plastic substance, then we have alumina.

Alumina is a most useful ingredient in the soil, provided that it does not exist in excessive quantities; if there be too much of it, it forms that stiff, clayey, unmanageable soil, of which there is so much in England. I must take you to it in its pure state, and we get it out of alum. If we dissolve a quantity of alum in water and add an alkali, we shall throw down alumina in a pure state, or very nearly so.

If we only take ten or twelve per cent. of alumina, and mix it with silica, we shall find that it will give to it the plastic nature of clay. Indeed, a very small portion of alumina gives plasticity and adhesiveness, and other important properties, especially as relates to moisture in any soil. Like silica, it also forms a component part of the growing crop. Some vegetables cannot grow without alumina; none, perhaps, can grow well without it in the soil; some few actually require it as food. There are certain vines which cannot be cultivated without alumina; in those vines we find alumina composing a certain part of the plant—*vay*, we find it even in the grape—and even in the wine. The Rhenish wines contain a considerable quantity of alumina; and it is a curious fact, that a quantity of wine was actually stopped at the Custom House some time ago, which it was thought had been adulterated with alum; when, in fact, it contained no more alumina than it had taken up from the soil. Alumina at once differs from silica, in that it is equally soluble in acid and alkali. Another character of alumina is, that it combines with sulphuric acid and potass, and crystalizes very readily; but we have to deal with alumina only in reference to the soil and its agricultural purposes.

#### DERWENT AND SHOTLEY BRIDGE AGRICULTURAL SOCIETY.

FIRST ANNUAL REPORT READ BEFORE THE GENERAL COMMITTEE, JANUARY 12, 1844.

The committee, in bringing to a close the transactions of the Society for the year now terminated, deem it of importance to lay before the members and friends a short report of the proceedings, together with a statement of the accounts during the past year, and such suggestions as have occurred to them in carrying out the objects they have in view.

The committee have great satisfaction in congratulating the members on the success which has attended their exertions for the improvement of the agriculture of the district, and the numerous attendance at the ploughing meeting and exhibition of stock (upwards of four hundred persons having been admitted to the show ground at a charge of sixpence each) shews the great and general interest which is taken by those engaged in agriculture in the labours of the society.

The ploughing meeting was held on Mr. Bell's farm, High Waskerley, on the 9th February, when twenty-nine ploughmen entered the field to compete for the prizes. There was a very decided improvement in the ploughing generally upon that of the previous year, and much of the work was highly commended by the judges. The committee, however, think it desirable that in future, the ploughmen should be limited to a certain breadth and

thickness of furrow, and also to the time in which the work shall be performed; all of which points were omitted in the previous competitions. They also consider it important that the draught of the ploughs should be tested by a dynamometer, if such an instrument can be obtained; believing, as they do, that a considerable saving of animal power might be effected if more attention was paid to the construction of the ploughs used in the district.

The competition in hedging also took place upon the same farm on the previous day, when six men entered. The improvement in this department was very considerable; but, considering the very unskillful way in which the hedges in the district are generally managed, the committee consider it of great importance that more encouragement should be given towards improving that item in rural economy, and therefore beg to recommend that prizes should be offered for competition by young men under twenty years of age.

The competition for the best reaped farms excited considerable interest, and although the numbers entered this year were not so numerous as the advantages resulting from it in the two previous seasons led the committee to expect, many farmers having declined, from a contracted notion that they had no chance of success, and others, it is feared, from an unwillingness to allow strangers to see the defective and wasteful system they pursued—yet there were eleven farmers with their labourers entered, viz., seven in the first class, and four in the second; and, whilst the successful competitors had the gratification of dividing amongst their labourers the whole amount of the prizes, according to their respective merits, it was satisfactory to hear from the unsuccessful ones that they considered themselves great gainers in the improved mode in which the crops had been taken off the ground: nor is the advantage confined to those who entered the competition, for all who know the district cannot but have remarked the progressive improvement that has taken place in the mode of gathering the crops in the last two years. The importance of an improved mode of reaping and gathering the crops cannot be too highly estimated, both as a local and national object; and if that is the only benefit resulting from the labours of the society, they are amply rewarded for all their exertions by the success which has attended the improvement in this important branch of agricultural industry. With reference to prize reaping and non-prize reaping, see Mr. Siddell's letter at the end of the report (No. 1.)

The general show of live stock and agricultural implements was held in a field belonging to Thomas Wilson, Esq., Shotley Hall, on the 13th October. The show of short-horned cattle was numerous, but inferior in quality to what the district ought to produce; and it is hoped that from the stimulus given by this society in offering premiums for the best animals, the stock, in a short time, will be materially improved.

The show of Leicester sheep was not numerous, but some very useful animals were exhibited. In the pigs, for breeding purposes, the show was limited, and those shown were capable of much improvement; but the cottagers' pigs were very good, and excited much interest.

There were some very good agricultural implements shown, and a few sales effected, which, it is hoped, will induce the makers to attend the future meetings of the society. From the great improve-

ment which has, of late years, been effected in the construction and adaptation of agricultural implements, the committee consider that they would best promote the interests of the society by offering *prize implements*, and such as are applicable to the district, for the higher class of prizes in place of money, and thus introduce new and improved implements of husbandry, which, in all probability, would not otherwise be procured.

Much attention has of late years been given by scientific men to the application of chemistry to agriculture, and from which the most important results may be anticipated; but, until we arrive at that state of perfection when every farmer shall possess his little laboratory, and, by chemical analysis, be able to ascertain the component parts of his soils, and the composition of his plants, and thus obtain the knowledge of the essential substances to be added to his soils in the shape of manures to produce those vegetable substances he may require.—until that time arrives, and of which we have no doubt, we must be satisfied to feel our way by practical experiments upon the varied soils in our respective districts. Let us take nature as our guide, and by carefully studying her laws, and following them out in practice, so far as our peculiar circumstances will admit, we have a well grounded hope we will not be disappointed in the result. Hear the beautiful remark of the greatest modern benefactor of agriculture, Liebig, "Experiments are questions put to nature, and the result of those experiments are nature's answer." But, in making these experiments, great care and attention should be observed; otherwise disappointment, in all probability, will be the consequence.

Should the members of this society make any experiments on thorough draining, the manufacturing and application of fold-yard and the use of liquid and foreign manures, the comparative merits of the different descriptions of grain, feeding of cattle, or in any other branch of agriculture, it is hoped the result will be communicated to the secretary, so that others may be benefited thereby. We have much satisfaction in observing that Mr. Burnett, to whom this society is so much indebted, is, with his usual ability and perseverance, prosecuting experiments on the win or gorse, so as to make it useful to man; and has so far succeeded, by the aid of machinery, as to make it applicable to the feeding of his cattle. Next year he has kindly promised to lay the results of the trial before the society.

It may be useful to those who wish to purchase foreign manures, to know the success which has attended their application in this district, so as to guide them in some degree in the selection. Various experiments have for some years been made on Low Waskerley Farm, under the direction of our excellent president, and some of the more successful are appended to this report. It will be observed that the application of nitrate of soda (No. 2) has been attended with very important results; and as that article is now reduced in price from £28 to £12 per ton, it may, therefore, be used at that price with great advantage. The same remark may be applied to rape dust, when used upon strong soils, for wheat, for example, as will be seen by experiment No. 3, in which the comparative advantages are shown between purchasing and applying that manure, and sowing wheat upon clean fallow without any manure at all, and which, it is to be regretted, is too frequent a practice in this district, and bad crops are the consequence. It should always be borne in mind, that half crops are ruinous; and,

therefore, every means within our reach should be used to make them more abundant.

The merits of guano as a manure is now tolerably well established by the experiments of the last two years in this district. It is, however, one of those substances of foreign importation so liable to adulteration, that a word of caution may be useful to the purchaser. Always buy it from a respectable merchant. Perhaps the best and easiest test by which its purity can be estimated by the farmer, is to put a quantity into a glass, pouring upon it a quantity of hot water, and in a short time the soluble or valuable parts will be dissolved, and the earthy or impure particles will be left at the bottom of the glass; and the value is, of course, in proportion to the quantity of soluble matter it contains, and which ought to be nearly one half.

Bone manure is now so well understood in this district as not to require many remarks.

In a series of experiments made on Low Waskerley Farm upon turnips this year with various manures, a solution of bones in sulphuric acid or oil of vitriol was tried, and the result was very satisfactory; but, in consequence of the unfavourable season for the growth of turnips in this district, we cannot give so much information as to guide the farmer in the application of this composition; but the experiments will be repeated next season, and it is hoped that others will also turn their attention to it, as from the result of the decomposition of the bones, viz., free phosphoric acid and sulphate of lime, we have great hope of its general applicability. Mr. W. dressed seven acres of old grass land with this solution after the hay crop was taken off; it now looks well and promises an ample return for the expenditure. See also the report of Mr. Bell, on the comparative cost and produce of various manures in No. 4.

It is an important desideratum to the farmer in this district to be able to raise his turnip crop with foreign or artificial manures, so that he may be able to save that produced in the fold-yard for his fallow land or grass; and, with this view, the committee beg to recommend that a premium be offered next year for the best crop of turnips (say three acres) raised with foreign or artificial manures, and restricted to tenant farmers.

But, whilst so much attention is given to the introduction of something new in the shape of manures, it is to be regretted that so little attention is given by farmers to a subject of far greater importance, both to himself and the country at large—the *management and application of that produced on his own farm*. It is lamentable to observe the immense wealth which is annually washed away from almost every fold-yard in the country; whilst, at the same time, large sums are expended in the purchase of manures from foreign countries. Let every farmer ask himself this question—Have I made the most of that within my reach? It is feared few can answer in the affirmative. If he cannot, let him, forthwith set about to remedy so great an evil; let him in some convenient place, form a receptacle for the liquids from his cow-houses, stables, fold-yards, piggeries, &c.; but, let him always bear in mind the *quality* of his manure depends on the good or bad *quality* of the food consumed by his cattle, and that, if he should indulge them with a little oil cake, he will be doubly rewarded for such an outlay, in the improvement in the stock and the very great increased value of the manure: above all, let him bear in mind that in his own fold-yard he is carrying on a little but most important manufactory, and that upon the proper

management of which his future crops and his own success or ruin as a farmer depends.

On the subject of thorough draining and subsoil ploughing it is perhaps not necessary for the committee to make many remarks, for the many examples which the farmers now have before them must carry conviction to the minds of all, that on our heavy clayey soils "thorough draining" must form the basis of all our future improvements. It is a work of much national importance, and must be accomplished; but how, is a question to be settled between the owner and the occupier of the soil, and with which this society cannot interfere further than expressing a decided conviction that it will afford an ample return for the capital of the landlord and the industry of the tenant, and an almost endless source of employment to the agricultural labourer. Next report, we hope to have a communication on this subject and the application of guano from our spirited vice-president.

No. 1.

Shotley Field, Dec., 1843.

DEAR SIR,—As many of the members of the society are prevented competing for the shearing from a dread that the extra expense will not be covered by the increase of the straw, I have made a calculation of the comparative cost of reaping the crop on my farm last year when I did not compete, and of this year when I had the pleasure of receiving the first prize. In 1842 my crop stood thus:—

24 Acres Wheat reaped.....	£7 4 0
13 Acres Barley reaped.....	6 10 0
18 Acres Oats reaped.....	9 0 0
18 Acres Oats mown.....	3 12 0
	£26 6 0

The wages paid that year were in general about 2s. per day.

In 1843 it stood thus:—

28 Acres Wheat reaped.....	£6 6 0
6 Acres Oats reaped.....	1 16 0
44 Acres Oats mown.....	7 12 0
9 Acres Barley mown.....	1 16 0
	£17 10 0

The wages this year for women shearers were 1s. 6d.

The decrease in the price of wages, and the larger quantity mown, will in some measure account for the less sum paid this year; but yet it will be seen I had fourteen acres more corn to cut, so that I do not consider that, even at the same rate of wages, I paid more for my reaping than I did last year; and, at the lowest calculation I can make, I have been a gainer of sixty thrave of straw, or a pecuniary profit of £6, independent of the pleasure of seeing well reaped fields.

I am, dear Sir, yours obediently,

To J. Renton, Esq., Sec. WM. SIDDELL.

No. 2.

The following experiments on the nitrate of soda as a manure were made at Low Waskerley Farm in 1840. The quantity of nitrate used in each case was at the rate of one hundred weight per acre, and applied on the 24th of May, 1840:—

1st.—OATS.

	Weight of Corn in the sheaf per acre. Stones. lbs.	Weight of Corn per acre. Stones. lbs.	Measure of Corn per acre. Win. Bush. Qts.
With Nitrate.....	439 9.....	183 6.....	65 4
Without.....	267 9.....	143 8.....	49 20
	Increase per acre 172 0	39 12	15 16
	64 per cent. in Straw. 31½ per cent. increase in grain.		

This crop was after grass, and in a forward and healthy state when the nitrate of soda was applied. Soil a good turnip and barley.

2nd.—BARLEY.

	Weight of Corn in the sheaf per acre. Stones lbs.	Weight of Corn per acre. Stones lbs.	Measure of Corn per acre. Win. Bush. Qts.
With Nitrate	442 7	192 8	50 17
Without	262 12	120 7	31 3

Increase per acre 180 9..... 72 1..... 19 14  
71 per cent. increase in straw. 6½ per cent. increase in grain.

This crop was after turnips. Soil, a strong loam upon a subsoil of sandy clay, was thoroughly drained and subsoil ploughed the preceding year.

3rd.—WHEAT (CREEPING RED).

	Weight of Corn in the sheaf per acre. Stones lbs.	Weight of Corn per acre. Stones lbs.	Measure of Corn per acre. Win. Bush. Qts.
With Nitrate	412 12	167 12	46 21
Without	212 13	110 8	29 12

169 3                      57 4                      17 9  
70 per cent. increase in straw. 5½ per cent. increase in grain.

This crop was after a clean fallow, which had a dressing of shell lime after the rate of forty bushels per acre, but without manure. Soil, clayey loam upon a subsoil of sandy clay,

4th.—Grass.

First year, being a mixture of Pace's perennial and Italian rye-grass, with red and white clover.

	Stones lbs.
With Nitrate of Soda	322 1
Without	232 4

Increase of weight per acre.. 89 11  
Being at the rate of 38½ per cent. The hay was weighed out of dry cock, in a fit state for stacking.

The recurrent year there was a considerable increase of grass where the nitrate of soda was applied. The field was in pasture, and the cattle were very fond of the grass where it was applied; and it was considered that the advantage this year was fully equal to the first cost of the article. In the third year little difference was observed, but it is satisfactory to know that it was not injured by the treatment, as many supposed it would be. In the above experiments upon the corn no effect was observable in the succeeding years.

No. 3.

Experiments on the comparative value of manures made in the Pond Field at Low Waskerley, on wheat sown October, 1842:—

1st.—WITH FOLD YARD MANURE.

	Imp. Bush. Qts.	£. s. d.
Produce of Wheat	25 12 at 7s. per bush.	8 17 7
Produce of Straw, 263 stones at 3d.		3 5 9
		12 5 4
15 fethers of Fold Yard Manure at 4s....		3 0 0

2nd.—WITH RAPE DUST.

	Imp. Bush. Qts.	£. s. d.
Produce of Wheat	22 16 at 7s. per bush.	7 17 6
Produce of Straw, 190 stones at 3d. per stone		2 7 6
		10 5 0
20 Imperial bushels of Rape Dust at 2s. ...		2 0 0
		£8 5 0

3rd.—No MANURE.

	Imp. Bush. Qts.	£. s. d.
Produce of Wheat	15 8 at 7s. per bush....	5 6 9
Produce of Straw, 183 stones at 3d.....		2 5 9
		£7 12 6

WITH FOLD YARD MANURE.

Value of the Crop after deducting the cost of the Manure per Acre	£9 3 4
Value of Crop without Manure	7 12 6

Difference in favour of Fold Yard Manure over no Manure.....£1 10 10

WITH RAPE DUST.

Value of the Crop after deducting the cost of the Manure	£8 5 0
Value of Crop without Manure	7 12 6

Difference in favour of Rape Dust over Manure.....£0 12 6

No. 4.

High Waskerley, Dec., 1843.

DEAR SIR,—I have much pleasure in forwarding you the comparative result of five experiments I made with my turnip crop this last season, giving you the price of the manures per acre, and the weight of turnips on a given portion of land:—

1.

	Weight of Crop on 3 Drills 22 Yds. long, each, and 26 in. wide.
Manures used, and Cost per acre.	£. s. d.
20 loads of Fold Yard Manure mixed with Soil at 4s. 6d. . . . .	4 10 0.....385lbs

25 bushels Dust and ½ in. Bone sown by hand, at 2s. 3d. . . . . 2 16 3.....250lbs.

3.

15 bushels Bones . . . at 2s. 3d. . . . .	
Mixed with 5 cart lds. of Ashes sown by drill . . . . . at 1s. 0d	1 18 9.....310lbs.

4.

52 gallons Coal Tar, at 0s. 1d. Mixed with 5 fethers Soil . . . . . at 1s. 6d. And 6 fethers Ashes, at 1s. 0d.	0 17 10.....270lbs.
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5.

3 cwt. Guano . . . . . at 17s. 0d. Mixed with 3 fether of Ashes . . . . . at 1s. 0d.	2 14 0.....370lbs.
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I am, dear Sir, yours, &c.

To J. Renton, Esq., Sec. JOSEPH BELL.

GUANO.—The analysis of this substance is so complicated that it would be useless to give any process for detecting adulterations; it is believed that at present it is not adulterated in this country, but the value of the samples imported vary greatly, some containing no ammonia, and others as much as fifteen per cent.; it is recommended to those that purchase it, to have the ammonia and phosphate of lime determined by an experienced chemist.—B, *Laues, on Manures.*

## LOUGHBOROUGH AGRICULTURAL ASSOCIATION.

This society which now numbers in its list of members almost every intelligent and distinguished landowner or occupier in the neighbourhood, who have established a library in connection with it, and also quarterly meetings for the improvement of agriculture, by the discussion of subjects relating to that science, bids fair from its past operations, and present aspects, to be a most popular and valuable institution; and by the information elucidated thereby shedding lustre and conferring benefits upon thousands. Its last quarterly meeting was held on Thursday, the 25th January, 1844, at the King's Head Hotel, after the market ordinary, which was numerously attended. The subject of "the best method of Keeping Farm Horses," which was so ably introduced by Mr. H. Lacey, of Hoton, at the last meeting was resumed, and that of "the Keeping of Cattle in General" was also introduced. Further remarks from us upon the discussion itself, is unnecessary; our agricultural friends will do well, however, attentively to pursue the report.

After the healths of Her Majesty, the Queen Dowager, Prince Albert, the rest of the royal family, and C. W. Packe, Esq., the President of the Society, had been proposed, and duly honoured,

The Chairman, S. B. WILD, Esq., of Costock, read the circular addressed to the members, which stated the objects of their assembling; and called upon Mr. Stokes, of Kingston, to lead the discussion.

Mr. STOKES expressed the pleasure it would always give him to be useful in promoting the cause of agriculture; though, with regard to the duty he was then called upon to perform, he was well aware there were many members of that association more competent than himself. He would not, however, detain them, but proceed at once to lay the facts he had been enabled to gather before them. The first was on the keeping of horses. From the observation he had made as to the quantity consumed, and the price, he found the expence of keeping one cart horse for a week to be as follows:—No. 1. Half-a-strike of beans, 21lbs. of clover per day, making 147lbs. for the week, 28lbs. of bran, 48lbs. of cut hay, 48lbs. of cut straw, and 14lbs. of turnips. Now, the beans he estimated at 2s. 3d. being 4s. 6d. per strike, or about 3s. 4d. per quarter; the clover, at 2s. 6d. per cwt. 3s. 3½d.; bran at 4l. 10s. per ton, 1s. 1½d.; the cut hay he put down at the same price as the clover, 1s.; the straw he took at 1s. per cwt., which would leave 6d.; and the turnips 7l. per acre, which would be 7s. per ton, the average being 20 tons per acre, and leave 1d. for the week; amounting altogether to 8s. 3d. per week. (*Cheers.*) The next, No. 2, was the expence of keeping six horses for one week, viz. 8 strike of bean flour, at 2s. 6d., 1l.; 2 cwt. of cut clover and hay at 2s. 6d., 5s.; 2 cwt. of straw at 1s., 2s.; 3½ cwt. of clover and hay at 2s. 6d., 8s. 9d.; 12 stones bean meal at 1s., 12s.; and 84lbs. of turnips 6d.; making 2l. 8s. 3d. in the whole, and 8s. 0½d. for each horse. [Mr. Henson: Did you say 2 cwt. of straw at one shilling?] No, two shillings; a shilling per cwt. Then for No. 3.—The expence of six horses for one week. He allowed 350lbs. of cut hay at 2s. 6d., 8s.; 350lbs. ditto straw, 3s. 1½d.; 252lbs. of bean flour at 1s. per stone, 18s.; 190lbs. of cut hay at 2s. 6d. per cwt., 4s. 3d.; 392lbs. of pea straw at 1s. 6d. per cwt., 5s. 3d.; 224lbs. of Swede turnips at 7s. per ton, 9d.; equal in the whole to 1l. 19s. 4½d., and 6s. 6½d. per week, per horse. That was all the keep he gave his horses. (*Cheers.*) He hoped some gentle-

man would introduce a system more economical and beneficial to all, and he for one should be very willing to adopt it. He would next proceed to the stalled beast.—No. 1, was a beast of his own. He found the quantities and expence to be as follows:—70lbs. of cake at 7l. 5s. per ton, 4s. 6½d.; 140lbs. of hay at 2s. 6d. per cwt., 3s. 1½d.; 224lbs. of turnips, 8½d.; amounting to 8s. 4½d. per week. [The Chairman: How do you calculate your turnips?] He took 20 tons to the acre, and calculated them at 7s. per ton. No. 2, of the same class, he found consumed 110lbs. of grains, 1s. 10d.; 280lbs. of turnips, 1s. 9d.; 21lbs. of oil cake, 1s. 8d.; 60lbs. of cut hay, 1s. 8d.; 60lbs. of cut straw, 10d.; 14lbs. of long hay, 5d.; amounting to 8s. 2d. per week. Next came the second class of feeding beast: that was, when they were not kept quite so high. 245lbs. of turnips, at the same price as before, 1s. 1d.; cut hay, 1s. 6d.; and he put down the straw at 9d.; amounting with oil cake to 6s. 1d. per week per beast. He gave his milking cows 70lbs. of hay, 1s. 6d.; 16lbs. of turnips, 7d.; 21lbs. of oil cake, 1s. 4d.; 3½lbs. linseed, 7d.; 63lbs. of hay, 1s. 6d.; 63lbs. of cut straw, 7d.; which altogether would amount to 6s. 1d. per week per beast. More generous food would produce, he dare say, more milk, but he found in winter it was necessary to economise as much as possible (*Hear, hear.*) For this straw-yard beast.—He gave 2lbs. of cake per day, which for the week would come to 14d., and straw 1s., amounting to 1s. 11d. per week. To the Calves. He gave 10½lbs. of cake per week, 8d.; 32lbs. of cut hay, 8d.; and 36lbs. of cut straw, 6d.; amounting to 1s. 10d. per yearling calf per week. Sheep came next.—Now he did not know whether his sheep had as great appetites as others; certain it was they did not eat so much as some which he could speak of. He gave them about 1 cwt. of turnips, 4½d.; and 13½lbs. of oil cake, 13½d.; making 6½d. per week. For fat sheep—No. 2. Turnips, 4d.; 3½lbs. of cake, 3½d.; 7½d. per week. He then proceeded to the sheep fed in the fold-yard, 47 for one week. 4,711lbs. of turnips, 14s. 7d.; 147lbs. of beans, 9s. 4d.; 49lbs. of bran, 1s. 10½d.; 42lbs. of oil cake, 3s. 6d.; equal to about 1l. 9s. 3½d. in the whole, or 7½d. each per week. (*Applause.*) He begged to read them an extract from the *Agricultural Journal*, which contained a statement by Mr. Childers, of Doncaster, "On Shed-feeding Sheep," from which it appeared that 20 wether hogs consumed 27 stone of turnips per day, 10lbs. of linseed cake, ½lb. of barley, a little hay, and a constant supply of salt. The same quantity was given to the same number of sheep in a shed; these were in the field. [The Chairman: In a field with a shed?] They were in a yard, and could go into the shed if they liked. The first three weeks, each consumed the same quantity, but in the fourth week those in the yard consumed three stones of turnips less than the others, and in the ninth week five stone. Of linseed cake there was also a falling off of 3lbs. per day, and the sheep in the shed, though they consumed nearly one-fifth less food, made one-third more weight. Now that was a very important fact, where turnips were grown on common strong land, and could not be consumed upon it, because they might have sheep in the yard, where they could be attended to, and produce a great deal more weight. But upon all land, where it was of that convertible kind that would bear the foot of a sheep well, it was impossible any farmer could draw turnips off without being a loser. With regard to the feeding of pigs, Mr. Childers gave them 74lbs. of barley meal, and one stone of potatoes, 6s. 10d. per week. With those

remarks Mr. S. resumed his seat, stating, he should be very happy to hear any observations which others might wish to make. None would be more gratified than himself to receive information on the subject, and adopt any plan which should be the most advantageous and beneficial. (*Cheers*).

The CHAIRMAN said the meeting was much indebted to the gentleman who had just sat down for leading the discussion, and they would neither be doing him justice, nor giving satisfaction to themselves, were they not to drink his very good health. He suggested, however, that after that toast, any gentleman should express his sentiments to the meeting, without the preliminary of his name being called by himself, as probably there were some present who were far better informed on the subject than those he might call upon, and thus the company would be deprived of that intelligence they would otherwise have obtained. He then gave the health of Mr. Stokes.

Mr. STOKES returned thanks, and hoped those gentlemen who intended speaking, would do so quickly (*Hear*).

Mr. G. KILBY, of Queenborough, then rose, and after a few preliminary remarks, said, with regard to the manner of keeping horses, he regretted he was not prepared at the last meeting for the discussion, and he thought it would be a good plan if, for the future, notices of fresh discussions were sent as soon as possible to the members, that they might have time to take them into consideration, and thus come prepared on the subject. With regard, however, to the keeping of farm horses, from what he had heard from Mr. Stokes, he considered that gentleman's plans threw his (Mr. K.'s) completely in the shade, because they were so much less expensive than his own. He should, he thought, detain them somewhat longer than his friend Mr. Stokes had done, as he should give them the whole routine of his plan of keeping cart-horses for one year. He would commence with May. For twelve weeks from the 1st of that month his farm-horses were kept entirely on rye and tares, or longer, if he thought he could get a regular supply of them; for he would rather keep them on this food till the time for taking them up for winter than turn them out to grass; but as he did not always get this supply, he would consider in that statement that he only kept them upon this food for twelve weeks. Unless the spring had been unusually cold and severe, he generally had rye and tares ready to mow in the first week in May. He did not immediately give them to the horses alone, but cut them up with a portion of their winter fodder, gradually increasing the green food till it formed the principal part of the whole. Then he ceased cutting, and gave them the rye and tares only in the cribs. When the rye had been some time in ear, and the straw coarse and strong, the horses would pick out the tares, and reject the rye. He then returned to cutting again, and by mixing a good portion of younger tares with the rye, and, cutting both up together, they would eat it very well till all the rye was consumed, when he gave them tares in their cribs to the end of the twelve weeks. He then turned them out to grass for twelve weeks, the latter half of which he gave them half a bushel of beans mixed with wheat or other chaff. He thought it a much better plan to keep them in the yard on green food as long as possible, instead of turning them out to grass at all. Manure was hereby economised. He now came to the remaining, and by far the most important, part of the year for keeping horses, as regarded both trouble and expense. Perhaps the time of his taking the

horses from grass, and keeping them in the stable, would be considered too early by many persons, and it might be so in numerous cases. Mr. K. then alluded to the strong clay land of which his farm was composed, and the necessity he saw for having his horses well cared for, both as to their meals and their comfortable stabling. From that digression he would return to the subject of keeping farm-horses during the time he before mentioned (from the 16th of October to the 1st of May). The little corn and chaff they had had for the previous six weeks, he believed, had prepared them to be taken entirely from grass food, without any injury, for, he thought, sudden changes from one kind of food to another was not good either for man or beast. He then began with cutting their food by the machine. This consisted of clover and Italian rye-grass, as it had grown mixed, generally the grass was the greatest proportion. He had produced it on his strong clay land five feet in height. Last season a great portion of the clover disappeared early in the spring, and he should be very happy if any gentleman would give him his opinion as to the cause of his clover dying away, as he could not account for the destruction of that plant. With that he could cut about one-seventh part of oats in the straw. Some hours before it was given to the horses a solution of linseed cake, a quarter of a pound to the gallon of water, boiled, was sprinkled and mixed with the heap, and to it was added a little salt. At the time that was used it would be found to have undergone a slight heating, and feel warm to the touch. This was his plan of steaming (*A laugh*). A portion of boiled beans was added, when served to the horses. He should say, that when he had some very good pea-straw, a small quantity was cut with the rye-grass and oats, about as much as the latter— one-seventh. With that food, and plenty of straw for bedding, he found his horses to do well, and keep up to their work, which was generally severe and constant, as he never used more than a pair to a plough, when that was practicable. On the first stirring of his clay land he was obliged to use three, and on some occasions four, to the single plough. He would now state to them, as correctly as possible, the amount of the food which his six horses ate in one week, and the cost of it. He had been very particular in weighing what they had consumed, and he hoped the statement was void of error:—

Cwt. lbs.		£.	s.	d.
14	24 of clover and Italian rye-grass, cut, 3s.....	2	2	8
2	0 of oats, in the straw, cut, 3s.	0	6	0
1	80 of peas, boiled (3 bushels), 3s. 6d.....	0	10	6
0	14 of oil-cake, boiled in 56 gallons of water, mixed with the cut stuff, 1s. 3d.....	0	1	1
For six horses one week.....		3	0	5
For one horse one week.....		0	10	0

If he calculated his clover at the same price as Mr. Stokes, it would diminish the cost to 8s. 10½d. 1,594lbs. of rye-grass, 224lbs. of oats in straw, 192lbs. of peas, 14lbs. of oil-cake, 2,024lbs. of all kinds of food consumed by six horses in one week, equal to 337½lbs. per horse per week, or 48lbs. each per day. He would next calculate the cost of his six horses for the other portion of the year. He found, on an average of crops, four acres of tares would be about what six horses consumed. He calculated that crop which would keep them for

12 weeks to be worth £5 per acre, which is 5s. 7d. per week each horse. For the next six weeks, in which they were fed on grass alone, he should charge at 5s. per week each horse; and for the last six weeks, in which they had half a bushel of beans each, the amount would be 7s. 6d. Thus—

	£	s.	d.
12 weeks for one horse, on tares and rye, at 5s. 7d. per week . . . . .	3	7	0
6 weeks for one horse, on grass, at 5s. . . . .	1	10	0
6 ditto for ditto, on grass and beans, half a bushel, at 7s. 3d. . . . .	2	3	6
28 ditto for ditto, on dry cut food, and boiled peas or beans, at 10d. . . . .	14	2	4
52 weeks for one horse, at 8s. 1½d. . . . .	21	2	10

And for a team of six horses per annum . . . . . 126 17 0

He knew not how that statement would accord with the opinion of practical farmers there present, as to the cost of their horses in the article of food alone. He would at once acknowledge that upon searching into the details of the matter, he was somewhat startled at the cost of a team of horses, and as to the great amount of the produce of a farm which they devoured. Had it not been for the inquiry which the establishment of the club had elicited, he might still have remained in ignorance as to the precise expense of this part of his establishment, and he must beg to acknowledge and express his thanks to their excellent member, Mr. Lacey, for the elaborate statement which he gave them at the last meeting, and which put him in the path of inquiry upon the subject. Mr. K. then, in allusion to an inquiry as to the loss sustained where more animals were kept than were absolutely necessary, humourously related an instance which proved the correctness of his remark, and we are sorry the limits of our columns will not allow us to give it at length. He would conclude by drawing a comparison between Mr. Lacey's plan and his own, in regard to the keeping of a team—the quantity they consumed, and the cost thereof.

Quantity consumed by Mr. Lacey's horses per week each.	Quantity consumed by Mr. Kilby's horses per week each.
lbs.	lbs.
Beans . . . . . 44	Clover and Ryegrass 265¾
Malt-combs . . . . . 33½	Oats in straw . . . . . 37½
Potatoes . . . . . 112	Peas . . . . . 32
Chaff . . . . . 179	Oil cake . . . . . 2½
Hay, . . . . . 33½	
402	307½
which cost 9s. 9d.	which cost 10s. 1d.

He was obliged to acknowledge, that both in the quantity and the expense Mr. Lacey's scale had the advantage over his, for that gentleman obtained 402lbs. of food at 9s. 9d., and he (Mr. K.) got only 337½lbs. at a cost of 10s. 1d. That, however, would not fully prove that his plan was the best, and they must take it to another test, and that was, whether the food Mr. Lacey used, though more in quantity, was of an equal quality. (*Hear, hear.*) Whether it contained as much nutriment as his, which he was inclined to doubt, and he thought the greater quantity consumed by his horses was some proof. He would, however, bring it to a surer test. At page 78 of the first part of the third vol. of the Royal Agricultural Society's Journal, article viii., "On the comparative value of different kinds of fodder," a table gave the relative quantity of different kinds of fodder which was equal in nutriment to 100lbs. of hay.

Potatoes (boiled) . . . . .	175 equal to 100 of hay.
Wheat, Pea, and Oat chaff . . . . .	167 equal to 100 of hay.
Rye and Barley chaff . . . . .	179 equal to 100 of hay.
Beans and Peas . . . . .	45 equal to 100 of hay.

Now, if they brought Mr. Lacey's potatoes and chaff, &c., equal to the nourishment of hay, it would stand thus:—

112lbs. of Potatoes (boiled) equal to	69½lbs. of hay.
179lbs. of Chaff . . . . . equal to	103½lbs. of hay.
44lbs. of Beans . . . . . equal to	97½lbs. of hay.
33½lbs. of Hay . . . . . equal to	33½lbs. of hay.
33½lbs. of Malt-combs . . equal to	33½lbs. of hay.

402lbs of all kinds. . . . . equal to	337½lbs. of hay.
He would then test his food by the same table.	
265¾lbs. of Clover and Rye-grass . . . . . equal to	265¾lbs. of hay.
37½lbs. Oats in straw . . . . . equal to	37½lbs. of hay.
32lbs. Peas . . . . . equal to	71lbs. of hay.
2lbs. Linseed cake . . . . . equal to	3lbs. of hay.

337lbs. of all kinds . . . . . equal to 377lbs. of hay.

In the above he had considered the malt-combs, and oats in the straw, both to be of the value of hay, as they were not in the table. Now it was found by reducing those several kinds of fodder down to the nourishment of hay, he gave his horses 377lbs. per week, at the cost of 10s. 1d., and he (Mr. L.) gave his only 337lbs. at the expense of 9s. 9d., so that he (Mr. K.) got 39½lbs. of hay for 4d.; and, in the end, had the advantage both in quantity and nutriment, and at less cost by about 1s. per week for each horse. After some further remarks as to whether the plan of steaming inferior food improved its quality of nutrition; and, confessing his own inability to give an opinion upon the matter, Mr. Kilby apologized for the long time he had occupied their attention; so long, that he feared he had been tedious,—(*no, no,*)—but considering how important an item in the management of a farm the keep of a team was, he trusted allowance would be made for him. He submitted his plan for comment, and comparison, and not as a dictum to any individual. He believed if he had apparatus for steaming he should adopt that method, but he looked at the *first cost*, and thought considerable expense must be incurred upon it. He had made no charge for fuel in his estimate; neither had Mr. Lacey. They were met there to arrive at the truth, and none ought to complain if a search was made for error in what he advanced. It was doubtless the enthusiasm he felt upon the subject of agriculture which had induced him to pay so much attention to it, for upon the success of that science he believed the welfare of the nation to be grounded. (*Cheers.*)

The CHAIRMAN, in complimentary terms, proposed the health of Mr. Kilby.

Mr. KILBY returned thanks, and hoped, though he had occupied their attention so long, that nevertheless some other gentleman would soon rise, and express his sentiments as freely as he had done.

Mr. WALKER (of Bradmore) said, as the chairman had expressed a wish that they should rise without their healths being drank, he hoped that any member who chose would get up and deliver his sentiments, and give that free and liberal expression to his opinions which ought to belong to all societies of this kind. (*Hear, hear.*) He had very little to offer in the way of remark, as to the keep of horses. The statement Mr. Stokes had given them, respecting one horse, was from his own stables. Six of his horses consumed 32lbs. per horse, per day, and the cost of one horse was 8s. 3d. per week. Now he thought it a very important thing to keep horses fit

for any employment, and without injury to their nerves and energies. He thought a moderate vegetable mode of feeding would be better than powerful stimulants, at certain periods of the year. He thought it was highly necessary that the horse should never be without corn at any period, proportioned always so as to keep it in a healthful state, and the system kept up. He gave his beans every day in the year. He could not go into details, as Mr. Kilby and Mr. Stokes had done; but he made use of lucerne daily for his summer keep: one reason was, that it came into use sooner; another reason was, it was cheaper—(hear, hear); and another, it had not that sudden effect upon the bowels which dills had. He was a little at a loss how to cut for them in wet weather. As for the keep of sheep, he found it a very important thing not to give them too highly stimulating food, as when they came to be put to the keep again, they invariably fell back very much. A little would assist in preventing disease, but by no means should they employ stimulating food largely. In the keeping of cattle, as well as sheep, he had always found it useful to give them vegetables to swell them. It was said, seven years ago, that cake would feed as well as turnips. He found it would make them fat. He had tried the experiment by giving some cake and others turnips, and the result was that the sheep which had the turnips were more solid, and weighed 3lbs. per quarter heavier than the others. These were the more fleshy, but they did not handle well. He might be wrong; but if so, he trusted some one would shew him that he was. This winter, he was very short of turnips, and he gave his cows a cake per day each: they got dry, stiff, and so on, but did not fatten. He gave them turnips, and no cows could thrive better. Those observations were the results of his own experience; and he was much obliged for the attention with which the company had listened to them.

Mr. STOKES rose to propose the health of their excellent Chairman, who at all times was so ready to come forward to do them service. (Cheers.)

The Chairman assured the meeting of his entertaining those sentiments of gratitude, which must necessarily result from the kindness which had been shown to him. It was not his intention to have addressed them at that early period of the meeting, for he had hoped that many members then present, well competent as they were, to elucidate the subject before them, would have indulged them with the result of their practice and experience. But since it was their pleasure then to call him upon his legs, he would, at once, introduce to them the results he had gathered from the observations of practical men. It was well known, he himself was not a practical man. It was very remarkable how the weight of food given to farm horses, varied in quantity. He obtained from three of his neighbours the exact quantity of food supplied to their stables for one week. In the first place, however, he differed a little as to the exact statement attributed to Mr. Lacey. The figures he supplied, came to 9s. per week, and he would tell them how he supplied them. In his calculation as to the expense of 10 horses for one week, he gave 160 lbs. of potatoes per day, 2s.; 63 lbs. of beans, 3s. 3d.; 57 lbs. of malt-combs, 2s. 3d.; 56 lbs. of hay, 1s. 3d.; 196 lbs. of straw and chaff, 3s. 9d.; making 12s. 6d. per day, which multiplied by seven, would bring it to £1. 7s. 6d., and 2s. 6d. for the fire—£4. 10s. the precise amount per week for 10 horses. Now there would be some difference in the statements before them, in consequence of the different value put

upon the food supplied to them. In some instances, they would be put down at a much lower price than the others, therefore, the calculations he had procured would require to be regulated according to that limitation. In the first place, for six horses, 1,774 lbs. of clover at 3s.—£2. 7s. 6d.; 309 lbs. of what were called the riddings (pulse) of barley or short straw at 2s.—5s. 6d.; 199½ lbs. or about 3 strikes of beans at 4s. 6d.—13s. 6d. This, of course, would have to be regulated by the price of this article. [Mr. Kilby: They agree with mine exactly.] The whole would bring it to 11s. 1d. for each horse. The next statement he had, was for Seven horses, 1,568 lbs. of hay at 3s. 6d. Hay had been estimated at 2s. per cwt., this of course would be regulated, but at this price would come £2. 9s.; 210 lbs. of oats at 22s. per quarter—13s. 9d.; 56 lbs. of chaff at 2s. per cwt. would be 1s., cutting 2s. 9d. The cost altogether would be £3. 6s., or 9s. 6d. per horse instead of 11s. 1d. as in the other case. His next statement was 680 lbs. of clover at 3s. per cwt.—18s.; 331 lbs. of oat straw at 2s. per cwt.—5s. 11d.; 537 lbs. of oats in the straw. To ascertain what quantity of oats was in this straw, a quantity was thrashed out, amounting to 202 lbs. at 18s. per quarter—10s. 10d.; and a strike of beans, 4s. 6d.—£2. 5s. 6d. for the six horses, making the cost of each one 7s. 7d.\* These horses would appear to consume only about 38 lbs. per day. Now they would see Mr. Lacey's statement showed the quantity of food per week to be about 54 lbs. His own next statement was 51 lbs., the next 37½ lbs., the next 33 lbs. Now, the quantity given to cavalry horses was 14 lbs. or 16 lbs. per day, with 8 or 10 lbs. of oats included; of other food, there would be only about 4 to 6 lbs. It was well known that certain descriptions of food afforded a particular kind of nutriment, and certain other descriptions of food, certain other kinds of nutriment. This was found by the process of analyzing. In the instance of a milch cow which had been fed on four different kinds of food, an experiment was made with the milk taken from her, and it was found that when she had taken bean flour, the result was a greater abundance of cheese, and when she had potatoes, the result was a greater abundance of butter. Now it was known, that for the purpose of maintaining the proper temperature of the body, there was no other supply, than by the combustion of food, and it was these very kinds of food which supplied the butter, and which is used in the maintenance of the warmth of the body. The same kind of food goes to supply the fat of the animal; the cheesy kind goes to supply the muscles of the flesh. Now if the horse were kept upon potato diet, it would be very unable to perform its work, but if kept on bean food properly modified, the horse would not only have flesh, but a proper degree of warmth. Horses might be very well kept upon equal quantities of straw (bruised) and hay instead of potatoes; from 30 to 35 lbs. was said to be a sufficient daily supply. (Hear, hear.) Now, if they were to attempt to keep these animals upon potato diet only (in the case of cows in particular), the most injurious effects would ensue. A very curious instance occurred of a pig that was accidentally inundated by a sudden fall of earth, and its weight being ascertained before the accident, it was discovered to have lost, after a confinement of 160 days, 120 lbs.! It was a fact that potatoes would feed a pig; but peas and beans, as a beginning for

\* Here there must be an omission of an item, as those stated do not make up the amount.

feeding, were the best, mixed with potatoes and barley meal. It had been stated that sheep, fed upon oil cake, would handle soft, and so they might, unless meal, or something possessing the cheesy principle, were given them. So, like a pig which was fed upon potatoes, it might be fat, but that fat would boil out in the cooking. It had been said that warmth was necessary for the feeding of animals, and it appeared to be reasonable it should be so, because there was a quantity of food which went to the maintenance of that warmth. If the animal be chilled, then they must supply warmth by food. In the case of sheep, Mr. Stokes had absolutely stated those which were sheltered ate the less food, yet they increased most in bulk. The explanation was plain; they were not starved, and did not require that quantity of food which was necessary to supply the place of heat; but quiet was almost as necessary to them as warmth. The Chairman proceeded to illustrate his previous remarks by some further very interesting observations, and concluded by expressing the pleasure he felt in being thus enabled to place his calculations before them.

Mr. MILLER proposed the health of the Stewards, which was responded to by Mr. Ward.

The CHAIRMAN, in the absence of any further discussion at the moment, proposed the health of Mr. Walker.

Mr. WALKER returned thanks. He was much gratified by the remarks of the Chairman, but he did not agree with him in his remarks as to the fattening of sheep, nor as to the feeding of pigs. The best feed for a pig was, in his opinion, potatoes and barley meal. The gradation between turnips and grain, was as great as between meal and oil cake. He should always prefer using the two latter in connection with vegetables.

G. PAGER, Esq., of Sutton Bonnington, feeling that he had no right to receive information from others, without, as far as his experience should enable him, adding his mite to those of the gentlemen who had previously addressed them; said it appeared to him, they had somewhat confused the matters of debate. They had been speaking of the keeping of farm horses, in which it was necessary that muscular power should be obtained, and of sheep, where it was not wanted; but, on the contrary, weight and fat for the butcher. (*Hear, hear.*) It was very possible that one substance should induce a considerable quantity of muscle, and another of fat. One state of temperature might be necessary for the increase of fat, which would be detrimental to the increase of muscle, but he did think they had been confounding the two matters. He was little accustomed to go through with calculations, of which they had had a great many; and still less was he prepared, from all he had heard, to say which was the best method of keeping horses, cattle, or sheep. Something must depend upon the price of the articles upon which they are fed, and which sometimes could be bought dearer or cheaper, according to place and circumstance. Was it not better to do as Mr. Kilby had done; first to ascertain the relative nutriment of each article of food in proportion, compare accordingly, and see how they might be enabled to keep their horses the cheapest? (*Cheers.*) There was a little elementary treatise by Johnson, on the relative value of certain articles as to their feeding properties. Mr. P. then quoted a passage as to the relative value of hay, straw, barley straw, and oat straw, beans and oats, barley and oil cake, and deduced therefrom, that there was a great waste of power. It was necessary that a certain

bulk of food independently of its feeding propensities, should be received into the stomach. For that purpose he thought it would be wise to give them a certain portion of straw, but did not think it wise to throw away the same labour upon cut straw, which was only about one-fifth the value of hay. In Mr. Lacey's statement he found the price of potatoes at 1s. per bushel, now the price was 2s. (*Hear, hear.*) Here then was a great discrepancy seen at once. [Mr. Henson: He bought them of you.] (*laughter.*) He bought them of himself at 1s. but next year he might have to give 2s. 3d. per strike, as it might happen. He merely mentioned it as an exemplification that there was no general rule as to the feeding of horses. They must take the average price of food, and having ascertained their different relative value, accommodate themselves to circumstances. They all knew that very much depended upon the waggoner. They would find some men who would keep horses in good condition with one-fourth less food than others. So that he did not think they could depend much upon the statement of others. They must try with their own men what plan would be the best; and, though it was very useful to listen to the suggestions of others, yet they must themselves ascertain which was the best plan for their adoption. He felt obliged to them for the attention they had given to him, and sat down amid very general cheering.

Mr. SMITH (late of Dishley) made some remarks upon the absence of Mr. Lacey, and other matters, and proposed Mr. Lacey's health, proclaiming himself and them all (the Society), his friends. (*Loud cheers.*)

Mr. STOKES.—As I had the honor to bring forward this subject, I assure you I shall not feel sorry, nor angry, at its being again adjourned: and I move that it be adjourned till the next quarterly meeting, when I think our friend, Mr. Lacey, will be present; and I am sure we have only one object in this meeting with each other. (*Applause.*)

The CHAIRMAN.—The whole question?

Mr. STOKES.—Yes, the whole question.

Mr. KILBY seconded the motion, which was carried without a dissentient voice, and the meeting broke up.

## AGRICULTURAL EDUCATION.

The following remarks from Mr. Colman's fourth Report of the Agriculture of Massachusetts, United States, will apply with almost equal force to England:—

AGRICULTURAL EDUCATION.—Middlesex county is the seat of Harvard University, the earliest public literary institution founded on this continent. It has been the long-cherished object of private and public munificence. This subject may by some be deemed inappropriate to an agricultural report; yet is no class in the community more deeply interested than the agricultural in the subject of education.

It has always been my earnest desire to see the agricultural profession exalted, and rendered attractive to the young. How shall this be done? The highest distinctions in human character, the brightest ornaments which can be worn in life, those which "sparkle with an inherent lustre all their own," and differ from the mere artificial trappings of society, as the diamond differs from the paste, are moral integrity and religious principle. I shall not farther speak of these in this case. But the distinction which, separate from these, gives elevation to the

character is the improvement of the mind. This confers a rank which wealth cannot purchase; this commands a respect which the proudest aristocracy may envy.

In order to render the agricultural profession more attractive and respectable, we must seek its intellectual elevation. In general intelligence and practical wisdom, the farmers of New England as a body are not wanting. Much more than this is desirable. There is no class in our community who have more favourable opportunities for the improvement of their minds than our farmers, if they would, and knew how to use them. Our long winters, which bring so protracted a respite from labour, furnish quiet evenings for reading and study. Many intelligent men among us, some of whom have been the boast of science and the ornaments of literature, have made themselves what they were in the devotion of the hours of leisure, which their long voyages or intervals of business afforded, to the improvement of their minds, the cultivation of taste, and the acquisition of knowledge. Our farmers have equal, in some respects more, favourable opportunities. The improvement of our common schools, therefore, and the elevation and extension of the course of instruction pursued in them, particularly concerns the agricultural interest. It is not enough to meet the present condition of society that our boys and girls are able to read and spell, to write and cypher, and to have some knowledge of geography: the highest branches of natural science, the principles of moral and intellectual philosophy and of political economy, should be at least so far taught in them, which is at present perhaps all we have a right to expect, that a taste for their continued pursuit might be formed, inquiry awakened, and the track marked out by which they might unassisted advance at their own pleasure to high attainments. The establishment of social libraries and lyceums in every village and town, and associations bringing both sexes together for mutual intellectual improvement, should have every encouragement, and would be followed with the best results. Such cultivation of the mind need not interfere with the necessary and useful labours of the farm; but would render these labours, otherwise, in some cases, discouraging and severe, light and cheerful. Education is a good, measurable by no pecuniary standard. As the cultivation of the highest attributes of our nature—as furnishing resources of pleasure and gratification in the solitary and the cloudy hours of life—as fitting us to be more useful and to do more good to our fellow-beings than by any other means we can adopt—as enabling us to use to the best advantage the power which God has furnished of providing for ourselves and those dependent on us—as increasing our self-respect, and saving men from low pleasures and pursuits—and as securing a position of respectability and influence in society—education, in the best and most enlarged sense of the term, cannot be too much regarded by the rural and labouring classes. There is indeed no reason and no hinderance in the way why our farmers and their children should not be among the best-informed persons in the community.

But knowledge has a specific value to farmers in respect to the improvement of their art.

It is too late in the day to decry the value of science in agriculture. Who can name an art, or trade, or business, in which knowledge is a disadvantage or a prejudice to success; or in which, indeed, it is not a substantial help? Who are the men who best succeed in life—the ignoramuses, the block-heads, the dunces; or the intelligent, the inquisitive,

the observing, the experienced? Why should agriculture, combining as it does so many occasions and opportunities for the application of skill and knowledge, be an exception to every other art and business? But it is said that agriculture is altogether matter of experiment! Who, then, are so well qualified to make, to observe, and to report these experiments as men of disciplined and enlightened minds?

All the great improvements which have been made in agriculture here or abroad have been made by men of intelligence, inquiry, education, and science. The present improved structure of the plough—the great instrument of the farmer, so infinitely superior to the implement of former times, and by which the power of draft required in its operation is reduced in many cases more than fifty per cent. from what was formerly demanded—is the result of a profound application of mechanical science to the construction of the mould-board and the general manufacture and make of this important implement. All that has been effected among us in the production and improvement of fine fruits, in the increase of crops, in the cultivation of crops, in the construction of farm-implements generally, in the multiplication of articles of culture, in the redemption of waste lands, doomed otherwise to perpetual unproductiveness, has been first made by men of active and enlightened minds, whose attention has been absorbed by these matters—who experiment in various processes, carefully noting the results—and who are not unfrequently stigmatized by the sneering application of book-farmers.

How much have we yet to learn of soils, of manures, of the particular improvements which particular soils require, of the proper application of manures, of their mode of operation, of the structure and habits of plants, of their best modes of culture, of the part which the soil performs in vegetation, of the uses of manures which have been little known among us, of the improvements which have been made and are still making in foreign countries; and how is all this, or any of it, to be known but by inquiry, scientific enquiry and examination? Who will pretend to set any limits to improvements which may be made, or say to what great results inquiry may still lead?

Fifty years ago, by the example and influence of some of the most enlightened men in the kingdom, the turnip husbandry was introduced into Great Britain. It has added uncounted millions to their wealth. Fifty years ago, the cultivation of cotton was among the smallest of our agricultural products; now the value of this great staple approaches one hundred millions of dollars a year. Thirty years ago it was scarcely known that sugar could be obtained from the beet-root; now the product in France alone is annually 120,000,000 of lbs. What has contributed more largely to the prosperity of the culture of cotton than anything else? The scientific labours of Whitney in the invention of the cotton gin. Who discovered the existence of sugar in beets, and who has perfected the art of manufacturing it? The most eminent chemists in Germany and France.

The most common farmer observes a difference in soils; and his familiar observation enables him to choose with advantage for his different crops. The most common farmer is aware of the importance of manure. Practice soon teaches a man the times of sowing and reaping, and the common modes of saving and using his crops. But why should we be satisfied with this, and why should we think that this is all?

The soil may be suited to some crops better than

to those which we now cultivate upon it. It may be deficient in some elements; it may superabound in others. Both of these circumstances may have a material bearing upon its culture and productiveness. It may have intermixtures which are poisonous to some products, but which art would enable us to correct or modify. How shall we come at these secrets but by scientific and laborious chemical analysis? The subject of manures is matter of vast importance to the agricultural interest. As yet we are comparatively in the infancy of knowledge in respect to them. The power of some substances to affect the crop, when applied to the soil, are among the profound wonders of nature. Who, before experience had taught us what it has, would not have ridiculed the idea that half a bushel of ground plaster of Paris, strewed over an acre of ground, would cause land otherwise unproductive to become covered with a most luxuriant vegetation, and to yield tons of hay to the cultivator? Yet who will pretend that this is anything more than the first step in the profound science of manures and their influence upon vegetation?

Various mineral manures of extraordinary efficacy are now coming into use in Great Britain and in this country, as, for example, saltpetre and the nitrate of soda? What is to solve the secrets of their operation, and consequently determine the best modes and times of applying them, but the science of chemistry, aided by practical observation?

"The fit period," says Daubeny, "for collecting the fruits of the soil, depends upon the physiological fact, that the farinaceous matter which constitutes the nutritive portion of those tubers that serve for food to man, being designed for the nourishment of the bud, begins to be consumed as soon as the latter starts into existence."

Here now is a most important fact, which science alone could have discovered, and which has at once various practical bearings in the gathering and uses of these productions.

How far the productiveness of plants is effected by the nature and condition of the soil, how manures operate to produce their effects, what relation the fertility of a soil bears to its mineral constituents, the dependence of vegetable life upon air and water, and heat and light, are all questions, which with many others must materially affect our cultivation. These are points which science, properly so called, alone can solve.

When many minds are concentrating their rays upon the same point, why should it not be rendered luminous? It is to the glory of Massachusetts that she has taken the lead among these States in forwarding the plans of scientific improvement; and by her geological, botanical, and zoological surveys she has already contributed to practical science in the most essential manner. These contributions are not to be estimated by a pecuniary value; and the cost, compared with the good accomplished and ultimately to result from them, deserves not a second's consideration with an intelligent and patriotic mind.

It is only for these sentiments, which are founded on the highest truth, to become more deeply impressed on the minds of the agricultural community, for them to take a just interest in the great subject of practical education; and to see that, where their patronage is in any form bestowed, it should be applied with an impartial hand to the advancement of their interests in a just proportion to those of other departments and classes in the community. It is my honest opinion, which I should be most happy to correct upon farther light, that this is not done

in any of our colleges or universities to the extent which is desired. The course of education in general pursued in these places, is adapted almost exclusively to the training young men for the learned professions, and very little for the more practical and productive pursuits of life.

Education may be considered as having three prominent objects; first as a mere exercise of the intellectual powers, the strengthening and disciplining of the mind for action; and in this respect it matters little what the particular study is provided it is of a nature to call out the faculties, to form a habit of attention and concentration, and to bring the powers of the mind entirely under the command of the will. The second is as matter of ornament and luxury and personal gratification. Education tends to give refinement and elegance to the manners and character, and puts within reach of its possessor innumerable means and sources of pleasure; yet though it is called liberal with a large portion of those who enjoy its advantages, it seems to serve only as an instrument of personal ambition and vanity, or of selfish indulgence or gratification. But the third and highest object of education, is that of forming the mind and character to everything that is manly and useful, developing the physical powers in their highest perfection, and seeking a correspondent development of the intellectual and moral man; preparing men for the practical business of practical life; to provide for their own subsistence and welfare, and the subsistence and welfare of others; to advance civilization; to increase the wealth of the community; to adorn and embellish society by all the arts which ingenuity can invent, and to contribute to the general comfort; to multiply and extend the means of enjoyment and improvement, and further the progress of mankind in all that is useful and good.

For these objects, which are the best objects of human aim, education cannot be made too practical. To these objects the great pursuits of agriculture, manufactures, and commerce, when under an enlightened direction and raised to the dignity of liberal professions, must essentially contribute; I will not say more than all the learned professions, because I wish to institute no offensive comparison; but I may say without these the learned professions could do nothing. And as far as experience goes, the intellectual and moral progress of society corresponds to the advanced condition of these great interests.

In every institution, therefore, for liberal and general education, these objects should be prominent. They are at least entitled to their place in the system. In every university there should be, for example, a professor of commerce and trade, embracing in his instructions all the subjects of trade, all the customs and laws of trade throughout the world, the subjects of currency, banking, and exchange, and the arts of ship-building, equipment, and navigation. There should be likewise a professor of manufactures, who should give instruction in the mechanic arts and inventions in the various machinery employed in these arts, and in the history of their condition and progress. There should be, likewise, a professor of agriculture, whose department should embrace every department of this great art, with the kindred sciences of botany, zoology, and chemistry, as far as they bear upon it. The university could not establish more useful courses of instruction. In regard to this latter subject many of our young men, who are graduated with a fair classical reputation, seem hardly to have discovered that the bread which feeds them does not come as the manna did to the ancient Israelites.

## SYNOPSIS OF

SOLD BY

NAME OF MANURE.	NATURE AND COMPOSITION.	QUANTITY TO BE USED AND MODE
		FOR FARM CROPS.
GUANO.	The dung of sea birds, imported from Peru, and containing various salts of ammonia and phosphates.	3 to 4 cwt. mixed with its own weight of ashes or mould, and drilled or sown broadcast for grass, turnips, mangold-wurzel, or other green crops, or 2 cwt. of guano mixed with $\frac{1}{4}$ ton of Clarke's compost.
POTTER'S GUANO.	A chemical composition founded on the analysis of the purest guano, and of uniform value.	$2\frac{1}{2}$ to $2\frac{1}{2}$ cwt. per acre, sown broadcast, mixed with its own weight of ashes or mould.
NITRATE OF SODA.	Nitric acid and soda, a natural product imported from Peru.	$1\frac{1}{2}$ cwt. per acre, sown broadcast, with half its own weight of ashes or mould, for wheat oats, grasses, &c.
NITRATE OF POTASS, SALTPETRE.	Nitric acid and potass, a natural product imported from the East Indies.	1 cwt. per acre, sown broadcast, in the same manner as nitrate of soda, for wheat only.
PETRE SALT.	The residuum of a manufacture, common salt and nitrate of potass.	5 cwt. per acre, sown broadcast as a purifier of grass land.
GYPSUM, SULPHATE OF LIME.	Sulphuric acid and lime, an abundant mineral in several parts of England.	$2\frac{1}{2}$ to 3 cwt. per acre, sown broadcast on clover, trefoil, cinquefoil, and other grasses.
URATE OF THE LONDON MANURE COMPANY.	Earthy salts of bone combined with ammonia.	3 sacks, or $6\frac{1}{2}$ cwt. per acre, drilled with a little mould for turnips, wheat, oats, barley, &c.
SULPHATE OF AMMONIA.	The residuum of a manufacture, sulphuric acid and ammonia.	2 cwt. per acre, mixed with a little mould, and sown broadcast for clover, oats, &c., and drilled for turnips.
BONE DUST & HALF- INCH BONES.	Phosphates of lime and magnesia, carbonate of lime and animal matter yielding ammonia.	$1\frac{1}{2}$ qt. to 20 bushels drilled or sown broadcast, mixed with ashes, for turnips, vegetables, wheat, &c.
CALCINED BONES.	The same constituents as above with the exception of the animal matter.	For mixing with farm-yard dung, and other manures containing ammonia.
PHOSPHATE OF LIME.	Phosphoric acid and lime.	A preparation of the last-named, being more easily blended with farm-yard manure.
SUPERPHOSPHATE OF LIME.	Phosphoric acid and lime in a more soluble state than in bones, prepared by dissolving bones in sulphuric acid.	For mixing in composts, fixing the ammonia of dung-heaps and urine tanks with formation of phosphate of ammonia.
PHOSPHATE OF AMMONIA.	Phosphoric acid and ammonia.	For mixing in compost for the purpose of imparting two such important constituents of plants as phosphoric acid and ammonia.
MURIATE OF AMMONIA.	Muriatic acid and ammonia.	Applicable in the same manner as sulphate of ammonia.
MURIATE OF LIME.	Muriatic acid and lime.	For mixing with compost heaps.
SULPHATE OF MAGNESIA. (Epsom Salts.)	Sulphuric acid and magnesia.	Mixed with nightsoil for potatoes (Liebig); 1 cwt. per acre to 8 loads of stable dung (Gardener's Almanac).
SODA ASH.	Lime, magnesia, alumina, charcoal, silica, and a few other ingredients in smaller proportions.	For destroying wireworm.
DANIELL'S BRISTOL MANURE.	Vegetable matter, nitrate of soda, lime, ammonia, gas tar, and sulphur.	20 to 30 bushels for wheat and barley; 30 to 40 for turnips.
CLARKE'S DESICCATED COMPOST.	A preparation of nightsoil.	1 hogshead for two acres.
WATSON'S COMPOST.	Contains, in a concentrated form, all the ingredients essential to the growth of plants.	4 to 6 cwt. per acre, for turnips, wheat, or spring crops, drilled or sown broadcast.
ALEXANDER'S COMPOST.	Ditto.	$2\frac{1}{2}$ to 40 bushels according to crop. (See Prospectus.)

MANURES,  
MARK FOTHERGILL.

[See Advertisement.]

OF APPLICATION.	PRICE.	WEIGHT PER BUSHEL.
FOR GARDEN CROPS.		
3lbs. per square rod, equal to 30½ square yds. This, and all other soluble salts, are best applied in solution, containing not more than 5oz. in 2 gals. of water.	In quantities of 25 tons, £10 2 6 per ton, in dock. " 10 " 10 5 0 " " 5 " 10 7 6 " " 1 " 10 10 0 " Less than 1 ton, 11s. 6d. per cwt., free of dock charges.	80lbs.
3lbs. per square rod, in solution 4oz. to 2 gals. of water.	£12. per ton.	65lbs.
1lb. per square rod, in solution like guano.	In quantities of 10 tons and upwards, 16s. per cwt. in dock, duty " 5 " 16s. 3d. " [free. " 1 " 16s. 6d. " Less than 1 ton, 17s. per cwt., free of dock charges.	80lbs.
	26s. per cwt., duty paid.	80lbs.
4lbs. per square rod, in solution like guano.	In quantities of 5 tons and upwards, £3 10 per ton. " 3 " 4 0 " " 1 " "	75lbs.
3lbs. per square rod.	In quantities of 5 tons and upwards, 27s. per ton. " 3 " 30 " " 1 " 35 " Less than 1 ton, 40s. per ton; small quantities 2s. 6d. per cwt.	80 to 84lbs.
2lbs. per square rod.	£5. per ton, no packages charged.	50lbs.
1lb. per square rod.	In quantities of 5 tons, £17 0 per ton. " 3 " 18 0 " " 1 " 18 10 " Less than 1 ton, 20s. per cwt.	70lbs.
10 to 20lbs. per square rod.	16s. to 17s. per qr.  8s. to 10s. per cwt.	42 to 45lbs.
3lbs. per square rod.	14s. per cwt.	
For garden culture, ½lb to the square rod.	18s. per cwt.	
1lb. per square rod.	24s. per cwt., in fine powder.	
1lb. per square rod.	20s. to 24s. per cwt.	65 to 70lbs.
2lbs. per square rod.	5s. to 6s. per cwt.	65 to 70lbs.
¾lb. per square rod.	Pure crystals 12s. to 14s., 1 impure 8s. to 10s. per cwt.	
	14s. to 16s. per cwt.	60lbs.
7lbs. per square rod.	1s. per bushel, in quantity 10d.	40lbs.
7lbs. per square rod.	£3. 12s. 6d. per hogshead.	60 to 65lbs.
2½ to 4½lbs. per square rod.	In quantity £9 per ton, 10s. per cwt.	40 to 45lbs.
7lbs. per square rod.	1s. 8d. per bushel.	65lbs.

EXPERIMENTS WITH MANURES.

BY ROBERT MONTEITH, ESQ., OF CARSTAIRS.

I. OAT CROP, 1843.—Part of a field manured with 267lbs. of guano, at the cost of 31s. per imperial acre, produced per acre 59 bushels.

Manured with 10 bushels of bone-dust, at the cost of 23s. 4d. per imperial acre, produced per acre 43 bushels.

The difference may be stated as follows:—

Cost of guano, 31s. 0d.; produce, 59 bushels, at 2s. 6d.....	£7 7 6
Cost of bones, 23s. 4d.; produce, 43 bushels, at 2s. 6d.....	5 7 6
7s. 8d.	2 0 0
Deduct difference of manure....	0 7 8

Leaving in favour of guano .... £1 12 4

II. HAY CROP, 1843.—To part of a field, manured the previous year with farm-yard dung, was given 267lbs. of guano per imperial acre, at the cost of 31s., and the extra produce, per acre, was 22 cwt. of hay, which, at 3s. per cwt., is. .... £3 6 0

Deduct expense of guano .. 1 11 0

Leaving in favour of guano, £1 15 0 per acre.

No.	Quantity of land tried.	Description of manure tried, and quantity per imperial acre.	Cost of other manures per acre.			Total cost per acre.			Produce stored Nov. 15th, 1843.		
			£.	s.	d.	£.	s.	d.	T.	Cwt.	
1	1	Guano, 4 cwt.	2	8	0	2	8	0	11	8	
2	1	Sulphate of Soda, 1 cwt.	5	12	0	5	16	0	9	8	
3	1	Burned Bones, 6 cwt.	5	12	0	7	14	0	7	11	
4	1	Bone-dust, 20 bushels.	5	12	0	7	18	8	7	2	
5	1	Gypsum, 2½ bushels.	5	12	0	5	12	0	4	19	
6	1	Guano, 4 cwt.	5	12	0	8	9	0	6	1	
7	1	Beech-ashes, 48 bushels.	5	12	0	2	8	0	7	13	
8	1	Gypsum, 6 cwt.	5	12	0	0	6	0	5	12	
9	1	Bone-dust, 25 bushels.	0	12	0	0	6	4	0	A failure.	
10	1	Do., 12 bushels; and 133lbs. guano.	1	1	0	1	1	0	4	9	
11	1	Guano, 356 lbs.	4	3	4	4	3	4	11	15	
12	1	Guano, 267 lbs.	2	14	3	2	14	3	11	0	
13	1	Guano, 267 lbs.	1	18	2	1	18	2	7	10	
			1	8	7	1	8	7	10	15	

III. WITH TURNIP, 1243.

November 30th, 1843.—The turnip crop on the field in which the above experiments were tried was fully one-third deficient in quantity from crops generally grown on such land in this part of the country, the soil being heavy and under medium quality. All the turnip crops in this neighbourhood are, however, from one-third to one-half deficient this season.—*Quarterly Journal of Agriculture.*

GOOD HUSBANDRY v. NAKED FALLOWS, THE CORN-LAWS v. THE ANTI-CORN-LAW LEAGUE, AND LIBERAL LEASING v. TENANCIES AT WILL.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—The case lately decided, *Robinson v. King*, reported in your papers of the 31st of July and 8th of January last, will, it is expected, go far to put an end to the antiquated custom of naked fallows; that case deciding that, when the arable land of a farm is clean, and not less than two-fifth parts of it in green crop, the absence of naked fallow is not a breach of the custom of the country.

You were pleased to insert a letter from me in your paper of the 22nd ult., addressed to the Council of the Anti-Corn-Law League, on the subject of the demonstration making by the League in favour of "an immediate and total repeal of the corn laws;" to which no answer has been given: the inference I leave to your readers. Some landlords, and also some tenants, who have seen that letter do not approve of it, because it calls upon Sir Robert Peel to declare that, in the event of his not fully and without reservation assuring Parliament that he has no intention of altering the present corn laws, he would boldly tell the country that he was in favour of a free trade in corn, if that really was his meaning. Surely it must be better for the farmer to get a distinct avowal from the minister of his intentions, whatever they were, than to go on, from year to year, in that state of uncertainty which has existed ever since the last alteration in the corn laws took place. Sir Robert has answered the call to a certain extent, but not without leaving a loop-hole, which Lord John says he was right in doing, and which, therefore, all thinking people will like the less approval coming from that quarter. However, sir, I believe that Sir Robert has not the least intention of disturbing the present arrangement; and, in proof, I let a farm yesterday upon the terms and conditions set forth in the draught of a lease—a copy of which is at the end of this article—with an assurance to the tenant that, if any alteration in the present corn laws should take place within the first five years of the term, he would be at liberty to quit at the end of any year, giving twelve months' notice, with the same benefits as if the whole term had expired; deeming it the better policy that the tenant should be made secure, whatever hereafter might happen to the landlord. Much as I dislike the mixing of politics with matters relating to agriculture, the present state of parties, as regards the vital question at issue, leaves no alternative, because the League are pursuing a course not new to those who remember Mr. Wilberforce and his little party of twenty-five, known as "the saints," how by a well directed combination they awed the minister of that day, carrying almost every measure they proposed, because between the belligerents of whig and tory they frequently held the majority in their hands; and who

has not, at a later period, witnessed the immense power wielded by Mr. O'Connell and his friends. The whig measure of reform, by extending the constituencies of cities and boroughs, threw an immense power into the hands of the whigs, quite sufficient to swamp the county representation; until the Duke of Buckingham got the 50l. tenancy qualification engrafted on the measure, which then gave to property its due share in the representation, and for which the whigs and the leaguers will never forgive the Duke. In Ireland the same game is now playing, and will continue to be played until property obtain its due share in the representation, and which I am happy to find will soon occupy the attention of Parliament as a Government measure; then we may hope for peace in that blindly deceived, misguided country, when its vast sources of wealth will be opened to English capital and enterprise, for under Heaven I do not believe there is a more beautiful, more fruitful spot than Ireland.

Long before the whigs quitted office, it was seen by all who chose to open their eyes, that they were trying to coax the manufacturing and commercial interests on their side, well knowing that the landed interest had taken alarm at their fixed duty panacea, and their other measures for supporting public credit. Out then went the hydra of faction in the shape of an Anti-Corn-Law League; their pockets well lined with gold, they employed preachers, not to preach the truth, but to set class against class, farmers against landlords, labourers against farmers, and shopkeepers and tradesmen against all of them, especially in cities and boroughs, where the elective franchise could be employed to return members pledged to vote for the immediate repeal of the corn laws, regardless of the ruin they knew would spread through the length and breadth of the land, if such a reckless proceeding succeeded. Let the landlords and tenant farmers look to these voters. Fortunately the lion heart of England was roused; and if, as Englishmen, they do their duty, this country will still maintain her high position among the kingdoms of the world—let the landlords and tenant farmers but go hand in hand, and let both look to the due employment and sufficient payment of their labourers, giving a religious education to the young, and showing kindness to all, when, in the words of the excellent vicar of this parish, on a late occasion, "they will insure the peaceable enjoyment of that which they possess, with the reward of having done their duty here, and the reasonable hope of a greater reward in another and better world."

Having disposed of the two first items at the head of my paper, I proceed to lay before your readers the form of a lease, resulting from considerable experience in all that relates to the beneficial employment of capital in agriculture, and promoting the interests of all parties concerned in the cultivation of the soil. From the reports of speeches made by Sir Robert Peel and Lord Stanley at agricultural meetings, held at Litchfield, Tamworth, and Liverpool in the last year, those gentlemen appeared to recommend landlords to grant leases upon equitable terms to their tenants, as an inducement to them to expend capital in extended improvements, such as might afford the reasonable hope of a return of their capital with interest, and something more for their skill and labour bestowed in its application. Hence arises three important questions for consideration—the length of the term, the amount of rent, and the covenants of the lease, so as to meet any change in the corn and provision laws which Parliament may hereafter find it expedient or necessary to make, and so that the rent may keep pace with the fluctuation of prices, arising from those or any other causes of a general nature.

Assuming the first year's rent to have been fixed, with reference to the prices established by law for the commutation of tithes in England and Wales, viz., wheat at 7s. 0½d. per bushel, barley at 3s. 11½d. per bushel, and oats at 2s. 9d. per bushel, the following form of lease for a Michaelmas entry will apply very generally, varying the clauses to suit particular localities, omitting some and inserting others as circumstances may require.

It will be observed that the tenant is not confined as to the crops he shall cultivate; only that he must adopt a rotation of crops, alternating corn, grain, or seed crops with fallow or green crops; and, as the five course appears to be better adapted for the generality of soils than any other, the covenants of the present lease are drawn in accordance with that system: on some thin soils, a six, or even an eight years' shift; particularly on calcareous soils, adapted to the growth of sainfoin, may be necessary; and, on rich soils near to towns, the four, or even the three course shift may be employed with advantage. The lease provides for the drainage of wet lands, for the improvement of the farm-yards and farm-buildings, and a mode of entry and quitting consistent with the just interests of all parties. Provision is also made for the landlord to re-enter upon a limited quantity of land; to allot as garden ground to labourers employed upon the farm, or occupying cottages belonging to him; also authorizing the tenant, and his friends in company, to course, hunt, and take hares and rabbits, those great destroyers of cultivated crops, enabling tenants to invite their corn-factors, their cattle salesmen, their dairy-factors, their hop merchants, and other friends to take a day's sport; enabling them also to preserve just so much game as will not injure their crops, yet sufficient to furnish reasonable sport to their landlords and their friends, whenever they visit their farms: tenants would then feel an interest in keeping off poachers, who before were their best friends; for be it known to all landlords that poachers are among the best friends most tenant-farmers at present have. Nor is that all; it is quite contrary to reason and common sense, that tenant-farmers should be expected to respect those landlords who call upon them to pay the full value of their farms, and then deprive them of the means of paying their rent, by reserving all the game to themselves. Pheasants and partridges do but little harm as compared with that done by hares and rabbits. By such an arrangement with tenants, landlords would be certain of a larger proportion of the former species of game than they now get; the farmers would look after, and keep off, poachers for their own sakes; and, by degrees, that class of marauders would become extinct, a consummation to be devoutly wished by all who desire to see our jails free from that demoralizing class. The covenants also provide for the care and protection of young trees likely to become timber, by giving the tenant a direct interest in their preservation.

In conclusion, it will be a source of great gratification to me if, after a long professional life, and particularly after a considerable portion of the last four years, spent in close attention to the rural affairs of the country, as a member of the Council of the Royal Agricultural Society of England, to find that I have been so fortunate as to frame a form of lease adapted to the times in which we live, and in accordance with the best interests of landlords and tenant-farmers, and of the community generally.

JAMES DEAN.

Tottenham, Feb. 7, 1844.

## FORM OF A FARM LEASE ADAPTED TO THE PRESENT TIMES.

BY JAMES DEAN.

The parties. THIS LEASE made and duly executed on the 10th day of August, 1844, by and between Sir R. P—, Bart., of \_\_\_\_\_, in the county of \_\_\_\_\_, of the one part, and Richard Cobden, of the parish of \_\_\_\_\_, in the county of \_\_\_\_\_, of the other part, as follows:—

The consideration. WITNESSETH that, for and in consideration of the rents, covenants, provisos, and agreements, hereinafter reserved and contained, and which on the part and behalf of the said R. C., are to be paid, done, and performed, he, the said Sir R. P., HATH demised, leased, set, and to farm letten, and by these presents DOTH demise, lease, set, and to farm let unto the said R. C., ALL that messuage, tenement, or farm house, now or late in the possession of Joseph Humus, situate and being in the parish of \_\_\_\_\_, in the said county of \_\_\_\_\_, together with all and singular the yards, gardens, orchards, barns, stables, cowhouses, and other farm buildings thereunto belonging; and also all those several closes, pieces, or parcels of land, containing together 317 acres or thereabouts, lying and being in the said parish of \_\_\_\_\_, the particulars whereof are set forth in a schedule hereunder written, together with their and every of their rights, members, and appurtenances, privileges, and immunities whatsoever.

The demise. EXCEPT and always reserved out of the present lease unto the said Sir R. P., ALL timber and timber-like trees, saplings, tellers, and minerals, with liberty to cut down, dig, work, take and carry away the same, making satisfaction to the said R. C. for the land so taken, and for any damage done to the standing crops. ALSO the right to alter any hedges and to plant trees in the hedge-rows or on other parts of the said land. ALSO of exchanging intermixed lands. ALSO of altering and diverting roads or footpaths, and making new ones. ALSO of diverting streams of water for the purpose of irrigating lands or otherwise, so as not to prejudice the said farm or lands. ALSO of making ponds and leading water into or through the leased premises, making compensation to the said R. C. for any damage done thereby. ALSO for the said Sir R. P. his agents and workmen at all times during the said term to enter into and upon the said premises and every part thereof, to view the state and condition thereof, and of all defects, defaults, and omissions, to give notice in writing to the said R. C., that he may forthwith repair and make good the same. ALSO

The parcels. ALSO reserves liberty to sow with clover, sainfoin, grass, or other herbaceous seeds, such parts of the said leased premises as shall be planted or cropped with wheat, barley, or oats, next before the determination of this lease, which seeds the said R. C. shall and will brush-harrow in, and will not nor shall depasture the produce thereof with sheep, cattle, horses, or other animals, after harvest, but will leave the same for the then immediate use and benefit of the said Sir R. P., compensation being made by the said Sir R. P. for such brush-harrowing, and for the feed of the stubble, as may be agreed upon at the time of such occurrence happening, or as the arbitrators hereinafter mentioned shall deem reasonable, they, the said arbitrators, taking into their consideration the foul or clean state of such stubble land in the fixing of the amount of such compensation. ALSO reserving all game and fish and the right of sporting upon and over the leased premises, and taking the game found thereon for himself and all persons in his company, or authorized by him in writing, at all times, except hares and rabbits, which the said R. C. and his friends in company may course, hunt, ferret, and take for his and their use and benefit, he the said R. C. preserving the other game from poachers and others to the utmost of his ability. ALSO reserves the right of bringing any action or actions against trespassers in the name of the said R. C., indemnifying him from costs. AND that the said R. C. SHALL NOT NOR WILL allow any other than the accustomed roads or paths to be made or used across, over, or through the leased premises or any part thereof. ALSO reserving not exceeding \_\_\_\_\_ acres of the leased arable land nearest to the cottages of labourers employed upon the said farm, or who may rent cottages belonging to the said Sir R. P., for such time and at such rent as may be agreed upon, clear of all assessments, rates, or other payments whatsoever, and in case of difference as to the length of time and the amount of such rent, the same to be settled by the arbitrators to be appointed as is hereinafter mentioned. TO HAVE AND TO HOLD the said premises with the appurtenances (except as before excepted), free and clear of all title

More parcels. For years. commutation rent charge, unto the said R. C. for 20 years, to commence and be computed from the 29th day of September next ensuing, and fully to be complete and ended. YIELDING AND PAYING, therefore, in respect of the first year of the said term, the clear yearly rent or sum of four hundred pounds of lawful British money current in England, by equal quarterly payments on the 25th day of December, the 25th day of March, the 24th day of June, and the 29th day of September, the first payment thereof to become due and payable on the 25th day of December next ensuing the date hereof, which rent has been fixed with reference to the average prices of equal quantities of wheat, barley, and oats, being respectively, of wheat 7s. 0½d. per bushel, barley 3s. 11½d. per bushel, and oats 2s. 9d. per bushel; and that the rent of each succeeding year shall have reference to and be regulated by the returns of the average prices of wheat, barley, and oats, as published at the commencement of each year in the "London Gazette," and the amount thereof shall be paid by the said R. C. to the said Sir R. P. in equal portions, viz., at Christmas, Lady day, Midsummer day, and Michaelmas day, as aforesaid, and in proportion to those averages, as 7s. 0½d. per bushel for wheat, 3s. 11½d. per bushel for barley, and 2s. 9d. per bushel for oats in equal proportion are to four hundred pounds, the rent first reserved, PROVIDED that, in no case shall the amount of rent for any year be calculated upon lower averages than 4s. 6d. per bushel for wheat, 2s. 6d. per bushel for barley, and 1s. 6d. per bushel for oats, nor on a higher average than 9s. per bushel for wheat, 5s. per bushel for barley, and 3s. per bushel for oats; and in case of difference between the said Sir R. P. and the said R. C., as to the amount of rent due and payable from time to time, the said R. C. shall pay to the said Sir R. P. at the rate of four hundred pounds per annum, by quarterly payments as aforesaid until such difference shall be adjusted either by themselves or by

Exception of trees, minerals, &c.

Withingress for the lessor, &c., to view, &c.

Also to sow grass seeds.

Reserves game and fish, &c., except hares and rabbits, which the lessee may course, hunt, ferret, and take. Lessee not to allow new foot-paths to be made.

Lessor reserves land to let in gardens to cottagers.

Habendum.

Paying a fixed rent the first year, afterwards a corn rent.

the referees to be appointed as is hereinafter mentioned. AND ALSO YIELDING AND PAYING, therefore, yearly and every year during the remainder of the said term by quarterly payments at the times aforesaid, the sum of £50 per acre, per annum, over and above the rents hereinbefore reserved for every acre of the leased closes described in the said schedule as meadow and pasture, including orchards, which the said R. C. shall plough, dig, break up, or convert into tillage, and so in proportion for a less quantity than an acre, the first payment thereof to be made on the second quarter day which shall happen next after such ploughing, digging, or breaking up of the said meadow or pasture land, or any part thereof. PROVIDED ALWAYS NEVERTHELESS that if it shall happen that the said rents hereby reserved, or either of them, or any taxes, levies, or assessments, which shall be taxed, rated, or assessed on the said hereby leased premises (except land tax, tithe commutation, rent-charge, and property-tax), shall be behind and unpaid by the space of thirty days next over or after the days of payment whereon the same ought to be paid as aforesaid (being lawfully demanded); OR if the said R. C. shall assign over or otherwise part with this lease, or the premises hereby leased, or any part thereof, to any persons or person whatsoever, other than as aforesaid, or to his wife, child, or children, in and by his last will and testament in writing, without the consent in writing of the said Sir R. P. first had and obtained for that purpose; or if these presents and the said premises therein mentioned, or any part thereof, shall become assignable by operation of law during the said term hereby leased, then and in either of the said cases it shall and may be lawful to and for the said Sir R. P., his heirs or assigns into the premises hereby leased, or any part thereof, in the name of the whole, to re-enter, and the same to have again, retain, repossess, and enjoy as in his and their first and former estate, anything herein contained to the contrary thereof in any wise notwithstanding. AND the said R. C. doth hereby covenant, promise, and agree to and with the said Sir R. P., in manner following (that is to say), that he, the said R. C., will and shall well and truly pay, or cause to be paid, unto the said Sir R. P., the said reserved rents, at the days and times and in the manner hereinbefore limited and appointed for payment thereof, according to the respective reservation and meaning of these presents. AND ALSO that he, the said R. C., shall and will, at his own proper costs and charges, well and sufficiently repair, uphold, support, maintain, and keep the said messuage and farm buildings, gates, posts, rails, pales, stiles, soughs, and drains; he, the said Sir R. P. (upon request and notice to him made), finding and allowing on the said premises, or within three miles distance thereof, all rough timber, brick, lime, roof tiles, and draining tiles for the doing thereof, which shall be carried to the said hereby leased premises at the charge of the said R. C.; and the same premises so repaired and amended, and kept in repair as aforesaid, at the end and expiration; or other sooner determination of this present lease, shall and will yield up unto the said Sir R. P. AND the said R. C. further agrees that he will, at his own costs and charges, insure, in the joint names of himself and the said Sir R. P., in the Farmers' Fire Insurance Office, or some other Insurance Office in London, the said dwelling-house, barns, stables, and other farm buildings, in the sum of £ , and will, once in each year, produce to the said Sir R. P. the receipt for the payment of the premium thereon. AND ALSO that he, the said R. C., shall not, nor will at any time during the present lease, have more than three-fifth parts (or as near thereto as the size of the several closes will admit) of the arable land in white-straw corn crops, or other grain or seed crops, in any year; AND that he shall and will have the remainder of the arable land in grass, lea, or fallow crops well hoed and thoroughly cleaned from couch grass or other perennial or annual weeds. AND that it shall and may be lawful to and for the said Sir R. P., and his heirs and assigns, with servants, horses, ploughs, carts and other necessaries, after harvest in the year preceding the expiration of this present lease, or other sooner determination thereof, to enter upon such parts of the said hereby leased premises, being not less than two-fifth parts of the arable land, or as near thereto as the size of the closes in the rotation will admit, to plough, cleanse, and prepare the same for wheat, and green or fallow crops, and to have the grass thereof for depasturing sheep, horses, and beasts thereon to the end of the said term; and also to have the dung which shall then be in the yard or yards without extinguishment of any of the rents herein reserved, but paying for the feed of the land to the said R. C. such sum or sums as may at the time be agreed upon, or as the arbitrators, to be appointed in manner hereinafter mentioned, shall by their award deem reasonable, regard being had to the clean or foul state of the land in fixing the sum so to be paid as aforesaid; AND ALSO to have some convenient place in the said dwelling house for his servants to lodge and diet in, and some convenient place to lay hay and chaff in, and some convenient stable and sheds for his horses and cattle to stand and be in, without giving or making any allowance or satisfaction for the same. AND FURTHER that the said R. C. shall not at any time or times during the last year of the said term, sell, give away, or otherwise dispose of the hay or straw which shall grow or arise upon the said leased premises in said last year. AND THAT the said R. C. shall and will lay, stack, and in-barn, all the crops of corn, grain, and seeds, which shall be growing and arising upon the said hereby leased premises in every year of the said term in the barns and rick yards belonging to the said leased premises and not elsewhere, and the same there thrash out, and the straw and stover which shall arise therefrom, and thereby turn into the sheds and yards, and the same feed up with his cattle for the better increase and making of dung, and the dung, soil, and compost which shall arise thereby, lay, spread, and bestow upon the hereby demised premises in a good husband-like manner, and not elsewhere, and shall and will leave unto and for the use of the said Sir R. P., all the muck, dung, and compost which shall be made on the said leased premises in the last year of the said term, which shall arise from the two last crops of hay, corn, and grain, for manuring, the premises or otherwise to be disposed of as he, the said Sir R. P., shall think fit and convenient, and that the said R. C. shall cultivate the whole of the arable land in a due rotation of crops to the end of the said term as that not more than three-fifth parts thereof shall at any time be in white straw, corn, or other grain and seed crops, and as that not less than two-fifth parts thereof shall be in the grass lea, or in fallow or green crops, to

An additional rent for ploughing, &c.

Proviso on non-payment of rents.

On assignment by lessee without consent, lessor may re-enter.

The lessee covenants to pay the reserved rents, &c.

Also to do repairs.

The lessor to find rough timber, &c.

Lessee covenants to insure against fire.

Lessee not to have more than three-fifth parts of the arable land in corn crops in any year, and the remaining two-fifth parts in ley or fallow, or green crops. Lessor may enter in the last year of the term upon a certain portion of land to prepare same for wheat, &c. And to have lodging for servants, stable room, &c., for horses, &c.

Lessee not to sell or otherwise dispose of hay or straw in the last year of the term.

And to in-barn &c. the corn upon the premises And to use the straw there.

Lessee to cultivate the land in the

the end that there shall and may be four clear and distinct courses of cropping of the arable land in such rotation, within the said term of 20 years, and especially within the last five years of the said term; and further that he the said R. C., shall not nor will mow any of the ancient pasture herein leased, nor in the last year of the said term mow any of the meadow ground, or any of the artificial grass crops on the arable land, more than once in that year; and shall not nor will, at any time or times during the said term, carry off the said demised premises any unthrashed corn or grain, or any hay, straw, fodder, muck, dung, compost, or other manure which shall be produced or raised thereon, without the previous consent in writing of the said Sir R. P.; and that the said R. C. shall and will, at all times during the said term of 20 years hereby leased, bear, pay, and discharge all such taxes, rates, and assessments, parliamentary and parochial, as are now or shall hereafter be taxed, charged, rated, or assessed upon the said premises or any part thereof, the land-tax and property-tax only excepted. AND THAT the said R. C. shall not, at any time or times during the present lease, cut, plash, nor make new any of the hedges belonging to the hereby demised premises but such as shall be years' growth at the least, and those only at seasonable times in the year, and when the closes and ground to which such hedges belong shall be sown with corn, grain, or seeds, or be closes of old meadow or pasture; and after the same shall have been cut, plashed, or made new as aforesaid, the same shall and will preserve, and keep from biting or destruction by cattle, or otherwise; and at such cutting and plashing thereof, will cleanse and scour and if necessary deepen the ditches or watercourses against such hedge or hedges where ditches have been heretofore, and also shall cleanse all open drains and watercourses running into and through the leased premises; and shall and will, before the cutting or making of any such hedge or hedges, give ten days' notice in writing to the said Sir R. P., or his agent, to the end that he or such agent may set out and mark such saplings and tellers therein as were not left from former cuttings of such hedges likely to become timber, to remain for that purpose, not exceeding one such sapling or teller in every chain of 66 feet in length running measure, which saplings and tellers the said R. C. shall and will preserve and protect in their maiden state, being allowed by the said Sir R. P. at the end of the said term one shilling for each such sapling and teller so marked, set out, and preserved as aforesaid. AND THAT the said R. C. shall not nor will, at any time or times during the term hereby leased, lop, top, shrod, or cut, any of the trees, except pollards as have been usually topped and cut by former tenants, and those only whose heads are not less than ten years' growth; and lastly, that he the said R. C. shall and will in all respects manage the said farm and lands according to the rules of good husbandry, and shall not impoverish nor make barren the same farm and lands. AND the said Sir R. P. doth hereby covenant, promise, and agree to and with the said R. C. in manner following:—(that is to say), that he the said Sir R. P. shall and will from time to time during this present lease, at seasonable times for cutting timber, provide and allow unto the said R. C. on the said premises or within three miles distant therefrom, necessary rough timber, bricks, lime, roof-tiles, and draining-tiles, for the repairing and amending thereof, within thirty days after notice in writing of the want thereof by the said R. C., the said materials to be carried to the said leased premises at the expense of the said R. C. AND that he the said Sir R. P. shall and will permit and suffer the said R. C. to have the use of the barns, yards, and granaries, hereby leased, and a paddock of grass land near called \_\_\_\_\_, for the laying in and thrashing out and consuming into manure of his crop of corn, grain, and seeds, which shall be growing and arising upon the premises in the last year of the said term hereby leased, for the spen ling of the straw and stover which shall arise therefrom, with horses, neat cattle, sheep, and pigs, until the first day of May next after the end, expiration, or other sooner determination of the said term of 20 years. AND ALSO to have for those purposes some convenient rooms in the said hereby leased messuage or farm house for his servants to lodge and diet in, and stable room for his horses to stand in, and some convenient place to lay hay and chaff in, until the said 1st day of May next after the determination of the said term of 20 years as aforesaid, as may be agreed upon by the said parties, or as the arbitrators to be appointed as aforesaid shall appoint. AND FURTHER that he the said Sir R. P. shall and will at his own proper cost and charges, within the first year of the said term hereby granted, repair and put into good tenable repair the said messuage or farm house, barns, stables, and other farm buildings, gates, posts, rails, pales, soughs, tile or stone drains, of or belonging to the said hereby leased premises. AND ALSO that he, the said Sir R. P. will, at the request in writing of the said R. C., from time to time at his own costs and charges provide stone or tiles or both for the draining of all or any of the wet land hereby leased which may require the same, and will cause the drains to be marked out by a competent surveyor, which drains when so marked out, the said R. C. shall and will at his own cost and charges cause to be digged and opened to such depth or depths as the said surveyor shall direct, and shall and will fill in the same trenches with tiles, stone, brushwood, straw, and earth, or other material, in such manner and in such proportions as the said surveyor shall direct, the said R. C. at his own costs and charges finding the carriage of the stones and tiles and other materials necessary for making and completing the said drains and the approaches and outlets thereto. Or the said Sir R. P. will, on request in writing by the said R. C., at his own costs and charges make, fill, and complete the said drains, and will provide the requisite stone and tiles for the doing thereof upon being paid by the said R. C. 5 per cent. per annum for the outlay of capital thereon during the remainder of the said term, the said R. C. finding and providing at his own costs and charges brushwood and stones and carriage of stone, tiles, and other materials necessary for the making and completing of the said drains. AND ALSO that he the said Sir R. P. will upon request and being approved by him, at his own cost and charges, sink, re-form, and improve the said farm yard or yards in such ways and manner as to receive and preserve the liquid manure arising or made therein, and will sink and stein a well or wells in such yard or yards, and will place the requisite pump or pumps therein, for the purpose of raising the accumulated liquid manure to be used by the said R. C. in manuring such of the land so leased as may require and will be most improved by the same, being paid in respect of such expenditure by the said R. C. 5 per cent. per annum during the remainder of the said term. AND ALSO that he

last years of the term as in the previous years.

Lessee to pay taxes and assessments, &c.

Not to cut hedges under a certain growth. Lessee not to lop trees, except pollards.

The lessor covenants to find timber, &c., for repairs.

Upon notice.

And to allow barns, &c., for thrashing and using of the lessee's last crop of hay, straw, &c.

And rooms for servants to lodge and diet in. The lessor will repair the building, &c., in the first instance.

Lessee on request will find stones and tiles for draining wet land, lessee doing the labour, &c. Or the lessor will make and complete the drainage at his own expense, lessee paying interest on the expenditure.

Lessee will re-form and improve farm-yard to preserve liquid manure, being paid interest by the lessee on the expenditure. And will make any other permanent improvement on the leased premises, lessee paying interest on the expenditure.

If lessee shall elect to make such im-

the said Sir R. P. will upon the request of the said R. C. make any other permanent improvement upon the said leased premises which he the said Sir R. P. shall approve, upon being paid by the said R. C. interest at the rate of 5 per cent. per annum upon the sum or sums expended about the same. OR in the event of the said R. C.'s electing to make such permanent improvements in draining and irrigating any of the said lands, and in the farm yards and farm buildings, at his own costs and charges in the first instance, such proposed improvements being approved by the said Sir R. P. by writing under his hand and made within the first fifteen years of the said term, the said Sir R. P. shall and will at the expiration of the said term pay to the said R. C. towards the cost of such improvements such sum as shall be agreed upon, or any sum which the arbitrators appointed as hereinafter mentioned shall think just and reasonable, such arbitrators taking into their consideration the then state of such improvements, the time that has elapsed since they were made, the benefit which the said R. C. has or might have received from the same, and the advantage which the reversioner may derive from such expenditure. And it is mutually agreed that the mode of entering upon the said farm by the said R. C., after the expiration of the tenancy of the said Joseph Humus, shall regulate, as far as is practicable, the mode of quitting by the said R. C. at the end of the said term; but, so as not to interfere with the course of husbandry herein prescribed, the difference, if any, to be ascertained and valued by the said arbitrators, and the amount shall be forthwith paid to the party entitled thereto. AND the said Sir R. P. and the said R. C. mutually agree that, if, at any time during the said term of twenty years, any difference or controversy shall arise between them touching or concerning this lease, or the buildings or lands leased hereby, or any matter or thing relating thereto, the same shall from time to time be referred to the arbitration of three persons indifferently chosen; one to be named by the said Sir R. P., one other by the said R. C., and the third arbitrator to be named by the two referees first appointed; and the award of the said arbitrators, or any two of them, if made in writing, within one month from the date of each such reference, ready to be delivered to the parties in difference, or either of them, shall be binding and conclusive upon both the said parties: and, if it shall happen that either of the said parties shall at any time or times hereafter, upon request in writing to the other of them, refuse or neglect to refer any matter or thing then in difference between them in this lease contained or herein referred to, and such refusal or neglect shall continue for the space of seven days after such request, and then not agreed to, for the party making such request to appoint one such arbitrator not interested in the difference then in question, and for that arbitrator to appoint a second arbitrator also not interested in the difference in question, and for the two so appointed to appoint a third arbitrator equally disinterested, who shall forthwith (being first sworn by competent authority) proceed to enquire into the matter or matters in difference, and the award of the said arbitrators, or any two of them, if made in writing within one month from the date of each such arbitration ready to be delivered to either of the parties in difference, shall be binding and conclusive on the said parties, or either of them, as if the appointment had been made as last hereinbefore-mentioned. If, if no such appointment shall be made, the aggrieved party shall be at liberty to take such proceedings at law or in equity as he may be advised, and the present agreement to refer all matters in difference between the said parties shall not be pleaded in bar to any such action or suit. PROVIDED ALWAYS that the powers of the arbitrators so appointed as aforesaid shall not be construed to extend to annul or make void this lease or any part thereof, or to exempt the said R. C. from damages consequent on the commitment of waste. AND IT IS ALSO mutually agreed by and between the said parties hereto that the name Sir R. P. shall be interpreted to embrace at every repetition herein of the same, his heirs, executors, administrators, and assigns; and at every repetition herein of the name of R. C., the same shall be interpreted to embrace his executors, administrators, and assigns.

improvements at his own expense, lessor to allow and re-pay a proportion of the expenditure at the end of the term.

Mode of entry upon the farm to govern the mode of quitting at the end of the term.

Lessor and lessee mutually agree to refer all matters in difference between them to arbitration.

Proviso that arbitrators shall not have power to annul the lease. Interpretation clause.

Covenant for quiet enjoyment.

AND LASTLY, that it shall and may be lawful to and for the said R. C. (paying the rents hereinbefore reserved, and performing the covenants and agreements hereinbefore mentioned and contained, and which on his part are or ought to be paid, done, and performed) peaceably and quietly to have, hold, occupy, possess, and enjoy all and singular the said hereby leased premises, with the appurtenances, during the said term of twenty years hereby demised, without any molestation, hindrance, or interruption whatsoever by him, the said Sir R. P., or of any other person or persons lawfully or equitably claiming or to claim by, from, or under him, them, or any of them.

In witness, &c.

SCHEDULE HEREIN REFERRED TO.

No. on Map.	State.	A.	R.	P.	No. on Map.	State.	A.	R.	P.
1. House, homestead, and garden . . . . .	..	1	2	0	12. Clay field . . . . .	Arable.	18	1	0
2. Orchard . . . . .	Pasture.	3	2	0	13. Marl-pit ground ..	Ditto ..	24	3	0
3. Home meadow . . . . .	Meadow	10	1	0	14. Sandy lands . . . . .	Ditto ..	12	0	0
4. Church meadow . . . . .	Ditto ..	15	3	0	15. Loam croft . . . . .	Ditto ..	16	1	0
5. Cow pasture . . . . .	Pasture.	20	2	0	16. Chalk hills . . . . .	Ditto ..	24	3	0
6. Sheep down . . . . .	Ditto ..	30	2	0	17. Red land . . . . .	Ditto ..	10	2	0
				82 0	18. Woodside . . . . .	Ditto ..	12	1	0
7. Ley field . . . . .	Arable.	8	3	0	19. Great park . . . . .	Ditto ..	25	2	0
8. Stubble ground. . . . .	Ditto ..	12	2	0	20. East Ham . . . . .	Ditto ..	6	1	0
9. Long field . . . . .	Ditto ..	16	3	0	21. Further field . . . . .	Ditto ..	22	0	0
10. Square field . . . . .	Ditto ..	18	0	0					235 0 0
11. Lodge ground . . . . .	Ditto ..	6	2	0					317 0 0
									Total acres. . . . .

Note.—The above admeasurements include buildings, yards, fences, occupation roads, and wastes, equal to about 17 acres.

## ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A monthly Council was held at the Society's house, in Hanover-square, on Wednesday last, the 7th of February, present, the Right Hon. Earl Spencer, President, in the Chair, His Royal Highness the Duke of Cambridge, His Grace the Duke of Richmond, Viscount Torrington, Hon. Robert Henry Clive, M.P., Hon. Captain Spencer, Colonel Austen, T. Raymond Barker, Esq., Samuel Bennett, Esq., W. R. Browne, Esq., French Burke, Esq., Colonel Challoner, F. Clifford Cherry, Esq., H. C. Compton, Esq., M.P., Layton Cooke, Esq., J. Evelyn Denison, Esq., M.P., Humphrey Gibbs, Esq., B. Brandreth Gibbs, Esq., Stephen Grantham, Esq., W. Goodenough Hayter, Esq., M.P., W. Fisher Hobbs, Esq., John Hudson, Esq., W. H. Hyett, Esq., John Kinder, Esq., Fielder King, Esq., William Miles, Esq., M.P., Philip Pusey, Esq., M.P., Francis Pym, Esq., Professor Sewell, William Shaw, Esq., J. Villiers Shelley, Esq., and H. S. Thompson, Esq.

The minutes of the former Monthly and Special Councils having been read,

The names of candidates for election at the next meeting, amounting to 91 in number, were then read, together with the names of the members on whose proposition they were respectively nominated to the Council for admission into the Society.

*Finances.*—Mr. Raymond Barker, Chairman of the Finance Committee, presented to the Council the Monthly Report on the state of the Funds of the Society; from which it appeared, that on the 31st of January, the current cash-balance in the hands of Messrs. Drummond, the Society's Bankers, amounted to 1,870*l.*, and the Stock invested in the names of the Trustees of the Society, to 7,700*l.* The Report also announced the extensive distribution of the Cottage Tracts on Gardening and Cookery among agricultural labourers, through the medium of Members of the Society; the addition of Mr. Braudreth Gibbs and Mr. W. R. Browne to the House Committee; and the reception of a communication from the Certifying Barrister of Friendly Societies, informing the Council that the Society had been included in the list of institutions entitled to exemption from County, Borough, Parochial, and other local rates on land and buildings.

*Conditions on Resignation.*—The Chairman of the Finance Committee then called the attention of the Council to the following paragraph, in conclusion of the Report:—"The Committee have had submitted to them the list of members expressing their desire to withdraw from the Society; many of whose letters contain simply an expression of such desire, while others assign reasons for their so doing at variance with the fundamental rules of the Society. The Committee feel it their duty to recommend to the Council the acceptance of such resignations, upon the payment of the Subscriptions due; but submit to the Council that they cannot recognize such reasons as grounds for their withdrawal." The question was then put from the Chair, and the whole of the Report unanimously confirmed by the Council.

*Southampton Meeting.*—Communications were received, and referred to the general Southampton Committee, from Mr. Mayes, the Chairman of the Local Committee of the Corporation, expressing the readiness of the authorities at Southampton to co-operate with the Society in the preparations for the meeting; from Colonel Le Couteur, President of the Jersey, and Mr. Dobrée, President of the Guernsey Agricultural Society, explanatory of conditions connected with the

exhibition of cattle of the Channel Islands breed; and from Mr. Matcham, agent of the South-Western Railway, offering to contract for the conveyance of all goods and implements from the terminus of the railway to the Show-yard.—Mr. Cuthbert Johnson presented to the Council the draft of a bill "to authorize the Society to enclose common or other open lands for the purposes of show-yards, to protect their property, and to suspend during a certain period the privileges of those who possess rights of common and other claims to the land which may be from time to time occupied by the Society." The Council resolved, that their best thanks should be returned to Mr. Cuthbert Johnson, for this instance of his attention to the interests of the Society, but that having the assurance of unanimous votes of the commoners at two public meetings convened by the Mayor at Southampton, for the consideration of the question, and a full confidence in the cordial feeling manifested towards the Society, in the promotion of its objects at the ensuing meeting in July by the inhabitants of that town and neighbourhood, they think the measure proposed would in every point of view be inexpedient.

*Entry for Exhibition.*—Mr. Raymond Barker, as Chairman of the Special Committee, appointed by the Council to inquire into the case of the parties charged with an attempt at the Derby Meeting to effect the entry of a churn by improper means after the date of entry had expired, and who had consequently been declared disqualified for future exhibition, submitted to the Council the result of their inquiry. The report stated the explanation offered personally by the representative of the parties in question before the Committee, and concluded with the following paragraphs: "Under all the circumstances, the Committee regret that they cannot find sufficient cause to recommend to the Council any alteration in their decision made on the 4th of August, 1843. The Committee are further of opinion that no bye-law on the subject referred to them need be introduced, inasmuch as they conceive, that whenever a case of fraud or gross impropriety is satisfactorily made out, the Society would, as a matter of course, without the authority of any bye-law, visit such offence with its highest displeasure, and, so far as it has authority, with punishment."

*West Indian Agriculture.*—A letter was read from the Rev. Dr. Stewart, Hon. Secretary of the Jamaica Agricultural Society, requesting the favour of communication with the Society in reference to the common objects of agricultural interest in England and the West Indian Colonies respectively; and this request being referred to the Journal Committee, the general agricultural association of Jamaica was declared a corresponding institution, and the Journals of the Society ordered for the Jamaica association accordingly.

*Library and Museum.*—Mr. John Robert Hall, of Grove End Road, St. John's Wood, offered to place at the disposal of the Society, at a valuation, the Agricultural Library of his brother, the late Mr. Webb Hall, of Bristol; originally formed by Mr. Arthur Young for the Board of Agriculture, and bestowed, on the discontinuance of that Board, on Mr. Webb Hall, their Secretary, in compensation for the loss of office he thereby sustained. This offer was referred by the Council to the consideration of the Journal Committee. Mr. Jardine, as executor of the late Rev. W. L. Rham, presented to the Society a Flemish plough, imported as a gift to the Society by Mr. Rham, and at present lying at the Custom House. This present was accepted, with the best thanks of the Council. A letter was read from Mr. Agnew, of Manchester, expressing his hope to be able to present to the Society the large painting of the Society's trial of implements

at their country meeting, and which had been painted for him at an expense of 1,000 guineas.—The Duke of Richmond presented, on the part of Mr. Lewis, a map of Southampton, on a large scale; Mr. Layton Cooke, a copy of his work on the value of landed property (illustrated by diagrams); and the Yorkshire Society, a copy of the last part of their transactions; for which, and numerous other presents, the best thanks of the Council were ordered.—The Council decided that Dr. Playfair, as consulting chemist to the Society, should be requested to analyze, under the direction of the Journal Committee, the specimen of marl transmitted to the Society by Mr. Trimmer, as retarding when present the operation of bone dust as a manure for land.

The Council then adjourned to Wednesday, the 14th of February.

At a Weekly Council, held at the Society's House, in Hanover Square, on Wednesday, the 14th of February, present, His Grace the Duke of Richmond, K.G., in the chair, Earl of March, Thos. Raymond Barker, Esq., F. Burke, Esq., F. C. Cherry, Esq., A. E. Fuller, Esq., M.P., H. Gibbs, Esq., B. Gibbs, Esq., L. Rogers, Esq., Professor Sewell, H. S. Thompson, Esq., and George Wilbraham, Esq.

Mr. Langdale presented to the Society a new variety of prolific dwarf pea; Mr. Wood, a specimen of Alexandrian Lupin; the Duke of Richmond, the second Report of the Morayshire Farmer's Club, on the results obtained in the application of bones and sulphuric acid employed as a manure; Mr. Fleetwood, samples of the fibres of sunflower stalks; Messrs. Kerr and Green, details on the sizes and prices of their iron grated tile ends, for preventing the entrance of vermin into drains; Mr. Baines, a communication on the modes of preserving milk; Mr. Stronge, a case of protracted gestation in a cow; Mr. Bellam and Mr. Cochran, papers on the economical collection of manures; Mr. Blurton, on his invention of a metallic churn; Mr. Charnock, papers relating to the Yorkshire Drainage Society; and Mr. Meyer, on the destruction of insects injurious to agricultural crops.

The Council then adjourned, over Ash-Wednesday, to meet again on the 28th of February.

#### NEW MEMBERS.

G. J. Bosanquet, Esq., of Broxbourne Bury, near Hoddesdon, Hertfordshire; Wm. Holbech, Esq., of Farnborough, near Banbury, Oxfordshire; and Henry Houghton, Esq., of Bold, near Warrington, Lancashire, were elected Governors, and the following gentlemen Members of the Society:—

Alston, Wm. Chas., Elmdon Hall, near Birmingham  
Atkinson, Joseph, Grazing-Nook, Bedale, Yorkshire  
Bailey, Frederick, Mitchelver, Andover-Road,  
Whitchurch, Hants

Bassill, Robert, Flamstead House, Redbourne, Herts  
Bevor, Henry, Barnby Moor, East Retford, Notts  
Bennett, Absalom, Mertyn Hall, Hoywell, Flintshire  
Bigg, John, Stanstead-Abbot's, near Hoddesdon, Herts  
Birchall, Thomas, Ribbleson Hall, Preston, Lanc.

Brandrane, John B., Beckenham, Kent  
Broderick, Edmund, Manor House, Cossington, near  
Bridgewater

Brook, James, Park Farm, Brading, Newport, Isle of  
Wight

Butler, John, Caerleon, Newport, Monmouthshire  
Carnegie, the Hon. J. J., Pair Oaks, near Petersfield  
Cartlich, Thomas, Chill Lodge, Tunstall, Newcastle,  
Staffs.

Child, Thomas, Michelham Priory, Hartshorne, Sussex  
Cock, William, Courtledge, Appledore, Tenterden,  
Kent

Cole, Thos. Henry, The Green, Wiek, near Bath  
Coles, Lieut.-Colonel, Woodcote, Alresford, Hants  
Cooper, Wm. W., Barningham Park, Isworth, Suffolk  
Courtney, Thomas, Stratton, Andover-Road, Whit-  
church, Hants

Cracroft, Colonel, Ilackthorn, near Lincoln  
Cunynghame, John, Hensol, Castle Douglas, N. B.  
Dandridge, Daniel, East Hendred, near Abingdon  
Darnel, Thomas Smith, St. Neot's, Huntingdonshire  
Davies, James, The Green, Aberystwyth, S.W.

Delgairus, W., Guernsey

De Berg, M., Secretary to the Russian Embassy in  
London, 30, Dover-street

Dixon, Thos. John, Holton, near Caistor, Lincolnshire  
Dixon, Thomas, Darlington, Durham

Dolphin, John, Hunter House, Edmondsbyres, Dur-  
ham

Eddison, William, Huddersfield, Yorkshire

Elliott, Jonathan, Sonning, near Reading, Berkshire  
Empson, Henry, West Ravendale, Binbrook, Spittal,  
Lincolnshire

Fowler, Marshall, Preston Hall, near Stockton-on-  
Tees, Durham

Gibbons, William, Foxgrove Farm, Beckenham, Kent  
Greaves, James, Radclive, near Buckingham

Grosvenor, The Earl, Grosvenor Square, London

Hankin, William, Heller's Place, Bentworth, near  
Alton, Hampshire

Hart, Thomas, Wing, near Leighton-Buzzard, Beds.

Hole, James, Knowle House, Dunster, Somersetshire

Hornby, Rev. Robert, Walton-le-dale, Preston, Lanc.

Hunt, John, Shirley, near Southampton

Hutton, Thomas, Upton-Gray, Odiham, Hants

Johnson, Francis Dixon, Aykley Heads, Durham

Kerrick, Edward, Arnolds, near Dorking, Surrey

King, John, The Grove, Exton, Alton, Hants

Knollys, Colonel, Blount's Court, Henley-on-Thames

Langdale, M. R., Mounthfield, near Tonbridge Wells

Langdon, Augustus, Cold-Harbour, near Tonbridge,  
Kent

Linn, William, Broomhill Tile Works, Felton, Nor-  
thumberland

Lysons, the Rev. Samuel, Hempsted Court, near  
Gloucester

Mason, Richard, Round, near Leominster, Hereford-  
shire

Maton, Leonard Pitt, Collingbourne, near Pewsey,  
Wilts

Meggison, George, 61, Cannon Street, City

Molyneux, Jas. More, Loseley Park, near Guildford,  
Surrey

Mundy, Chas. John Henry, Mavis-Enderby, near  
Spilsby, Lincolnshire

Pain, John, Houghton, near Stockbridge, Hants

Parkins, Edward, Chesfield Lodge, Stevenage, Herts.

Pelly, Richard Wilson, Upton, Essex

Piper, John D., Colne-Engain, Halstead, Essex

Pope, John Allen, Clifton Farm, near Yeovil, Somersct

Rawlins, George, Lee House, Romsey, Hants.

Rickaby, John, Ulrone House, Bridlington, Yorks.

Roach, John Perreton, Newport, Isle of Wight

Roddam, Joseph, Newton-Stanhope, Weardale, Dur-  
ham

Roe, Freeman, 70, Strand

Rogers, Longdon M., E.I.C. Service, Fitzroy Cottage,  
Highgate

Rowland, William, Ramsbury, Hungerford, Berks

Shearer, Bettesworth Pitt, Swanmire House, Bishop's-  
Waltham, Hants.

Shrimpton, John, Easton, near Winchester  
 Shuter, T. Allen, Hooley House, Coulsden, near  
 Croydon, Surrey  
 Selater, Wm. Lutley, Haddington House, Odiham,  
 Hants  
 Smith, Chas. Robert, Collingbourne-Ducis, near  
 Marlborough  
 Smith, Charles H., Gwconlluwnwyth, near Swansea,  
 S. W.  
 Spurgin, Dr., Orplands, near Bradwell, Essex  
 Strode, Jas. Cranborne, Brighton  
 Sykes, Edmund, Mansfield Woodhouse, Notts  
 Thew, Edward, Lesbury House, near Alnwick, Nor-  
 thumberland  
 Tilly, Harry Tobias, Tremough, near Penryn, Cornw.  
 Tredwell, John Clark, Oddington Grange, Bicester,  
 Oxfordshire  
 Vivian, Edward, Torquay, Devon  
 Warde, Charles, Squerries, near Westerham, Kent  
 Warry, Elias Taylor, Lyndhurst, Hants  
 Watts, Robert, Battle, Sussex  
 Wavell, William Lake, Newport, Isle of Wight  
 Webb, William, Haselor, near Tamworth, Staffs.  
 Wedlake, Mrs., Hornchurch, Essex  
 Whitaker, William, The Ash, Etwall, near Derby  
 Whittam, Jas. Sibley, Mayor of Coventry  
 White, James, Goverland Farm, Isle of Wight.  
 Williams, Captain, Torquay, Devon  
 Williams, G. M., Brocklesby, Great Limber, Linc.  
 Williams, Thomas, Brecon, S. W.  
 Wilkinson, Percival Spearman, Mount Oswald, Dur-  
 ham  
 Wooldridge, Henry, Meon-Stoke, Bishop's-Waltham,  
 Hants  
 Wooldridge, Jas. Wm., Webb's Lane, Wickham,  
 Hants  
 Wray, John, 6, Suffolk Place, Pall Mall East

## ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

The Council having referred the communication made to them at their last meeting by his Grace the Duke of Richmond, on the results obtained by the application of sulphuric acid and bones as a manure for turnips, to the journal committee, Philip Pusey, Esq., M.P., the chairman of that committee, has recommended to the Council the publication of the following reports on that subject:—

1.—*The Duke of Richmond's Experiments.*—Experiments made on turnips with five different kinds of manure, on the farm of Gordon castle, in the year 1843. The seed (Dale's Yellow Hybrid) was sown on the 15th of June, and as it was wished to ascertain the result while the Duke was at the castle, the turnips, before they came to maturity, were taken up on the 3d of November, and carefully topped and weighed.—1st. One imperial acre, manured with 8 bushels of bones and 14 cubic yards of farm-yard dung, at an expense of 3*l.*, produced 12 tons.—2nd. One ditto, manured with 2 cwt. 9*l*bs. of guano, at an expense of 1*l.* 17*s.* 4*d.*, produced 11 tons 4 cwt.—3rd. One ditto, manured with 16 bushels of bones, at an expense of 1*l.* 16*s.*, produced 11 tons.—4th. One ditto, manured with 83*l*bs. of sulphuric acid and 2 bushels of bone-dust, mixed with 400 gallons of water, at an expense of 11*s.* 6*d.*, produced 12 tons 4 cwt.—5th. One ditto, manured with 83*l*bs. of sulphuric acid, mixed with 8 bushels of bones, and sown with the hand, at an expense of 1*l.* 5*s.*, produced 11 tons.

(Signed) THOMAS BELL, Farm Steward.

II.—*Dr. Manson's Experiments.*—My field of twenty-one acres was last autumn deeply ploughed with three horses out of oat stubble, it having previously carried a wheat crop after two years' ley, well manured. In the spring it underwent the usual process of cleaning, and received about the 1st of June twenty-five quarters of Linksfield lime. Drilling and sowing commenced upon the 10th, allowing four bushels of bones and ninety-six pounds of sulphuric acid, properly diluted with water, to the acre. The manure was prepared by putting into a large vat, placed in a corner of the field to be sown, thirty-two bushels of bone-dust; and for each bushel was added ninety-six pounds of water, and twenty-four of sulphuric acid; there were thus in the vat at once 32 bushels of bones, 384 gallons of water, and 47½ gallons of sulphuric acid. The whole was allowed to lie for a fortnight previous to use, when it was found that the acid had nearly dissolved all the bones. The mixture was then drawn off and added to water, in a large water-cart, in the proportion of one gallon of the mixture to 50 of water, and which was distributed to the drills from three spouts into three drills at a time. The drills were previously slightly harrowed down, and immediately drilled up on receiving the liquid manure. Owing to the great drought which prevailed at the time of sowing, and the very recent liming, very few of the seeds vegetated till after the rain, which fell about a month from the time of sowing. The heavy gale which prevailed about this time cut down the greater part of the early plants, and has thus left the field deficient in some places. I observed that after the field came to be singled, it underwent that process in the order in which it was sown; 13 acres having been sown with farm-yard manure, and the remaining 8 with the bones and sulphuric acid, the plants from the acid keeping the lead of those sown with court manure, and are to-day a heavier crop, though not looking quite so healthy in the blade, owing to their having come earlier to maturity. The expense, 1*l.* per acre, viz., 4 bushels of bones, at 2*s.* 6*d.*, 10*s.*; sulphuric acid 96*l*bs. at 1½*d.*, 10*s.* Those laid down with court manure received 20 cart loads per acre, at 2*s.* 6*d.* per load, 2*l.* 10*s.* Weight per imp. acre, as ascertained on 15th Nov., the date of weighing.

Tons. cwt. lbs.

Sulphuric acid and bones	12	5	80	per imp. acre
Court manure	. . . . .	10	17	104 ditto

(Signed)

D. D. MANSON.

Spynie, Oct. 20, 1843.

## PROTECTION OF AGRICULTURE.

### CENTRAL AGRICULTURAL PROTECTION SOCIETY.

A meeting of the Essex Agricultural Protection Society (consisting of tenant farmers) was held by deputation, at the Freemasons' Tavern, Great Queen-street, on Tuesday, the 20th inst., to which the attendance of deputations from the other Agricultural Protection Societies of Tenant Farmers throughout the kingdom was invited for the purpose of conferring on the subject of making the necessary preliminary arrangements for forming a central society for the protection of agriculture. The meeting was convened by the central committee of the Essex Agricultural Protection Society, a body which has done so much to arouse the agriculturists from the apathy into which they had fallen upon the subject of the aggressive movement of the Anti-

Corn-Law League, and indeed from the exertions of which the present powerful opposition to the machinations of the latter body may, in a great measure, be said to have originated.

The meeting, being purely preliminary, was a private one, to which the press was not admitted, but we have been obligingly furnished by the secretary, Mr. H. T. Biddell, with the following particulars. About 250 persons were present. Mr. Robert Baker, the chairman of the Essex Agricultural Protection Society, presided.

There were in attendance deputations from Essex, Huntingdon, Wiltshire, Worcester, East Kent, West Kent, Hertfordshire, Berkshire, Northampton, and Warwickshire. There were also present Mr. G. Darby, M.P., and Mr. W. Miles, M.P., who attended as a deputation from the Metropolitan Association for the Protection of Agriculture, formed at the Duke of Richmond's, and annexed in our last.

Among the influential gentlemen and tenant-farmers present were Sir John Trollope, Bart., M.P., Sir B. W. Bridges, Sir Edward Dering, Sir John Chetwode, M.P., Mr. E. Fellowes, M.P., Mr. G. Thornhill, M.P., Mr. R. J. Eaton, M.P., Mr. W. S. Blackstone, M.P., Dr. Sleigh, Mr. J. Plumtre, M.P., Mr. J. Allix, M.P., Sir C. Burrell, M.P., Sir G. Chetwynde, Lieut.-General Sir J. Watson, Captain Gardiner.

From BERKSHIRE there were present—Messrs. Thomas Fouke, R. Welch, and J. Allnut.

BUCKINGHAMSHIRE.—Mr. G. Lucas.

ESSEX.—Messrs. R. Baker, Fisher Hobbs, O. Copland, J. Grove, C. S. Tower, O. Johnson, H. Bullock, W. Worcester, T. W. Crooks, Rev. J. Cox.

HERTFORDSHIRE.—Messrs. G. Passingham, E. Lewis, and T. Oakley.

HUNTINGDON.—Messrs. G. Bright, J. Warsop, and J. Knot.

KENT (EAST).—Mr. J. Cramp.

KENT (WEST).—Messrs. J. Ellis, C. G. Whittaker, J. Osborne, and E. P. Hall.

LINCOLNSHIRE.—Messrs. T. M. Vickery, and W. Shelton.

MIDDLESEX.—Messrs. C. Downes, and C. Crouch.

NORFOLK.—Mr. E. Barnes.

NORTHAMPTONSHIRE.—Messrs. J. Weston, and R. Hewitt.

RUTLAND.—Messrs. J. Hammond, R. Smith, and R. Dowling.

SUFFOLK.—Messrs. T. M. Rodwell, J. Wortledge, and J. Moseley.

STAFFORDSHIRE.—Mr. J. Hay.

SURREY.—Messrs. T. Ellman, J. W. Sutherland, and W. Lawrence.

WARWICKSHIRE.—Messrs. J. Chapman, and T. Umbers.

WILTSHIRE.—Messrs. Kelsey, and W. R. Browne.

The following resolutions were moved by Mr. O. Copland, of Chelmsford, seconded by Mr. W. Fisher Hobbs, of Marks Hall, Essex, and carried unanimously:—

"1. That a society be now formed in London for the protection of agriculture, to be called 'The Agricultural Protection Society of Great Britain.'

"2. That the objects of the society are to maintain protection for British agriculture, at least equivalent to that at present existing.

"3. That this society shall be under the management of a committee, which body shall direct its operations in accordance with rules hereafter to be determined upon.

"4. That a provisional committee be now formed, with power to add to their number, for the purpose of framing rules for the regulation of the society.

"5. That His Grace the Duke of Richmond be requested to accept the office of president."

It was then resolved that the provisional committee, the names of which follow, should wait upon his Grace the Duke of Richmond, to request his acceptance of the office of president:—

## PROVISIONAL COMMITTEE.

Essex—Mr. Robert Baker	Buckingham—Mr. J. Brickwell
Shropshire—Mr. Bloxan	Herts—Mr. E. Lewis
East Kent—Sir B. M. Brydges	Cirencester and Gloucester—Mr. Bruck
Huntingdon—Mr. James Rust	Vale of Gloucester—Mr. P. Mathews
West Surrey—Mr. T. Holland	East Surrey—Mr. Weale
East Suffolk—Mr. J. Moseley	Cambridge—Mr. Alix, M.P.
West Suffolk—Mr. W. Rodwell	Stamford—Sir John Trollope
South Staffordsh.—Mr. Monk	West Surrey—Mr. Hudson
Berkshire—Mr. Allnut	Sussex—Mr. T. Ellman
Rutland—Mr. Smith	Huntingdonshire—Mr. John Warsop
Atherstone (Warwickshire)—Sir Geo. Chetwynde	
Worcester—Mr. Kirkland	
North Bucks—Mr. Pinfold	

At four o'clock the deputation waited upon his Grace, at his residence in Portland-place. They were received by his Grace, by the Duke of Buckingham, the Duke of Leeds, Lord Worsley, Lord Beaumont, Mr. Cayley, M.P., Mr. P. Pusey, M.P., Mr. R. Palmer, M.P., Mr. W. Miles, M.P., Mr. E. B. Denison, M.P., and many other gentlemen who take an active part in the defence of the agricultural interest.

The resolutions passed by the tenant-farmers having been communicated to the Duke of Richmond and the noblemen and gentlemen already mentioned, a very animated conference ensued, characterized by the utmost good feeling and cordiality, his Grace frequently expressing a strong desire that the tenant-farmer should be fully represented in any union that should take place between them and the landowners. The following resolutions, forming a joint society of landlords and tenant-farmers, were eventually carried unanimously:—

"That a society called the Agricultural Protection Society for the United Kingdom of Great Britain and Ireland, be now formed, for the purpose of upholding by constitutional means protection to British agriculture.

"That the object of this society is to maintain protection for British agriculture not less than that at present existing.

"That the society shall through the press repel the imputations, and point out the inconsistencies, contained in the statements of those who oppose such protection.

"That party politics shall not enter into the proceedings of this society, and that the society shall on no account interfere in any election for a member to serve in parliament.

"That the affairs of the society shall be managed by a president, vice-president, four trustees, and a committee of 40 members, whereof 20 shall always be tenant-farmers, and that chairmen or vice-chairmen of provincial societies connected with this society shall be *ex officio* members of the committee, and that the said committee shall have power to add to their number.

"That the Duke of Richmond be requested to act as president of this society.

"That the Duke of Buckingham and Chandos be requested to act as vice-president of the society.

His Grace the Duke of RICHMOND said he had great pleasure in accepting the office of president.

The Duke of BUCKINGHAM expressed a similar feeling in accepting the office of vice-president.

Four trustees and a committee of forty having been appointed, the deputation then withdrew, evidently much gratified at their reception, and at the result of the conference.

The following case and opinion in reference to the formation of the Central Agricultural Protection Society were laid before the meeting of tenant-farmers:—

## "CASE.

"An association has been recently formed in the county of Essex, called 'The Essex Agricultural Protection Society,' the constitution and objects of which society will be seen by the printed declaration and rules accompanying this case.

"It is intended also to form a Central Agricultural Protection Society in London, for the purpose of corresponding with and directing the operations of the societies of a similar nature in different parts of the country.

"The Essex Agricultural Protection Society will have considerable funds at its disposal, which are intended chiefly to be expended in publications advocating the principles of protection to the interests of British agriculture.

"The committee of the Essex Agricultural Protection Society wish to be advised by counsel for the guidance of the society:—  
"1st. Whether there is anything illegal in thus affiliating the different country or other local societies on the proposed central society?  
"2nd. Whether there is anything illegal in thus forming corresponding societies?

"3rd. If there is, what course or mode, or extent of co-operation, would be legal, and what illegal?  
"Your advice generally is requested."

"OPINION.

"The 39 Geo. III., c. 79, which I suppose has raised a doubt as to the legality of the associations in question, has not any application to the subject. The Essex Agricultural Protection Society contemplates a legal object, and seeks to attain it by legal means. Its object is, to protect the most important interests in the country; and its means are, the concentration of agricultural intelligence, the diffusion of agricultural information, and the constitutional appeal to the legislature, by petition, in protection of the civil and political interests of the petitioners. I am of opinion that it is the undoubted right of any number of her Majesty's subjects to combine for the purpose of attaining such an object by such means; and if, for the purpose of giving vitality and energy to such a combination, they form local and central corresponding societies, such societies are, in my judgment, legal.

"Temple, Feb. 14, 1844."

"THOMAS J. PLATT.

## AGRICULTURAL QUERIES.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—I should feel obliged if any correspondent to your valuable Magazine would give their opinion of the relative value of carrots and mangel-wurzel as winter food for milking cows. I have land suitable for the growth of either, and have tried the former (white Belgian) with good success; and which my cows eat with avidity, and giving at the same time a pleasant taste to the butter; but perhaps a heavier weight may be obtained of mangel-wurzel if it is as nutritious as carrots.

I am, sir,

Yours respectfully,

Feb. 12th, 1844.

W.W.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—Many of your correspondents speak very highly of giving linseed cake to sheep along with turnips, and I feel very anxious to do so myself, but having to buy turnips half of the winter has prevented me from doing so. Suppose I were to buy a field of turnips at 3*l.* per acre, and to consume one acre per week, and also to consume half a ton of cake per acre, value of the cake 4*l.*, how much ought I to have returned from the above price of the turnips in consideration of the cake? as most certainly the land will have received an extra quantity of tillage from what it would have done had not the cake been given. I hope, sir, some of your numerous correspondents will give me information hereon, as it may be of great benefit to others as well as myself.

Y. K.

TO ROBERT BAKER, ESQ., WRITTLE.

SIR,—Referring to a communication from you in the December number of the *Farmer's Magazine*, relative to a subject on which I am very desirous to be more particularly informed, viz., "On leases and low rents," I understand you to say, that a tenant holding a farm at a money rent of 220*l.* per annum, covenanted for on the supposition of getting, during the currency of a lease, 50*s.* for wheat, 32*s.* for

barley, 20*s.* for oats, and 28*s.* for beans, per qr., &c., by the proprietor taking as much grain at the above prices as will make up the money, rent, convertible into money at the average of the two or three preceding crops, the tenant stands in the same position he did at entry, however low grain may sell. Now this is the point I wish cleared up: that he (*i. e.*, the tenant) pays the same rent he formerly did is pretty evident, though the nominal money-rent is less, the same amount of produce goes to the proprietor that he originally intended to meet rent, while he loses the difference between 50*s.*, &c., and whatever less wheat and the other grain sell at; and thereby, according to this view of the subject, in pecuniary matters his situation is decidedly worse. Many of our most liberal proprietors made very much the same arrangement with their tenantry some years ago; and, notwithstanding the great sacrifice made by the former, the latter sustained a loss fully as great in proportion, but being all bound under lease, and legally liable, they very thankfully acceded to the change.

I shall feel particularly obliged by your reply at your convenience; meantime,

I am, sir,

Your obedient servant,

Mount Tanel, by Tain, N.B., DAVID LYME.

Feb. 14th, 1844.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—A club has been formed in the parishes of Enfield and Edmonton, for the discussion of agricultural subjects. I am about to bring before the members for their consideration a subject which has for some time past occupied the attention of farmers resident in these districts, viz., the disease prevalent in potatoes.

I should feel much obliged by any of your correspondents giving their opinion on the origin of the disease, and on the best means of eradicating it.

I have been a potato-grower for many years, and, until lately, have seldom experienced a failure in my crops; in fact, I can testify that, during the whole of the period I have been a farmer, I have not lost so many acres of potatoes by the rot as I have done during the last two years; although I can well remember seasons quite as unfavourable to the growth of them as the last has been.

I am, sir, your obedient servant,

Edmonton, Feb. 10. A POTATO-GROWER.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—Will some one of your numerous readers inform me the best mode of making a compound of salt and lime, the quantity per acre of each, and whether the lime should be slacked before mixing with the salt; also the quantity of lime requisite for converting old ditch stuff (that is, to the cart-load) into profitable compost?

My salt and lime I intend to apply on a fallow for turnips: should it be put on as a dressing after the last earth, or be incorporated with the soil previously? And would such a compound be beneficial as a dressing for oats? Also, what can be most recommended as a top-dressing for wheat on wet-bottomed land?

If some practical man will answer the above, it will much oblige, sir, your most obedient servant,

Feb. 7.

A TENANT FARMER.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—I shall feel obliged if any of your readers will kindly inform me, through the medium of your

*Express*, what quantity of nitrate of soda, or Potter's artificial guano, or gypsum, per acre should be used upon meadow land? and in what proportions to mix the same with other soil, or ashes, to dress the land? also, the best time to apply it to the land?

I am, sir, yours, &c.,

Beverly, Feb. 7.

ENQUIRER.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—If any of your readers will be so kind as communicate, through your columns, the results of their adoption of "DIBBLING," compared with any other mode of sowing wheat, it might prove very serviceable, both to the farmer and the country; and it would much oblige one very desirous of promoting economy, now more than ever necessary, in every branch of agriculture.

Feb. 20th, 1844.

TERRA FIRMA.

"A Young Farmer," who resides in a manufacturing district, where he can purchase "the lime that has been used in the manufacture of soft soap" at 1s. for a two-horse-load, wishes to know if the lime loses any of its fertilizing qualities during the process of making the soap; and, if so, which of them? Also, what crops will it be most suited for?

A young farmer enquires the best cure for the scab in sheep without salivating the pregnant ewes, and doing the least injury to the wool; how long a lamb would be before he began to break, if the mother is infected; and what should be done by them, so as to keep it from doing injury.

"A New Subscriber" wishes to be informed the length of time bacon, hams, &c., in pieces of from 25 to 40lbs. each, should hang, so that the flavour and weight may be best preserved. He intends keeping them twelve months.

#### ANSWER TO AGRICULTURAL QUERY. SWEDE TURNIPS.

TO THE EDITOR OF THE MARK LANE EXPRESS.

Having been, for forty years, a successful grower of Swede turnips, I will answer your correspondent, "Inquirer."

If the wheat stubble is clean, I believe it to be best to plough in dung in the autumn. I should have done so with a few acres last autumn, had I had the dung, but not having it I am now about to plough it in.

Northumberland ridges being often dried through, in hot dry weather, I mean this year (to prevent, in some degree, the soil from becoming very dry, consequently causing the leaves of the turnips to mildew, and the growth of the bulb stopped) to throw the soil of two ridges together, and have two rows of turnips on such double ridges.

Having been a stall-feeder for forty years, I will give an answer to your correspondent's inquiries as to the comparative feeding qualities of Swedish turnips and mangel wurzel. I am again this year trying which are, and am now convinced of the reality of what I have time after time publicly stated, that, till February, Swedes are the best for stall-feeding beasts; but after that time mangel wurzel.

Your's, &c.,

C. HILLYARD.

Thorpelands, near Northampton, Jan. 30.

## AGRICULTURAL REPORTS.

### GENERAL AGRICULTURAL REPORT FOR FEBRUARY.

Although the weather of this month has been unusually changeable, scarcely a day having elapsed without the wind having blown from several points of the compass, it cannot be considered otherwise than favourable to agriculture in general. It is true, the prevalence of humidity has somewhat deteriorated the corn, both in the stack and in the barns; still the absence of any very heavy falls of snow has enabled the agriculturist to proceed with those labours usual at this period of the year, without suffering much interruption from atmospheric inclemency.

In the early part of the month, numerous accounts reached us of the extensive ravages committed by the slug and other insects upon the young wheat plants; but the few sharp frosts by which we were favoured, from the 10th to the 19th, not only put a stop to those ravages, but acted as a preventive against those crops becoming winter proud. On the whole, we consider the losses of plants to have been fewer than in the ordinary run of years, and their present appearances to be very satisfactory.

In all quarters, preparations are now being made for sowing the Lent corn. Should the temperature be favourable, a few breadths of barley are expected to be sown in Devonshire, and some others of our forward districts, within a few days; while general activity in that department of farming may be looked for about the middle of next month.

We need, we presume, scarcely intimate that no little

curiosity, not to say anxiety, has continued to be exhibited on the part, not only of the agricultural interest but most other classes, as to the productiveness of last year's wheat and other crops. It cannot be denied that the extent to which thrashing has been proceeded with has afforded most persons an opportunity of comparing the yield with that of preceding seasons. In some parts of England, it would seem, a very great deficiency has been found to exist; but, as so alarming a falling off is by no means general, the extent thereof does not, we think, amount to more than a tenth: still, it must be borne in mind that the quality is, in most cases, far superior to that generally observed at this period of the year.

It is with great pleasure that we find, at length, the spirit of the farmers of England roused against the Anti-Corn-Law League. In every city, nay in almost every town in the provinces, have meetings been held to concert measures for self-protection. Resolutions have been passed detailing future proceedings. We are glad to find so laudable a spirit of resistance on the part of the agriculturists. Let it be followed up, and success must be the result.

The early lambing season, in our great flock districts, has passed off remarkably well. The favourable state of the weather has been the means of preventing any losses of moment. Twins have been very numerous. In Essex, Kent, Sussex, and Hampshire, shearing has been partially commenced. The sheep have come out of their wool remarkably well, and yielded some very heavy fleeces.

No serious complaints as to actual losses have

reached us relative to the so-long-complained-of epidemic. That disease is evidently subsiding, though a large portion of the stock is still suffering from its effects. As we anticipated in our last report, the damp weather has been productive of several cases of foot-rot in sheep. The graziers cannot be too careful with their stock at this period, or bad results will follow. Fodder has been again tolerably plentiful.

The corn trade, in the early part of the month, was in a state of activity, and prices of wheat advanced from 2s. to 4s. per qr. Towards the close, however, the demand fell off, and the rates declined from 1s. to 2s. per qr. The best malting barley has moved off freely, at fully previous currencies; but grinding and distilling sorts have hung heavily on hand. In malt very little has been doing, at late figures. Oats, beans, and peas have remained about stationary; but flour has improved in value 1s. to 2s. per 280lbs.

By letters from Scotland we learn that farm labours are in a very forward state. The produce of the crops is well spoken of in all quarters. Those of potatoes are acknowledged never to have been surpassed. Fine parcels of wheat and other grain have gone off briskly, at rather higher rates; while the value of other descriptions has been steadily supported.

Throughout Ireland, the stocks of last year's wheat crops are stated to be small for the time of year; hence the exports to this country have considerably fallen off. The various corn markets have been but moderately supplied with all grain; while the general demand may be considered steady, at very full rates.

The following is our usual monthly statement of the supplies and prices of fat stock, exhibited and sold in Smithfield Cattle Market. As a comparative return of the last four years may be interesting as well as interesting, we herewith insert it.

Prices per 8lbs. to sink the offals:—

AVERAGE FOR FEBRUARY.

	1841.			1842.			1843.			1844.			
	s.	d.	s. d.	s.	d.	s. d.	s.	d.	s. d.	s.	d.		
Beef ..	3	2	to 4 0	2	8	to 3 6	2	10	to 4 4	2	8	to 4 0	
Mutton	3	6	4 6	3	4	4 4	4	3	0	4	6	10 4	6
Veal ..	5	4	6 0	4	10	5 10	4	0	5 6	3	10	4 10	4
Pork ..	4	0	5 0	3	10	5 2	3	4	4 4	2	10	4 2	2

The statement of supplies is thus:—

FEBRUARY.

	1841.	1842.	1843.	1844.
Beasts .....	11,230	9,412	12,020	11,800
Sheep .....	94,100	84,230	105,233	104,980
Calves .....	823	819	992	841
Pigs .....	2,380	1,941	2,312	2,360

The Norfolk season for beasts having been fairly commenced, a large portion of the bullock supply for the present month has come to hand from that important county; the receipts having amounted to about 3,800 Scots and homebreds; while from Lincolnshire, Leicestershire, and Northamptonshire, 2,500 short-horns have come to hand; from the western and midland counties, 1,000 Herefords, Devons, runts, &c.; from other parts of England, 800 of various breeds; and from Scotland, 780 horned and polled Scots.

On the whole, the demand for each kind of stock—particularly for the finest qualities—has ruled steady, and, in most instances, prices have been supported. We are glad to observe that the butchers have made very few complaints respecting the interior condition of either beasts or sheep.

A STATEMENT AND COMPARISON OF THE SUPPLIES AND PRICES OF FAT STOCK, exhibited and sold in SMITHFIELD CATTLE MARKET, on Monday, Feb. 27, 1843, and Monday, Feb. 26, 1844.

Per 8lbs. to sink the offals.

	Feb. 27, 1843.			Feb. 26, 1844.			
	s.	d.	s. d.	s.	d.	s. d.	
Coarse and inferior Beasts.....	2	10	to 3 2	..	2	10	to 3 0
Second quality do .....	3	4	3 6	..	3	4	3 6
Prime large Oxen.....	3	8	3 10	..	3	8	3 10
Prime Scots, &c.....	3	10	4 0	..	3	10	4 0
Coarse and Inferior Sheep.....	2	10	3 0	..	3	0	3 2
Second quality do.....	3	2	3 4	..	3	0	3 6
Prime coarse woolled do.....	3	6	3 8	..	3	8	4 0
Prime Southdown do.....	3	10	4 0	..	4	2	4 0
Large coarse Calves.....	4	0	4 6	..	3	10	4 4
Prime small do.....	4	10	5 0	..	4	6	4 10
Large Hogs .....	3	0	3 6	..	3	0	3 8
Neat small Porkers.....	3	8	4 0	..	3	10	4 2

SUPPLIES.

	Feb. 27, 1843.	Feb. 26, 1844.
Beasts .....	2,807	2,519
Sheep.....	23,900	24,500
Calves.....	69	83
Pigs .....	339	327

Although the operation of the new Tariff has been watched with considerable anxiety, the imports of live stock into the United Kingdom have been quite unimportant—they having amounted to about 70 beasts from Spain, and 50 do. from Germany and Holland. Only 15 have been on sale in Smithfield, and which were in, for the most part, very middling condition.

The arrivals of slaughtered meat up to Newgate and Leadenhall, from Scotland and various parts of England, have been very extensive:—viz., about 1,000 carcasses of beef, 12,000 do. of mutton, 1,150 do. of veal, and 14,200 do. of pork. Prices have ruled as under.

Per 8lbs. by the carcass.

	s.	d.	s.	d.
Beef .....	from 2	4	to 3	4
Mutton .....	2	8	„	3 8
Veal .....	3	6	„	4 8
Pork.....	2	6	„	4 2

SOMERSETSHIRE.

Active field operations in planting have commenced, and up to this time under favourable circumstances; the land working well. Peas and beans, vetches and spring wheats, have gone under ground, for which purpose the drill has been in demand, and few days lost. The weather is now more variable—a clear frost one day, and the next mild rain. We had snow yesterday, but it is gone: it seldom lies long here. This winter we have heard of it north and east of us, when it has been clear here. I believe it has not lain over the land six hours this winter. The little frost we have had has been beneficial, but not sufficient to carry out manure on the land. I think, on the whole, all the crops above ground—wheat and winter beans—are looking well; but, considering the mildness of the winter, vetches are not so luxuriant as last year; but winter feed has been very plentiful, and a large quantity of hay appears likely to be saved: 2l. per ton is the price given for very good. Cows and calves are 12l., or 2l. dearer than last year, with a quick sale; indeed, the prices asked and obtained for all poor stock are such that the present prices of meat and cheese leave no prospect of profit. The same may be said of sheep: the advance in wool has occasioned them to sell more freely, and mutton is looking a little up likewise. Pigs are still very low; 6s. and 6s. 3d. to 6s. 6d. per 20lbs. Bacon, 4d. to 4½d. by the side per lb. Butter, 10d. to 11d.; cheese, 44s. to 56s. per cw. We have had a brisk sale for wheat lately, but the supplies just now are

rather better than they have been. Flour has been a good sale also, the demand for Wales having been extensive. Barley has been bought up freely as it comes to market, and there are by no means large stocks on hand. Beans have moved off but slowly; but the supply has not been unusually large. Peas have been a drug. Oats have rather improved in price. I may quote corn as follows:—Wheat, red, 60 to 63lbs., 6s. 9d. to 7s., white, 60 to 64lbs., 6s. 9d. to 7s. 6d.; flour, 40s. to 42s. per 280lbs.; barley, 30s. to 34s., grinding, 28s. to 30s., 54 to 56lbs. per bush.; beans, 3s. 9d. to 4s., 64 to 66lbs. per bush.; oats, 18s. to 24s. per qr., 38 to 44lbs. per bush.; peas, boiling, 4s. 6d. to 4s. 9d. We have had a pretty favourable lambing season—not many double ones. It has been a fine winter for the sheep, and I should suppose good for the quality of the wool, which is selling freely; long and fine combing, 1s. 1d. to 1s. 2d. per lb.; short-downs, 1s. 0½d. to 1s. 1d. per lb. There will be, it is expected, a good many calves reared this year, particularly heifers, for which there is a good demand. But veal is not selling by any means high; 6d. per lb. for the best is hardly obtained. There is a good deal of changing this year, not only in farms, but in the stock kept on the farms, some looking more to corn, others from grazing to dairy, as the latter was almost profitless last year; yet the latter could not be said to be paying the way. I have no doubt but we shall feel the improvement in trade sooner or later. I should, like some of the clever League men, as they think, and say that the agriculturists do not know their own interest, and are so pushing in their advice to those who they esteem so much below them in knowing how to take care of their own affairs—just to make clear by figures how a grower of corn in Hampshire is to compete with a grower of corn in Wiltshire in the same market without all the burthens of poor-rates and other indirect taxes, with wages just half in the latter county, let the land and rent be the same in both; in other words, how is the highly-taxed corn by poor and way rates, &c., &c., besides the taxes on the luxuries of tea, tobacco, and sugar, &c., &c., or the farmer and labourer in this country can compete with the *un-taxed* corn from abroad, say *nothing about the difference of rent*? One way will be to reduce the wages of the labourer and the comforts of the farmer just equal to those abroad, who send their wheat here, and eat rye bread and Indian corn, seldom tasting wheat bread; and then, even with equalizing the rents paid by the grower here to the level of the foreigner in proportion only to the advantage of locality to the best market enjoyed, we should still have a *heavy poor-rate* to contend with; but I hope never to see the day when the comforts of our country population will be sacrificed to the *supposed* interest of the manufacturer, who may be building castles in the air, in supposing that free trade in corn would make us the manufacturers for the world; when the producers of corn from abroad are willing to have a *free trade in taxes, then a free trade with general consent*. The only protection claimed is that for the foreign growers sharing with our growers the *English* market, is here sharing a fair proportion of the *difference of another*. There is certainly some disadvantage in the sliding scale; there is also a greater one in frequent changes. I think a simple measure of Legislature would cure these evils, viz., let the present maximum of 20s. per qr. be lowered 1s. every year until it comes to 8s., at which price let it be fixed until it be proved that there is more than equal to the proportion of burthen to which a quarter is subject *independent of rent* in this country than abroad. I am quite

persuaded, to every party, except the fundholder or those dependent on fixed stipends, the taking off all charges on the importation of wheat would be found ultimately to be inefficient; and it is evident that it cannot help the manufacturer unless it lower the wages of the mechanic, while the unfair competition it would create between the grower here and abroad cannot fail to be injurious to the home market, where he now finds customers for his goods without their being subject to duties put on them to *raise a revenue for their Government instead of direct taxes*, which, and particularly the Americans, are impossible or *impolitic* in their imposition. Among the unfair means of working on the feelings of the uninformed in representing the repeal of the corn or the abolition of the bread tax, whereas if it was repealed to-morrow that made from *our own growth* would still be *taxed bread*. Let them devise some means of relieving the growth of corn from poor-rates, and other indirect taxes, and there will be a proof of their *liberality and disinterestedness*, and the tenants will average with the landlord as regards the rent: this would be far more just and honourable than denouncing their opponents as hard-hearted monopolists: the motives of those who monopolize to themselves liberality, disinterestedness, and philanthropy, are often the most to be doubted.—Feb. 23.

#### INNERLEITHEN, PEEBLES-SHIRE.

Since the date of the last report of 31st December, no variation whatever has taken place in the price of grain. The openness of the season (previous to Candlemas day, upon which the snow storm commenced) has saved much fodder; and many a hay stack, which would otherwise have been consumed, remains untouched. Should the storm, however, continue, which is pelting on at a fearful rate, and at this moment, it is much to be feared that the hay may yet be required for the feeding of the mountain flocks. Some years ago, I spent a few weeks in the highlands of Pennsylvania with Dr. Rose, of Silver Lake, and during my stay I had the pleasure of paying a visit to the Messrs. Hogg, nephews of the Etrick, who farm extensively in shares on the estate of Silver Lake; and during our conversation on the management of stock, they mentioned that, in the winter feeding of sheep, they were at all times anxious that their hay stack should contain all the variety of herbage which sheep were known to partake of; and in particular that immense quantities of ferns were cut while young and succulent, and mixed up with the other dried grasses, forming, as it were, that miscellaneous provision which nature reckons essential for the health and comfort of the flocks. It affords us no ordinary pleasure to state that the Earl of Traquair has, with a view to the improvement of the fleece, intimated to his spirited and enterprising tenantry, that in July next, the farmer who shall produce the best managed clip of wool (this to be ascertained by the appointment of competent judges) shall be considered as the holder of the large splendid silver-mounted ram's horn snuff-mull, which was exhibited at his lordship's birth-day meeting, on the 31st January last, and not only for 1844, but until some other tenant shall be found more worthy; and at the expiry of five years, the tenant who shall have been the holder of the mull for the greatest number of years will be considered the *bona fide* proprietor of the valuable heir-loom. The washing of sheep in this country seems less understood, or, at all events, less attended to than any other department connected with the management of stock. And there is no case more strongly illustrative of Scottish negligence than the

principle upon which the wool of this country is generally produced. Indeed, it must astonish not a few, that the wool-growers of Scotland have not long ere now been affronted out of their slovenly habits, when they see how very perfectly the fleeces of other countries are sent to market, many of them of yesterday's date, as wool-growers, when compared with Scotland. That the English manufacturers are our best customers, no one in the least degree conversant with the subject can question for a moment; and, from the vast number of purposes into which the Scottish fleece is fabricated, and for which it is found better adapted, owing to its nature and properties, than the foreign material. There cannot, therefore, remain a doubt in the mind of those practically acquainted with the woollen manufacture, that the staple commodity of our country has only to be a little more perfectly produced, to insure, for all time coming, a demand fully equal to the supply. It is, therefore, fondly to be hoped that the landed proprietors of our country will see the propriety of following so praiseworthy an example as that pointed out to them by the Earl of Traquair, in giving a prize to the tenant who shall produce the best managed clip of wool. The principle, if generally adopted, we feel confident, cannot fail to create an emulation hitherto unknown among the wool-growers of Scotland, and which would, no doubt, ultimately stamp the Scottish fleece with a character for purity which it has hitherto unfortunately never attained.—*10th Feb.*

## CALENDAR OF HORTICULTURE FOR MARCH.

*Retrospect.*—Soon after our last article went to press, the weather began to change. January had been so mild, that the average lowest (or mean) temperature of all the nights, was taken at  $34\frac{1}{2}$  deg.; but the case was soon reversed, for with February came in deep snow and keen frost. Snow recurred on the 3rd and 4th days, and buried all the herbage of humble growth. Every night was frosty to the 13th inclusive, but a change of wind to the S.W. produced a rapid thaw on the 14th at noon. The 15th became mild, with a fresh current from the same quarter; and thus, with old Candlemas day, now Valentine's, we may presume that the winter has nearly passed away.

The effects upon vegetation are not as yet traceable, because the chief mischief that could be done was inflicted by the excessive and sudden asperity of January 3rd. A check, and a salutary one, has, however, been given; and nothing, either vegetable or arborescent, can now become precocious. The buds of the fruit-trees are very promising, and we think that there will be a profusion of currants, gooseberries, and strawberries.

Early peas must have suffered by the snow, but the crops sown in January are safe under-ground. Broccoli, we see and hear, will be found generally to have sustained the most injury.

*Upon seed sowing*, we beg to offer the following suggestion: the idea was obtained from a hint given by a neighbour, who has long profited by the practice. Peas, beans, and kidney-beans are chiefly alluded to, but it would appear that it admits of extension. When the quantity of seed to be sown for a given extent of row, or plot, has been ascertained, it is mixed with rather dry earth, either in a large garden pot, or put simply in a glazed frame in a heap, and covered with a layer of the same earth.

So protected by glass, the seeds absorb a little moisture, and soon sprout. By this means every bad or effete seed is detected, the destruction by insects or cold wet ground is obviated, and the plot being ready, the sprouting seed is deposited, and rarely fails to succeed entirely. Time also is gained, and trouble saved; for, in transplanting peas, &c., that have been grown in boxes, a great deal of nicety is required, and much disturbance of the roots becomes inevitable.

### NATURAL AGENTS.

*Earths* generally have been noticed: it remains to take a cursory review of the particular species usually resorted to in culinary and ornamental Horticulture.

For the *kitchen garden*, good loam, as we have said, is the staple; but it too frequently happens that loam, in the proper sense of the term, cannot be found. The best meliorator of light, sandy, poor soils, is chalk and good stable manure. For the higher branches of gardening—as, for instance, the pineapple, the earth of perfectly reduced couch-grass, raked from the neighbouring corn-land, with as little of the earth adhering as possible, is the best substitute for that perfect, silky loam which the plant revels in. Chopped green turf, an inch thick, smoked and heated over a wood fire, to destroy grubs, and kill the roots, is, perhaps, equally good.

For *Floriculture*, and especially rose-growing, this said fumigated loamy turf may be found very congenial; but we say, distinctly and forcibly, avoid all loam for every delicate plant, unless its texture be silky, unctuous, and not gritty or bending. *Loam* is good, but the rubbish called loam, in five instances of six, is fit only for corn and cabbage: it is fatal to the American tribes, to all azalias, acacias, kalmias, and other fine-rooted plants, especially when they are grown in pots.

*Heath-soil* (called peat and bog-earth) differs much in its qualities; it ought to consist chiefly of black, decayed, vegetable remains, reduced nearly to the condition of humus, with a predominant quantity of pure siliceous sand: a trace of iron is just discoverable in its first stage of oxygenation.

*Leaf-mould* is the product of every kind of leaves, from parks, shrubberies, and woods, decayed in masses till it becomes of a blackish brown tint. We would except the leaves of the beech and the laurel, as they do not moulder down so completely as the other softer leaves of oak, elm, and ash. Chemically, also, they appear to be differently constituted, so far as respects the proportion of iron and chalk. Good leaf-mould with white sand is a far safer medium than a faulty loam.

*White sand*: silver-sand is the best material for the striking of cuttings, and, indeed, for all purposes of admixture, were it readily procurable; but that not being the case, gardeners are constrained to purchase river or pit sand. The latter, however, always contains more or less clay, and some iron, which is the colouring material: whereas, the white, Calais, or writing sand, is silex, free from iron and clay. It is a medium which permits the free passage of water, yet retains sufficient moisture to sustain the vitality of a cutting, without swamping it, till a callus form at the base, and then protrude roots. As a general maxim, propagators by cuttings should always so prepare their pots or pans as to have a bulk of soil, suitable to the individual plant, within the eighth of an inch below the sand, into which the roots might advance at once, and meet with suitable aliment. No cuttings ought ever to be suffered to mat their

roots one with the other: they should be raised and potted off so soon as a few real fibres are produced, otherwise many of the more delicate plants will perish.

#### WEEKLY OPERATIONS IN THE KITCHEN GARDEN.

1st week.—*Potatoes*.—Plant in rows, four inches deep, the early ash-leaved kidneys; never cutting a tuber, unless it have four or five prominent eyes near the crown end. A little slaked lime, or rather dry plaster of Paris, over the cut surface, will preserve the set.

*Lettuce*, any hardy sort: sow a few shallow drills in very rich soil. *Radish*—short-top, red and white turnip, for a small supply: repeat the sowing toward the end of the month.

Transplant early *cabbage* to follow the autumnal plantings: also autumn-sown *lettuces*.

If the soil be free and dryish, earth up and stick *peas*; and draw earth to the advancing stems of broad *beans*.

Remove litter, particularly the broecoli stumps of plants destroyed by the frost; and if a row be at liberty, immediately replace with early potatoes.

2nd week.—Sow succession *peas*, the marrows, or any approved best kinds; *beans*—the Spanish, long-pod, and Windsor.

Small salad, early spinach, parsley, onions in drill for a main crop of large bulbs, and the silver skinned for picklers.

3rd week.—Sow chervil, basil, dill, fennel, purslane, thyme, and nasturtium. Beet-root, carrot, and parsnip, for main crops.

Some like broad-cast, others drill-sowing; in either case the land ought to be made free of stones and other obstructions, and be manured, at least, a foot below the surface.

Sow more *lettuce*, such as the best white cos, the admirable, and drumhead.

4th week.—Fork carefully the *asparagus* beds and rows; turn the loosened soil into the adjoining spaces, and cover the beds with two or three inches of rich leaf-mould and sand, or with (as a trial) some of the new manures. They are all loose and powdery substances, and prepared mainly of desiccated night-soil; hence, may much improve the staple of the beds.

Sow *asparagus* and *sea-kale* seeds for new rows; also a sprinkling of Brussell's sprout. The *sea-kale* that is cut should be re-cut over, by passing a very sharp spade along the plants, two inches below the surface; thus, many flowering shoots will be removed, and new buds be prepared for next season. Level the ground and make it even, and dress the tops with leaf-mould and sand; a handful or two of common salt sprinkled over the surface, intermediate of the plants, will do some good.

#### HOTBED CULTURE.

*Cucumbers* are now sown in pots; putting each seed point downward. Place the pots in a frame over a gentle hot-bed; the sooner this is done the better; but for *melons*, the last week will be early enough.

*Celery seed*, either the solid white *Seymour's*, or the mild *red*, is best raised under a hand light, or in a small box over a deep bed of leaves and manure, a yard or four feet square; this will retain heat sufficient to bring the plants to a size fit for their first remove.

*Hot-beds*, of the best construction, for melons, cucumbers, or pines, appear to be thus formed: A

brick pit four-inch work is built with the front and two ends complete, returning at the back so far as to secure the strength of the erection, and yet leaving an opening of three or four feet at the back; the bed rests upon strong half-inch slates, which thus form within the walls a hollow chamber. When the plants are set in a good bed of appropriate earth upon the slates, the chamber is filled with stable manure and leaves mixed together; and finally, a lining is banked up behind and round the ends and front, to the top of the brick-work. By withdrawing the back lining, fresh warm manure can be introduced, if required, within the chamber. In pits so prepared, of various sizes, according to the proposed object, flowering plants of all kinds, annual or perennial, can be raised. The beautiful gardenias (Cape jasmine) may also be thus brought to perfection in the early spring, with their rich, dark foliage entirely free from the acarus or spider.

#### FRUIT DEPARTMENT.

*Prune* peach, nectarine, and apricot trees.—Curtail the spurs of espalier apple and pear-trees, tying the shoots neatly to the trellises; regulate all the wall trees.

*Raspberries*.—Cut out to five or six good canes, and shorten them to an upright, good bud. Manure round the roots, and just turn an inch of the surface earth to destroy weeds; but never dig, excepting to remove wandering suckers.

*Strawberries*.—Remove the dead leaves and rambling sucker-strings; then strew soft, rich loam, with bone dust, or guano, to the extent of one-twelfth of the loam, around the plants. Make new beds of the best retained runner-plants of last summer, about the 3rd week, and place them in all aspects, to keep up a long succession of fruit.

#### FORCING DEPARTMENT.

*Pines* are disrooted by many persons: we say, never disroot, but re-pot in some warm day, in fine, good loam, or chopped turf, and plunge in gentle bottom heat, keeping the pits and houses close, moist, and warm.

*Vines* of the second crop will soon be in bloom; desist then from steam and sprinkling, but keep 70 deg. at least, by day.

#### GREENHOUSE.

Give abundance of air, and attend to judicious watering; watch the approaching growth, suffering no one thing to flag. As to *geraniums*, it might be very desirable to bring the question of the "one shift system" to a fair proof with them, for the following reason: It is well known that so long as a fancy geranium (pelargonium) has not filled its pots with roots, so as to touch and wind round the bottom, the plant will continue to grow; but that it tends to bloom whenever the roots trace about the pot. Now, if a plant of good figure be (we will suppose) in a large 60, and it be desirable to make it have a handsome head in a 24, why not remove it, ball entire, into that size at once? If so removed, it would be sure to grow richly, soil and other desiderata being propitious; and thus a fine display of bloom would be prepared for by one operation. We restrict our suggestion to this tribe, and plants of like habit, disclaiming the system as referred to the hard wooded species.

We must defer remarks on the flower-garden till the next month, only requiring that neatness, order, and attention be observed in the plots, parterres, lawns, shrubberies, and walks.

Feb. 20.

## AGRICULTURAL INTELLIGENCE, FAIRS, &c.

**DORCHESTER CANDLEMAS FAIR**, on Wednesday last, was largely attended by both buyers and sellers, and the amount of business transacted was very considerable. Cows and calves were most in demand, and realized from 9*l.* to 16*l.* Good fresh barreners sold as high as 11*l.* The demand for beef was rather dull, and the top price did not exceed 8*s.* 6*d.* per score. Mutton was about the same price. Wool sold from 15*d.* to 16*d.* per lb.

**LISKEARD FAIR**.—This fair was held on Monday last, and notwithstanding the badness of the weather, was well supplied with cattle, which met with a brisk sale, although no advance of prices was made. Good fat cattle made about 48*s.* per cwt., and sheep averaged 4½*d.* to 5*d.* per lb.—*West Briton*.

**BATH ORANGE FAIR** (Wednesday) was one of the largest for cattle that has been known for some years. The supply both of fat and grazing stock was considerable; and of the latter it was very abundant. From the high prices asked, however, the sales were not very numerous. Fat beef fetched from 8*s.* to 9*s.* 6*d.* per score; mutton, from 5½*d.* to 6½*d.* per lb. Horses were very scanty.

**ST. MABYN FAIR**.—This fair, on the 14th instant, was well supplied with fat cattle and sheep. Beef fetched from 46*s.* to 48*s.* per cwt.; and there was a great demand for plough oxen and steers, which sold at high prices. Fat sheep were very plentiful, and the sale was dull at a trifle under 5*d.* per lb.—*West Briton*.

**TREGONY FAIR**.—There was a large supply of good beef and mutton at this fair, on Tuesday last, for which there was a very dull sale. Beef brought about 48*s.* per cwt., and good store oxen and steers from 33*s.* to 36*s.* per cwt. Sheep fetched 5*d.* per lb.—*West Briton*.

**ABBERLEY ANNUAL FAIR**, we are informed, will this year take place on Tuesday, the 16th of April, in consequence of Worcester Fair falling on the previous day.—*Worcester Journal*.

**DONCASTER APRIL FAIR**.—In consequence of the fair falling this year on Good Friday, the Mayor has fixed it to be held on the Thursday, the 4th of April next.

**MAIDSTONE FAIR**.—This fair on Tuesday went off rather flatly, the show of stock being much less than was anticipated. The cart horses were pretty good, but the demand was anything but brisk.—*Kentish Courier*.

**EXETER FAIR**.—The Shrovetide Fair was held on Wednesday last. The day was inclement, but still the show of cattle was tolerably large, and embraced all kinds. Business generally was dull, and many were exceedingly disappointed at the prices obtained. Fat beef sold at from 8*s.* to 9*s.* per score; the best lots were readily disposed of, but only the very finest of them fetched 9*s.* Oxen were tolerably numerous, and fetched from 30*l.* to 36*l.* per pair. The show of steers was large, and prices varied from 14*l.* to 24*l.* per pair. There was a pretty good sale for barreners, at from 6*s.* to 6*s.* 6*d.* per score. Cows and Calves were numerous, but the quality was inferior on the whole, and prices varied from 10*l.* to 16*l.* 10*s.*; the latter being obtained in only one instance. T. Gubbins Newton, Esq., of Bridestowe, exhibited a fine show of working oxen, being thirty bullocks and three fat heifers, two of which fetched extraordinary prices for the season of the year. We understand that

this gentleman's monster ox, which has made so much noise in the feeding world on account of its prodigious size, is still growing, so that he looks more like an elephant in bulk than a bullock. The animal stands 18½ hands high, and measures above four feet from pin to pin. He is a pure North Devon, and doth infinite credit to his "broughtings" up. Mr. Bond, of Crediton, showed a lot of twelve Liecester ewes, bred and fed by Mr. J. Partridge, jun., of Bow. They were exceedingly fat, and had remarkably fine wool, and weighed about 30*lbs.* per quarter; several good judges pronounced the lot to be the finest ever seen in the fair. Mr. Bond asked 50*s.* a piece.—**LEATHER FAIR**.—The supply was large, but business dull at the following quotations:—Calf skins, 20*d.*; rounded ditto, 22*d.*; close butts, 14*d.* to 14½*d.*; English hides, 12½*d.*; to 13*d.*; Spanish horse hides, 16*d.* to 18*d.*; prime shoulders, 12*d.*; English horse hides, 12*d.* to 13*d.*; bellies, 9*d.* to 10*d.*; Russia kips, 16*d.* to 18*d.* per lb.

The annual **HORSE FAIR** at **COCKERMOUTH** took place on Saturday, 17th; but owing, we presume, to the horse fairs at Carlisle and Egremont being held on the same day, the show of horses was rather scanty. The attendance of dealers from distant parts was good, and considering the number of animals exposed for sale, more business was transacted than could be reasonably expected. The chief part of the better description of horses were either bought up on the night preceding the fair, or at an early hour next morning.—*Cumberland Pacquet*.

**WORCESTER FAIR**, on Monday last, was well supplied with stock, while there were but few purchasers. Prices for beef averaged 5½*d.*, being a lower quotation than that fetched at Leominster, and a great many beasts were driven away unsold. Barrens fetched from 1*l.* to 30*s.* a head more than they did this time twelvemonths. The cows and calves in offer were of inferior quality, and the trade for them was flat, and many were unsold. Prices for mutton ranged from 5½*d.* to 6*d.*

**BRENCHLEY AGRICULTURAL SOCIETY**.—The ploughing-match of this valuable society is expected to be a very interesting affair. We hear that Robert Towner, the winner in this society of the first prizes in 1841 and 1842, and the successful competitor with the Horsmonden champion last year, has challenged Brooker, the Nettlestead man, who lately won the three-horse championship prize for West Kent.—*Kentish Courier*.

**EXTRAORDINARY PRICES**.—At a sale by auction, at Elias Court Farm, Dunhead St. Andrew, on Saturday last, three cows were sold at the following extraordinary prices:—The first was knocked down at 100*l.*, the second 70*l.*, and the third 50*l.*

**DESTROYING THISTLES BY SALT**.—It is said that if a small quantity of common salt, say about a tea-spoonful, is taken between the fingers and thumb and placed on the centre of the thistle, in a day or two it will turn black, and in the course of nine or ten days the root and every part of the plant will be destroyed. This is a cheap and certain method of destroying thistles on land. One person will salt as many as five or six will cut up in the usual way. The salt should be applied before the thistles have attained a large size, and great care must be taken that it is not dropped amongst the grass or other herbage, as it will destroy it also.

## REVIEW OF THE CORN TRADE

DURING THE MONTH OF FEBRUARY.

The turn which affairs have lately taken is of a sufficiently encouraging nature to allow us to hope that the crisis which threatened the destruction of the British agriculturists has been passed, and that more auspicious times are in store for the cultivators of the land. The arrogance and unbearable impudence of the Anti-Corn-Law League have, at length, aroused the landed interest; the proper steps to prevent further encroachments upon their just rights have been taken. In all parts of the country meetings of landlords and tenant farmers have been held; and though the different societies to oppose the League are as yet in their infancy, they have already produced beneficial results. The boast made by the League, that wherever a vacancy might occur in the representation of a borough or county they would be prepared to bring forward a candidate and ensure his return, is not now very likely to be fulfilled. They can no longer mislead the people by their one-sided and notoriously unfair statements; the body which their own audacity has called into existence will have no difficulty in proving the hollowness of their pretensions—truth must prevail; the misrepresentations of the League will be met by honest and straightforward statements of fact, acting as an antidote to poison. Their importance has already been diminished; and, judging from the miserable figure their candidates have cut at recent elections, we trust we may say their glory has departed.

The success which has attended the first movements of the societies established for the protection of British agriculture, promises well; and now that we have a central society in London, under the presidency of the Duke of Richmond, the necessary preliminaries for offering a determined opposition to the enemies of the agriculturist may be said to have been fairly organized.

In how far the pressure from without influenced Sir Robert Peel when he declared, in his place in Parliament, that ministers had no intention of making further alterations in the laws regulating the importation of corn, we are not prepared to say; and we are disposed to think, however, that the counter-agitation to the League was not without its effects, and we look upon the certainty of the existing law being maintained (at least for a year) as the first fruits of the movement. Be this as it may, in whatever manner it was brought about, there can be no doubt that the ministerial declaration has been productive of benefit; and, without enquiring too minutely into causes, we are satisfied with the result. Within a few weeks confidence has taken the place of despondency, and we are fully persuaded that union and cordial co-operation between the owners and occupiers of the land, and a firm determination to resist further concessions, will soon render the Anti-Corn-Law League, with all its boasted capital, powerless to work mischief. The lively interest we must at all times feel in that which concerns the farmer has now, as on several previous occasions, caused us to travel somewhat out of our legitimate province; and we have, perhaps, allowed politics to mix rather too largely in an article professing to be of an entirely agricultural and commercial character. This, however, can scarcely be avoided at periods when legislative changes, highly prejudicial to the landed interest, are being clamour-

ously and impudently demanded of the government by a body like the League.

Up to the close of the month of January, the weather retained the same mild and open character by which the winter had been previously characterized, and fears were entertained that the wheat plant might become prematurely luxuriant. With the commencement of February a favourable change occurred, without, at any period, being of so severe a nature as to threaten to destroy the vitality of vegetation, the frost was, during the first fortnight, sufficiently sharp to give a wholesome check. The heavy fall of snow which was experienced in most parts of the country, in the early part of the month, afforded additional protection to the young wheat; and from the reports which have since reached us, respecting the appearance of the crop, we have ample reason to be satisfied with the favourable prospects held out for the future. The plant is, with few exceptions, described as thick on the ground, of a healthy colour, and though sufficiently forward, by no means *winter proud*. The ravages committed by the slug are partially complained of, but as an effectual remedy is now well known for destroying this insect, viz., a dressing of unslacked lime applied to the land, we cannot believe that the mischief from that cause can be very extensive. The absence of frost, and the comparatively small quantity of rain that fell during the autumn and early part of the winter, induced many farmers to continue to sow wheat to a much later period than in ordinary years; and though it was currently reported at one time that the breadth of land under this crop was less than usual, the additions which have been made from time to time, have worked so great a change in this respect, that it is now the opinion of many well-informed practical men, that fully an usual breadth has been committed to the ground, and generally under very auspicious circumstances. During the short time the frost lasted, great exertions were made to get manure carted on the land, and so successfully was this work carried on that the labours preparatory for spring sowing may be said to be in a state of great forwardness, and the soil is, we believe, generally in remarkably good order.

The various out-door occupations which have lately engaged the attention of the farmer, have allowed of little leisure for thrashing: the supplies brought forward at the different markets in the agricultural districts have consequently been moderate, and the demand having, meanwhile, become active, the value of wheat has, within the space of about a month, risen 5s. to 6s. per qr. Several circumstances have combined to occasion this rise, among which the removal of the uncertainty which was generally felt in regard to the maintenance of the existing corn laws, and the improvement wrought by the frost in the condition of the grain of last year's growth, were perhaps the most prominent. To give a striking illustration of the magnitude of the advance which has occurred in the price of wheat, we shall instance the fluctuations which the quotations of the article have undergone at the town of Boston, in Lincolnshire: not longer ago than the middle of January, good 62 to 63lbs. red wheat was obtainable there at 50s. per qr., free on board; just one month later, viz., the 14th February, the same quali-

ties were readily saleable at 56s. to 57s. per qr.; and though a slight reaction has since occurred, still prices are at least 5s. to 6s. per qr. higher than was the case some six weeks ago.

Those farmers whose pecuniary affairs have enabled them to retain a part of their last crop, have therefore now an opportunity of realizing something like remunerating prices; but in the majority of instances the improvement has, we fear, come too late. The depreciation which the property of the agriculturists has undergone during the past two years, owing to the Tariff, the altered corn laws, and other prejudicial measures, has so impoverished them, that the more needy were compelled to thrash out freely, very shortly after harvest, and to force their wheat to market when prices were at the lowest; and now, when a better state of affairs has been brought about, they are not in a position to derive the advantage. Whilst we are on this subject, we deem it right to warn our agricultural friends not to place too much confidence in the present value of wheat being very long maintained: we think the most favourable period for realizing is likely to be between this and the end of April. Very extensive purchases have been made abroad during the winter, not only at the near continental ports, but likewise in the Mediterranean and Black seas. Some of these will begin to come forward in May, and by the middle of June large arrivals may be expected. It is true that high prices have been paid abroad, and that importers are not likely to clear in for home consumption so long as a chance remains of the duty receding; but should the seasons prove propitious, and the growing crops present a favourable appearance in the spring and summer, a contrary course would probably be adopted; in that case a material depreciation in prices would unquestionably ensue, and we therefore are disposed to believe that the wisest course for holders of English corn to pursue, will be to sell whilst there is comparatively little foreign to compete with. With regard to the probable range of the duty, opinions vary materially; many are disposed to think it will recede to a very low point before the termination of June, in which view, however, we are not disposed to coincide. Whatever disadvantages may have attended the substitution of the present for the corn laws of 1828, there can be no doubt that the ability of tampering with the averages has been wonderfully lessened, if not altogether rendered impossible. Under the old law the making of false returns was notorious, and by the combination of a few wealthy operators the duty has been frequently reduced much below what it would have been if allowed to work fairly. The immense inducement held out by the rapid manner in which the duty lessened after it had been got down to 20s. 8d. per qr., naturally led to mal-practices. The introduction of rests at particular points in Sir Robert Peel's scale is a great improvement, and by rendering all tampering with the averages unprofitable, has gone far to abolish any attempt at fraud. Before speculators had become practically acquainted with the working of the new system, efforts to influence the averages may have been made, but so unsuccessful must these have proved that we see little cause to expect their repetition. The general weekly average of the kingdom, published on the 22nd instant, was 53s. 6d.; and the aggregate of the six weeks rose on that day to 52s. 2d.; we have therefore, now, an 18s. duty. The high prices which have lately been obtained for wheat, together with the firm state of the trade at present, render it probable that the returns from the country will come sufficiently high to cause a rise in the aggregate, during the next six weeks, of

4s. per qr.; and early in April the duty will most likely have receded to 15s. to 16s. per qr. Any subsequent changes must depend altogether upon circumstances, of which nothing can at present be known, the most important of which will be the then state of the weather, and the appearance of the growing crop, regarding which it would be vain to enter into predictions.

As the transactions at Mark Lane have a direct influence on the grain trade over the whole kingdom, and are even watched with interest in most parts of Europe, we propose, for the future, to give a somewhat detailed account of the operations which take place there monthly.

During the whole of February the supplies of English wheat into London have been on a moderate scale; the arrivals from Lincolnshire, which had previously constituted a large proportion of the weekly receipts, having in a great measure ceased. The falling off in the supplies of home-grown wheat, the low state of the stocks in the hands of millers, merchants, and dealers, caused buyers—who had, for many months before, operated with the utmost caution—to gain more confidence; and, with an improved demand, prices began gradually to tend upwards. On the first Monday in the month, wheat was generally quoted 1s. to 2s. per qr. higher at Mark-lane, and the following week it again advanced to the same extent—showing a rise of 3s. to 4s. per qr. within a fortnight. This was (as might naturally have been supposed) followed by better arrivals, the farmers in the neighbouring counties having become anxious to profit by so material an improvement in the value of the article; still the show of samples from Kent, Essex, and Suffolk has not at any time been large; and though a check has for the present been given to any further advance, no material reaction has taken place. Good runs of red wheat, of last year's growth, are still worth 56s. to 57s., and fine white over 60s. per qr. The enhancement in prices of free foreign wheat has been quite as great as that which has occurred in the value of home-grown; having, in addition to a good local enquiry, experienced rather an extensive demand for the article for shipment coastwise and to Ireland. For the latter purpose, low Mediterranean qualities have excited most attention; and as these are not at all calculated for the London consumption, our market has been cleared of a portion of those descriptions generally the most unsaleable. Danzig and red Baltic sorts have been pretty freely taken by our own and neighbouring millers; and, on the whole, the deliveries from granary have been rather extensive. At the close of the year 1843, the stock of free wheat in the port of London was estimated, after careful investigation, at 280,000 qrs.; and it is now supposed to consist of only 180,000 qrs., having diminished nearly a third in the course of the last two months. Besides a large amount of business done in bonded wheat on the spot, very important contracts for spring delivery at continental ports have been entered into during the month. For Danzig wheat in granary 43s. to 44s., and, in one instance, as much as 46s. per qr. has been paid; whilst equally high prices have been realized for cargoes to be shipped at foreign ports. The quality of last year's wheat is described as much inferior to that of 1842 all over the continent of Europe. From Pommern and Meklenburg, from whence we received wheat of splendid quality last year, weighing 62 to 63 lbs. per bushel, we have scarcely seen a single fine sample, the berry being lean and shrivelled, and, from appearance, we should question whether shipments

from that quarter will, upon their arrival in this country, be found to weigh more than 59 to 60lbs.

Notwithstanding this circumstance, English speculators have been found willing to pay 36s. per qr., at which figure many orders to buy have been sent to Rostock. Even at these high rates, and with a probable duty of 16s. per qr., freight, insurances, and other charges, a profit is expected to be derived from the investment: what protection could the British farmer, therefore, expect under an 8s. fixed duty?

In how far the generally reported deficiency in the crop of Barley at harvest time will ultimately be borne out, still remains to be proved; but so universally was the opinion entertained during the autumn and spring, that from the increased breadth of land under wheat, less than the usual quantity of barley was grown in this country in 1843, that many orders were transmitted abroad for the purchase of this grain. Some of these orders were executed before the winter had set in on the other side, and from time to time we have had arrivals from the continent, as well during this as the preceding month. Fine malting qualities (English), which at one period were worth as much as 38s. to 39s. per qr. in the London market, subsequently receded to 35s. to 36s.; and a corresponding reduction has taken place in the value of other descriptions. Many usually well-informed parties are nevertheless still sanguine, and stoutly maintain that our own crop will prove so short that the whole of what has been bought abroad will be required before another harvest can be secured, and predict that the duty will recede, if not to the minimum, at least to a very low point. We must confess that we are not sufficiently clear sighted to see so far into futurity, at the same time we are disposed to believe that present quotations are likely to be maintained, at least until the time the bulk of the foreign shipments may come forward, which cannot well be until April or May.

In addition to rather large supplies of Irish Oats, the arrivals from our own coast and Scotland have been to a fair extent, and though no material variation has occurred in the value of this grain, the tendency has been downwards. The future range of prices will depend mainly upon the extent of the importations that may still come to hand from Ireland. What degree of credit attaches to the reports from thence we are unable to determine, but according to the most recent advices it would appear that stocks had become greatly reduced in that country; and it is confidently asserted that, unless we advance materially on this side of the channel, the consignments to England will, for the remainder of the season, be comparatively unimportant. Similar statements have, however, so frequently been made in former years by our Irish neighbours without being followed by the results predicted, that we have become somewhat sceptical on the subject.

From abroad we do not anticipate any supplies of importance, the prices being relatively high in most of the oat-growing countries of Europe, whilst much uncertainty exists as to any considerable reduction occurring in the duty. At present the aggregate average price for the kingdom is 19s. per qr., and the duty 7s. per qr., with little probability of its receding below that point for many weeks.

Beans have, ever since harvest, borne a very low value, and are at the present moment—weight taken into account—one of the cheapest articles for feeding. There can be no doubt that the consumption has been lessened by the unusual mildness of the winter, still we are disposed to think that prices have been at the lowest point. So little encouragement has been held

out to make investments in this article, that it has been almost totally neglected; and we much question whether purchases have been entered into, to any extent, on British account abroad. Under these circumstances, and with a very marked reduction in the stocks, as well at London as at the principal maritime ports, a slight improvement does not appear improbable.

The remarks we have just made in regard to beans, apply, in a great measure, to peas also. The absence of severe weather has materially influenced the consumption; and seldom have we had a winter during which peas have excited so little attention. About Christmas, choice white boilers were worth about 38s.; but since then they have gradually receded; and they may now be had at least 3s. to 4s. per qr. below the price named.

The following statement of the arrivals of the different kinds of Grain, Pulse, and Flour into London, during the four weeks ending 24th inst., with the receipts of the corresponding period last year, may prove of interest to our readers:—

Month ending 24th Feb., 1844.	Month ending February, 1843.
Wheat, English qrs. 19307	Wheat, English qrs. 17221
Scotch ... 695	Scotch ... 633
Irish ... —	Irish ... 265
Foreign.. 8301	Foreign.. —
28303	18119
Barley, English.. 28625	Barley, English .. 29786
Scotch .. 9313	Scotch ... 4333
Irish ... 2526	Irish ... 154
Foreign.. 2057	Foreign.. —
42521	34273
Oats, English ... 12878	Oats, English ... 16659
Scotch ... 11083	Scotch ... 16665
Irish ... 62248	Irish ... 28967
Foreign .. 130	Foreign ... 983
86339	63274
Beans, English .. 5812	Beans, English .. 5223
Scotch ... 27	Scotch ... 20
5839	7846
Peas, English ... 3891	Peas, English ... 2116
Foreign... 310	Foreign ... 83
4291	2199
Flour, English, sks. 25981	Flour, English, sks. 27102
Foreign, brls. 6107	Foreign ... —
sks. 25981	sks. 27102
brls. 6107	

We shall conclude our observations with a slight notice of the position of the corn trade in Scotland and Ireland.

In the former country, the last harvest is now allowed to have been universally good; and it is nearly certain that we shall continue, for some time longer, to receive supplies from thence of barley and oats, with an occasional shipment of wheat. The quality of all the different kinds of grain may likewise be described as satisfactory, the greater part of the crops having been well secured there.

In Ireland the produce of both wheat and oats may have been somewhat overrated at the time of harvest; and, as regards the former, we are likely to be called upon to afford her some assistance, by importing free foreign from this country; this, however, will be merely a change of commodities, and not a drain for which no return will be made. They are likely to require some quantity of old wheat for mixing, but we are far from believing that the shipments of their own growth to this country will entirely cease; and indeed, we think the balance is, for several months, likely to be in our favour. Respecting oats, we have already—in another part of this article—spoken. There can be no question that the crop in Ireland was fully an average; and though the more needy farmers may have little remaining, we are of opinion that the large corn merchants will be enabled to furnish us, for a long time to come, with regular weekly supplies, should our prices continue sufficiently encouraging.

CURRENCY PER IMPERIAL MEASURE.

FEBRUARY 26.			
WHEAT, Essex and Kent, new, red	52 56	White 58	60 66
Irish	50 54	Do. ....	52 58
Old, red, .....	59 64	Do. ....	63 68
RYE, old .....	30 36	New....	56 —
BARLEY, Grinding, 30 32 Malting	34 35	Chevalier	36 37
Irish .....	28 32	Bere .....	26 28
MALT, Suffolk and Norfolk .....	60 62	Brown..	56 58
Kingston and Ware .....	60 63	Chevalier	60 63
OATS, Yorksh. & Lincolnshire, feed	22 23	Potato..	22 25
Youghall and Cork, black..	19 20	Cork, white	20 21
Dublin .....	19 20	Westport	20 21
Waterford, white .....	19 21	Black ..	19 20
Newry .....	21 22		
Galway .....	18 19		
Scotch, feed.....	20 22	Potato ..	23 25
Clonmel .....	20 21	Limerick	20 21 23
Londonderry .....	20 21	Sligo ..	18 19
BEANS, Tick, new .....	28 34	Old, small	34 38
PEAS, Grey .....	32 33	Maple ..	31 33
White .....	23 36	Boilers..	34 38
FLOUR, Town-made 48 50 Suffolk	40	per sk. of 280lbs.	
Stockton and Norfolk 28 40		Irish 42	—

FOREIGN GRAIN AND FLOUR IN BOND.

WHEAT, Dantzic .....	45 50		
Hamburg .....	42 44		
Rostock .....	42 44		
BARLEY .....	20 —		
OATS, Brew .....	12 16	Feed ..	11 15
BEANS .....	15 19		
PEAS .....	23 25		
FLOUR, American, per brl.....	21 23	Baltic ..	21 23

Account shewing the Quantities of Corn, Grain, Meal, and Flour, imported into the United Kingdom, in the month ended the 5th Feb., 1844; the Quantities upon which Duties have been paid for Home Consumption during the same month, and the Quantities remaining in Warehouse at the close thereof.

Species of Grain.	Quantity imported.	Quantity entered for consumption.	Quantity remaining in warehouse.
	qrs. bush.	qrs. bush.	qrs. bush.
Wheat, from British Possessions .....	1854 3	2627 5	784 6
Barley, do. ....	12 7	12 7	—
Peas, from do. ....	873 7	873 7	386 0
Indian Corn, do. ....	—	—	—
Wheat, foreign .....	34066 2	918 7	210116 0
Barley, do. ....	16305 1	8049 6	18985 6
Oats, do. ....	123 1	152 1	57471 4
Rye, do. ....	—	—	2221 2
Peas, do. ....	3326 6	958 7	27856 6
Beans, do. ....	2985 6	14213 6	74476 0
Indian Corn, do. ....	0 4	100 4	2334 4
Buck Wheat, do. ....	—	—	—
	cwts. qrs.lbs.	cwts. qrs.lbs.	cwts. qrs.lbs.
Flour and Meal from British Possessions..	17201 2 20	18537 1 16	3350 1 13
Flour & Meal, foreign	1695 3 0	42 0 21	87277 3 18

IMPERIAL AVERAGES.

Week ending.	Wheat.	Barley.	Oats.	Rye.	Beans.	Peas.
Jan. 18th .....	50 9	33 0	18 9	33 5	29 8	31 0
20th .....	51 8	33 7	18 9	31 7	29 6	30 3
27th .....	52 3	33 8	19 0	32 4	29 6	30 10
Feb. 3rd .....	52 6	33 2	18 11	33 10	29 8	30 8
10th .....	52 7	33 1	19 1	33 9	29 10	30 6
17th .....	53 6	33 4	19 6	33 5	30 6	31 1
Aggregate average of the six weeks which regulates the duty.	52 2	33 4	19 0	32 11	29 10	30 9
Duties payable in London till Wednesday next inclusive, and at the Outports till the arrival of the mail of that day from London ..	18 0	5 0	7 0	10 6	11 6	10 6
Do. on grain from British possessions out of Europe. ....	6 0	0 6	2 0	2 6	2 0	1 9

COMPARATIVE PRICES OF GRAIN.

WEEKLY AVERAGES by the Imp. Quarter, from the Gazette, of Friday last, Feb. 23rd, 1844.	AVERAGES from the corresponding Gazette in the last year, Friday, Feb. 24th, 1843.
WHEAT..... s. d. 53 6	WHEAT..... s. d. 48 6
BARLEY .....	BARLEY .....
OATS .....	OATS .....
RYE .....	RYE .....
BEANS .....	BEANS .....
PEAS .....	PEAS .....

STOCK OF GRAIN, &c., IN BOND, IN THE PORT OF LONDON, ON THE 5TH FEB.

Wheat.	Barley.	Oats.	Beans.	Rye.	Flour.
qrs.	qrs.	qrs.	qrs.	qrs.	cwts.
66,370	6,086	20,883	25,037	4,176	20,291

PRICES OF SEEDS.

FEBRUARY 26.

The late severe, and present wet weather have been against the Seed trade, and the little business transacted in Cloverseed and Trefoil has been at the rates last quoted. Linseed and Rapeseed steadily supported former prices. Canaryseed was in fair supply, and decidedly easier to buy. In prices of other articles no change occurred.

Carraway .....	—	new ..	57 62 per cwt.
Clover, English, red .....	70 80	white..	none.
Flemish .....	54 76	do. ....	70 115 nominally
New Hamburgh ..	63 68	do. ....	70 122
Old do. ....	42 54	do. ....	70 115
French .....	50 68	do. ....	none.
Linseed, English, sowing 50 60			
Baltic.....	—	crushing	38 41 per qr.
Mediter. & Odessa 38 41			
Coriander .....	15 20	per cwt.	
Mustard, brown, new....	12 18	white..	10 12 p. bush.
Trefoil .....	—	old..	14 28 new 25 34
Rapeseed, English, new ..	25 1/2	26 1/2	per last.
Linseed Cakes, English..	9 1/2	10 1/2	per 1000
Do. Foreign..	5 1/2	6 1/2	10s. per ton.
Large, foreign .....	—		
Rapeseed Cakes.....	5 1/2	5 1/2	10s.
Hempseed .....	—	35	28 per qr.
Rye Grass, English.....	—	Scotch	— nominal.
Tares, Spring.....	4s. 0d.	to 4s. 6d.	
Canary, new.....	55 57	fine	— per qr.

PRICES OF HOPS.

BOROUGH, MONDAY, Feb. 26.

Although the business done has not been extensive, prices are supported, the holders not being disposed to force sales, notwithstanding the demand has fallen off temporarily. We quote—

POCKETS, 1843.			
Sussex.....	122s. to 130s.	Mid. Kent.....	140s. to 180s.
Wales .....	124s. to 130s.	Do. bags .....	140s. to 175s.
Choice do.....	135s. to 140s.	Farnham pockets	105s. to 210s.
East Kent .....	145s. to 210s.		

POTATO MARKET.

SOUTHWARK, WATERSIDE, Feb. 26.

The weather during the past week has been much like the preceding one, remarkable for its changeableness. The market has been supplied from most of the shipping districts since our last report, but by no means liberal, yet fully equal to the present demand; the information received from most of the principal shipping districts of the scarcity of Potatoes imparts firmness to holders of the best samples, but it does not induce the retailers to purchase beyond their present wants, they considering that there are plenty of Potatoes left to supply this market at the present languid demand, as the advance in price has caused a decrease in the consumption.

per ton.		per ton.	
York Reds .....	60s. to 80s.	Do. Kidneys .....	s. 70s.
Perth do. ....	65s. 70s.	Wisbeach do. ...	65s. 70s.
Early Devons .....	65s. 70s.	Do. Blues .....	55s. 60s.
Late Devons ....	70s. —s.	Do. Whites .....	50s. 55s.
Cornwall .....	65s. 70s.	Guernsey Blues ..	60s. 65s.
Jersey Blues .....	60s. 65s.	Prince Regents ...	s. 70s.
Kent & Essex Wh. 55s.	65s.		

BUTTER, BACON, CHEESE, AND HAMS.

Irish Butter, new, per cwt.		Cheese, per cwt.		s. s.	
	s. s.	Double Gloucester..	48	58	
Carlow, new .....	84 92	Single ditto .....	42	52	
Sigo .....	66 —	Cheshire .....	52	74	
Banbridge .....	72 —	Derby .....	50	55	
Cork, 1st. ....	80 82	Foreign ditto .....	36	44	
Waterford .....	70 76	Bacon, new .....	36	40	
English Butter,		Middle .....	40	44	
Dorset, per firkin. 54	—	Hams, Irish .....	56	62	
Foreign Butter, cwt.		Westmoreland .....	41	70	
Prime Friesland.. 100	104	York .....	70	74	
Do. Kiel .....	98 102	Fresh Butter, 14s. 0d. per doz.			

WOOL MARKETS.

BRITISH.

LEEDS, FEB. 23.—Sales of combing Wool during the present week have not been quite so extensive as for some few weeks past. Prices are firm, and stationary. Clothing Wools are in good demand, and last week's quotations are full realized.

WAKEFIELD, FEB. 23.—There is no further improvement in the demand or price of Wool since our last; sales have been limited in all sorts, but prices are firm.

LIVERPOOL, FEB. 24.

SCOTCH.—There continues to be a moderate demand for laid Highland Wool at former rates. White Highland is also much inquired for; good crossed is much wanted at full rates; inferior not so much inquired for. Good Cheviots are also much wanted, and our stocks are very low.

	s.	d.	s.	d.
Laid Highland Wool, per 24lbs ..	9	3	to	9 9
White do. do .....	12	6		13 0
Laid Crossed do. unwashed ..	10	0		11 0
Do. do. washed .....	11	0		12 6
Do. Cheviot do. unwashed ..	10	6		13 0
Do. do. do. washed .....	14	0		17 6
White do. do. ....	23	0		24 0

FOREIGN.—We have a fair business doing by private contract at full rates.

FOREIGN.

CITY, Feb. 26.—There is a steady market for wool. During the past week the imports into London were 449 bales.; viz., 46 from Germany, 30 from the Cape, 127 from Smyrna and Odessa, 142 from Mogadore, and 104 from Calcutta.

At Brunswick, on the 2nd inst., the fair turned out more favourably than was expected. Cloth and zollverein manufactures met a good sale; and although the attendance of buyers was not very numerous, they took large parcels.

LEEDS, FEB. 23.—We can merely this week confirm our last report; the demand continues good, but stocks are light, and the choice only indifferent.

WOOL, on which the Home Consumption Duties have been paid at London, Liverpool, Bristol, and Hull, during the last week:—

WOOL.	This Year previous to last week.	Same time in the last Year.
London:—		
Spanish, .....	191,307	10,980
Australian, do. ....	486,510	1,097,062
Other sorts, do. ....	1,391,189	1,237,380
Liverpool .....	1,260,050	359,837
Bristol .....	11,374	—
Hull .....	984,417	635,429

IMPORTS OF WOOL.—Quantity of Wool entered at Hull for home consumption during the week ending Feb. 15:—

From Hamburg ..	14,381 lbs.
Copenhagen .....	13,627 "
Aaalborg .....	1,100 "
Total .....	29,108 lbs.

PRICES OF MANURES.

Subjoined are the present prices of several sorts of Manure:—

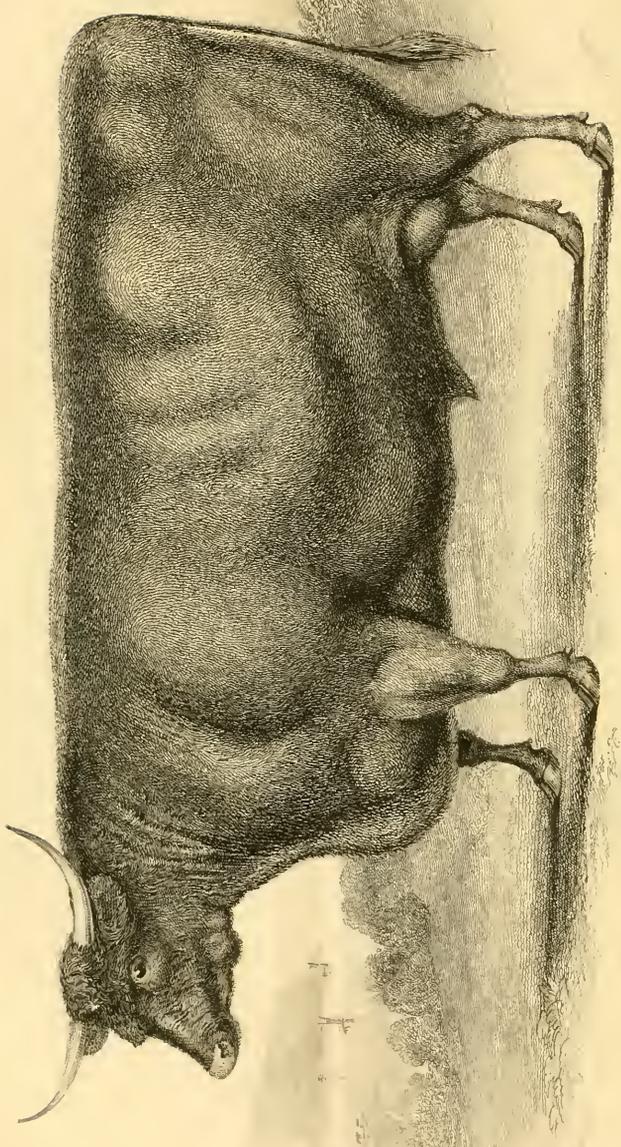
Hunt's Bone-dust, 16s. per qr.	Wolverhampton Compost (Alexander's), 12s. per qr, subject to carriage to London, or forwarded from Wolverhampton
Hunt's Half-inch Bone, 14s. per qr.	Guano, 10l. 10s. per ton; 12s. per cwt.
Hunt's Artificial Guano, 8l. per ton	Potter's Artificial Guano, 12s. per cwt.
Rape Dust, 6l. to 6l. 10s. per ton	Muriate of Ammonia, 24s. per cwt.
Rape Cake, 6l. per ton	Muriate of Lime, 12s. per cwt.
Rags, 4l. to 4l. 10s. per ton	Clarke's Compost, 3l. 12s. 6d. per hhd., sufficient for three acres
Graves, 6l. 10s. per ton	Alkalies, 28s. and 42s. per cwt.
Gypsum, at the waterside, 32s. 6d. per ton; landed and housed, 33s. to 42s. per ton, according to quantity	Soda Ash, 14s. to 16s.
Agricultural Salt, 34s. per ton	Chloride Lime, 28s. per cwt.
Carbon, 12s. per qr.	Sulphuric Acid, 24d. per lb.
Humus, 14s. per qr.	Sulphur for Destroying Worm on Turnips, 16s. per cwt.
Soap Ashes, 10s. per ton	Sulphate Soda, 7s. 6d. per cwt.
Patent Disinfected Manure, 13s. 6d. per qr.	The Liverpool Abattoir Company's Animalized Manuring Powder, 2l. 10s. per ton
Highly Concentrated Manure, 80s. per qr.	Manure Powder, 16s. per qr.
Nitrate of Soda, 14s. 6d. to 15s. per cwt.	Boast and Co.'s (Bow) Inorganic Manures, from 6s. to 11s. per cwt., according to crop
Nitrate Potash (saltpetre), 26s. per cwt.	Boast's Guano, 9l. 9s. per ton
Petre Salt, 4s. per cwt.	Pothergill's Gypsum, 35s. per ton.
Willey Dust, 4l. 4s. per ton	Pothergill's Phosphate of Lime, 14s. per cwt.
The Urate of the London Manure Company, 5l. per ton	
New Bristol Manure, 8s. per qr.	
Hunt's new Fertilizer, 13s. 4d. per qr.	
Chie flour, 21s. per cwt.	
Preparation for Turnip Fly, 16s. 6d. per pakt., sufficient for three acres	

PRICES OF SHARES.

No. of Shares.	Div. per Ann.	IRON RAILWAYS.	Price per Share.	Shares.	Div.	MINES.	Price.
6,300	2/8s p sh	Birmingham & Derby .. 100l sh pd	55 a 6	4,000		Alten .....	15l sh 13 1/2 pd
6,300	18s 8d p sh	Do. Thirds, iss. 8 1/2 dis. 33 1/2 sh 25d pd		10,900		Anglo Mexican, iss. 5l p. 100l sh pd	
6,310	2s 8d	Do. Eights .....	1 1/2 pd	2,000	1l	Ditto Subscription .....	25l pd
9,500	17 4s p sh	Do. and Gloucester .....	100l sh pd	11		Bolanos .....	150l sh pd
10,000	6s 0d	Do. New, iss. 7 1/2 dis. 25l sh 17 1/2 pd	67 1/2 a 6 1/2	10,000	3l per ct	Ditto Scrip .....	150l sh pd
15,000	4l per ct	Bristol and Exeter .. 100l sh 70l pd	10 1/2 a 8 1/2	6,000	17s 6d	Brazilian Imp. iss. 5l p. 35l sh 21l pd	
36,000	8s 0d	Eastern Counties .....	25l sh 23l pd			Do. Mocubas & Cocacs United	
88,000		Ditto New .....	25l sh pd	11,000		Do. St. John Del Rey .. 20l sh 15l pd	13 a 1/4
114,000	5l per ct	Ditto Extension .. 6l 13s 4d sh 13s 4d pd		12,000		Cobre Copper .....	40l pd
12,500	2 1/2 per ct	Glasgow, Paisley & Ayrshire 50l sh pd		8,500	15s	Copiapo .....	20l sh 13l pd
18,000	2l 5s p sh	Edinburgh & Glasgow .. 50l sh pd	57 1/2 a 1 1/2	10,000		Columbian iss. 5l pm ..	55l sh pd
18,000	7s 0d p s.	Ditto New .....	12 1/2 sh pd	1,500		Ditto New .....	11l sh pd
		Ditto Registered .....	12 1/2 pd	20,000		General Mining .....	20l sh pd
10,018	10l per ct	Grand Junction .....	100l sh pd	10,000		Great Wheel Martha .. 5l sh 2l pd	3 1/2
11,000	10l per ct	Ditto Half Shares .....	50l sh pd	15,000		Hibernian .....	50l sh 10 1/2 pd
		Ditto Quarter Shares .. 25l sh pd		5,051		Imp. Slate Company .. 10l sh 3l pd	
10,000	2 1/2 per ct	Great North of England .. 100l sh pd	94	20,000	10l per ct	Mexican .....	60l sh 50l pd
25,000	3l 18s p sh	Great Western .....	100l sh 75l pd	11,500	10s p sh	Mining Comp. of Ireland 25l sh 7l pd	
25,000	3l 0s p sh	Ditto Half Shares .....	50l sh pd			Real del Monte, registered Av.	
37,500	14s 4d p s.	Ditto Fifths .....	20l sh 12l pd			.....	63l 10s 6d
8,000	1l per ct	Hull and Selby .....	50l sh pd	1,872	4l per ct	Ditto Ditto unregistered ..	5 1/2 a 1/4
8,000		Do. Quarter Shares .. 12 1/2 sh 4l pd		3,548	4l per ct	Ditto Black Ditto .....	7l 6s 3d pd
16,000		Lancaster and Carlisle .. 50l sh 5l pd	5 1/2			Ditto Red and Black .....	
		Leeds and Bradford .....		10,000		Rhynney Iron .....	50l sh pd
2,100		Leeds and Selby .....	100l sh pd	10l p sh		Santiago de Cuba .. 25l sh 10l pd	7
5,100	10l per ct	Liverpool & Manchester .. 100l sh pd		30,000		United Mexican, iss. 2l p. 40l sh pd	
7,968	10l per ct	Ditto Half Shares .....	50l sh pd			Ditto Scrip .....	
11,475	10l per ct	Ditto Quarter Shares .. 25l sh pd				Ditto New Scrip .....	12 1/2 pd
35,000	2l 0s p sh	London and Brighton .. 50l sh pd	42 1/2 a 7 1/2				
	5l per ct	Ditto Loan Notes .....	10l sh pd				
48,000	2s 6d	London & Blackwall Av. 16l 13s 4d	5 1/2 a 6				
43,077		London & Greenwich Av. 12l 15s 4d		10,000	1l 4s	Anglo Mexican Mint .....	10l sh pd
11,136	5l per ct	Preference or Privilege Av. 18l 17s 2d	17 1/2	10,000	1l 15s	Australian Agricult. 100l sh 30l pd	
4125000l	10l per ct	London & Birmingham .....	Stock 224 a 7	5,709	6l per ct	Australian Trust Comp. 100l sh 35l pd	
54,450	10l p ct	Ditto New Quarter Shares .. 2l pd	20 1/2 a 4	6,000		British Ameri. Land 50l sh 35 1/2 pd	
41,250	1l 14s	Ditto New Thirds .....	32l sh 2l pd	10,000	6l per ct	Canada .....	100l sh 32 1/2 pd
46,200	3l 10s p s	London & South West. Av. 41l 6s 10d	76 1/2 a 7 1/2	10,000	5l per ct	Upper Canada Bonds .....	76 1/2
		Ditto Eighthths .....	6l 5s p sh 15s pd	5l per ct		Ditto .....	
33,000	13s 4d p s	London & Croydon .. Av. 13l 15s 8d	16 a 1/4	4l per ct		City Bonds .....	
7,000		Do. Scrip, iss. 50l dis. .... 10l sh 7 1/2 pd	13	10,000	5l per ct	Comp. Copper Miners in England	
13,000	3l 17s p sh	Manchester & Leeds 100l sh 70l pd	108 a 7			.....	100l sh 1 pd
13,000	1l 13s p sh	Ditto New Shares .....	50l sh 30l pd	5,000	5l per ct	General Rev. & Invest. 100l sh pd	
13,000	1s	Ditto Quarter Shares .....	2l pd	2,700	4 1/2 per ct	Equit. Reversionary 100l sh 70l pd	
30,000	1l	Manchester & Birming .. 70l sh 40l pd	30 1/2 a 40 1/2	20,000	1l 8s and		
		Ditto Extension .....	70l sh 7l pd		2s 6d bs	Gen. Steam Navigat. 15l sh 14l pd	27 1/2 a 6 1/2
10,000	4l 8s p sh	Midland Counties .....	100l sh pd	10l & bs.		Hudson's Bay Stock .....	100l sh pd
10,000	1l 2s	Do. 1/4 Shares, iss. 10 dis. 25l sh 15l pd		1l 10s.		London Commercial Sale Rooms	
10,000	2s 4d	Ditto Fifths .....	20l sh 2l pd			Average 75l	
10,000		Norwich and Brandon .. 2 1/2 sh 2l pd	4 1/2 a 3 1/2	8,000	5l per ct	London Reversionary Int. 50l sh	
	6s	Newest & Darlingt. Junc. 25l sh 15l pd	33 a 4			.....	17l pd
15,000	4l 0s	North Midland .....	100l sh pd	10,000		London Wood Paving Company	
15,000	2l 0s 6d	Do. 1/2 Shares, iss. 10 dis. 50l sh 40l pd	43 1/2 a 3			.....	10l sh 2l pd
22,500	1l 6s 8d	Ditto Thirds, iss. at 1l 13s 4d dis.				Mexican & South American 10l sh	
		.....	27 1/2 a 7			.....	7l pd
10,256	2l 5s	Northern & Eastern .. 50l sh 45l pd	55 1/2 a 4 1/2	20,000	5l per ct	New Brunswick (Land) .....	75l pd
3,136	15s	Do. Scrip .. iss. 5 dis. 50l sh 15l pd	23 1/2			New Zealand .....	25l pd
12,208		Do. 1/4 Shares. .... 12l 10s sh pd				Ditto New .....	25l sh 12 1/2 pd
80,000		Paris and Orleans .....	20l sh pd	7l per ct		Peninsular & Orient Steam 50l sh pd	52 1/2
72,000	1l 17s 0d	Paris and Rouen .....	20l sh 20l pd			Ditto .....	50l sh 35l pd
2,600		Preston & Wyre, appropriated 50l sh		5,387	4 1/2 per ct	Reversionary Int. Soc .. 100l sh pd	105
9,600		Ditto, not all appropriated 25l sh				Royal Mail Steam .....	60l pd
49,000		Rouen and Havre .....	20l sh 6l pd	14,000	6l per ct	South Australian .....	25l 20l pd
7,000	5l per ct	Sheffield, Ashton-under-Lyne, and Manchester .. 100l sh 82 1/2 pd	87 1/2			South Metropolitan Company 25l pd	
1,000	1l 15s	Sheffield and Rotherham 25l sh pd		4,000		Thames Tunnel .....	50l sh pd
1,600	15l per ct	Stockton and Darlington .. 100l sh pd		10,000	6s	Van Dieman's Land .....	100l sh 20l pd
24,000		South Eastern and Dover .. 50l sh pd	35 a 3 1/2				
24,000		Ditto New, iss. 25 dis. 25l sh 25l pd	35 1/2 a 3 1/2				
7,500		Yarmouth and Norwich 20l sh 13l pd	22 1/2				
6,700	10l per ct	York & North Midland .. 50l sh pd	116 1/2 a 17				
6,700	10l per ct	Ditto New Shares .....	25l sh 20l pd				
		Ditto Scarborough Branch .....	2 1/2 pd				

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*The Oxen of the West Indies of this country were brought to America by the Spaniards in 1492. They had never been seen before at the Caribbees.*





1877  
A. Lebrun's Station by Smith's out of Cambridge 1877

1877

# THE FARMER'S MAGAZINE.

APRIL, 1844.

No. 4.—VOL. IX.]

[SECOND SERIES.

## PLATE I.

### NORTH DEVON STEER.

Our first plate represents a North Devon Steer, three years and seven months old, bred and fed by Thomas Umbers, Esq., of Wappenbury, which was exhibited at the Smithfield Club Cattle Show in December last, and obtained the first prize in Class 3, of Fifteen Sovereigns and a Silver Medal.

Mr. Umbers also obtained a prize of Ten Pounds and a Silver Medal for another steer exhibited in Class 4 at the same show.

## PLATE II.

### RECOVERY.

ENGRAVED BY R. PARR, FROM A PAINTING BY C. HANCOCK.

It is not so much Recovery as a blood-horse, as Recovery a stud-horse, in the very character in fact in which he is here portrayed, that we introduce him to the readers of *The Farmer's Magazine*, as a horse for general purposes by no means unworthy of their notice. He is a horse of great muscular power, with some rare stout old blood in his veins, with handsome prominent points, and very good, though for a thorough bred one, rather high action. To our mind, he is just the sort of nag, the produce of which when crossed with a three-parts bred hackney, or a good roomy roadster, would very likely at four, or five year's old, be taken at a couple of hundred by "landlord," and thus very satisfactorily wipe out half-a-year's rent; or, going a little lower, let us suppose the dam to be a Welsh galloway, which nearly every farmer has to jog round his people on, and which might continue with his gentle work to carry him within six weeks of foaling. Here then we have little or no labour lost, while the youngster, who is "as handsome as a picture and as swift as a bird," will certainly either be sought after by some of the young ladies at the great house; or, if the squire won't have it, Master Arthur most assuredly will, when he comes home for the holidays. Far be it from us to wish to inoculate our friends with a horse mania, but we know many agriculturists who feel as much pleasure in looking at a well-bred well-reared horse, as they do at a well-bred well-reared heifer; and as far as our opinion goes, we think none the less of a farmer who can show us a good horse in his stable, and play a part with him out of it.

This horse has obtained an additional celebrity, from the fact of his being the model of the horse for the equestrian statue of the Duke of Wellington, about to be erected in front of the new Royal Exchange in the city of London.

Recovery, a chesnut horse, was bred by the late Lord Berners, in 1827; and is by Emilius, dam (Camarine's dam) by Rubens, out of Tippetwitchet by Waxy. Recovery is the sire of many first-rate animals.

## THE SOUTHAMPTON MEETING.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The period is now rapidly approaching, when the farmers of England will be assembled together at the great annual meeting, at Southampton, of the Royal English Agricultural Society. During the hurry, excitement, and contending objects of interest which press upon the visitor's attention at, and on the way to, these highly useful, and brilliant meetings, it is difficult for the farmer to coolly select for his inspection the most valuable objects which commonly then surround him. It may not, therefore, be unattended with benefit to the agricultural visitors, to that highly interesting town if I attempt to offer a few rapid notices of the objects to which I have just referred.

Supposing that the visitor takes his departure from London, the agricultural features of the line, of the South-Western Railway, which present themselves for the first portion of his journey, are neither remarkable nor instructive; till he has passed the Kingston station, he will find little but the rich lands of the market-gardeners. Soils made so rich by the excess of manure from the London scavengers, as to set the ill-effects of the vilest farming, the most execrable rotation of crops, utterly at defiance. Leaving these, the Kingston station is approached: some gravel slopes in the lovely district around Kingston are noticeable more for their richly wooded scenery than for the farming with which they are commonly disfigured. Passing the Kingston station, the train almost immediately enters, and for about thirty miles traverses, a barren-heath district, which, with little interruption, extends to beyond Winchfield; and now the farmer will have quitted Surrey, and have been for some miles moving through the county of Hants. Soon after he leaves Winchfield, the agriculturist will gladly quit that dreary series of heaths which must have disgusted him so long. The intelligent farmers of Norfolk, and of other English light-land districts who have made such magic improvements upon the drifting sands of the East of England, will hardly without pity, view these neglected, miserable heaths. It is idle to say that nothing can be profitably effected in bringing these lands into cultivation. The farmers from other properly cultivated, although as naturally poor districts, will readily allow, however, that nothing like profit can be expected from such soils, if they are treated as they are at present; such a ludicrous system of drainage, of enclosure, of planting, undrained swamps, over unbroken moorband pans, adorned as they are, of a natural consequence, with a wretched collection of yellow-tinted, worthless Scotch firs, could not in the nature of things ever be productive of profitable results to their indolent and ill-informed owners. It would be very desirable, I think, if the attention of either the government or of some public land-improving company was directed to the improvement of these utterly neglected heaths. It is quite evident that to their present owners, they are worse

than useless incumbrances. The portion of the county of Hants into which the farmer first enters is near the Farnborough station. In a report drawn up some years since for the consideration of the Board of Agriculture, the whole of this county was divided, for the convenience of description, into five districts; the first of these in which the farmer will find himself, is, in the report alluded to, called the Woodland District. The general character of this, however, hardly corresponds with the portion of it traversed by the South Western Railway trains. This division of about 103,000 acres includes the whole county to the north of a line drawn from Farnham in Surrey, to the south of Odiam, and the north of Basingstoke to Eastwoodhay. The reporter describes the predominating soil to be a strong brown or grey loam, resting upon a tough blue or yellow clay, generally wet, and in some places boggy. In the Eastern part are tracts of a dark coloured, sandy, or gravelly mould, of a good depth, and resting upon a dry subsoil; but even these are intermingled with a strong wet and brown loam. Along the borders of the rivulets lie tracts of meadow and pasture lands, the soil of which is a sandy loam, resting on clay, loam, peat, and gravel, and abounding in springs. Proceeding northward from the Woodland Valley, the soil becomes by degrees of a lighter quality, until the improvement is lost in a thin, sandy or gravelly mould lying upon deep beds of white, red, and yellow sand, and gravel, and a wet hungry loam upon a moist loose white and yellow clay. Along the south side of this district, the soil is of a mixed character, something between the heavy loams we have just noticed and the chalk to which it is approaching.

As the train arrives within rather more than a mile of Basingstoke, the farmer will see to his left hand the ruins of Basing House, memorable in days of anarchy, and rebellion, for the noble stand here made against the Republicans of the time of Charles the First, by the gallant ancestors of the present family of the Paulets. "The house was taken by storm in October, 1645," says Mr. Bell, in his Gazetteer, "after having been defended by John Paulett, fifth Marquis of Winchester; during a siege, or rather a series of sieges, for two years against the Parliamentary forces. The house whose remains, walls, and grounds bespeak its former magnificence, was demolished by order of Oliver Cromwell; though, according to Hugh Peters, "very spacious and beautiful, and fit for an empress." From a survey taken in 1798, it appears that the area of the works, including the garden and entrenchments, included upwards of fourteen acres of land.

Lord Clarendon, in his "History of the Rebellion," only slightly notices this event. He merely observes (vol. ii. p. 573),—"Cromwell had left Fairfax in the West, and, with a party selected, had set down before Basing; and his imperious summons having been rejected, he stormed the place and took it, and put most of the garrison to the sword; and a little before Winchester had surrendered on easy terms."

Near the Village of Basing, in 871, Ethelred was attacked and his army routed by the Danes.

The train next approaches the Basingstoke station, to the right of which the farmer will notice a beautiful ruin, being a fragment of the Holy Ghost Chapel—which is stated by Hassel to have been erected in the early part of the reign of King Henry VIII. by William, the first Lord Sandes, who obtained of that King a license for its foundation, and the establishment of a guild, by the name of "The Brotherhood, or Guild of the Holy Ghost." He endowed it with an estate, for the instruction of youth and maintenance of a priest, to perform divine service. This Brotherhood came to the crown in the 1st Edward VI. in pursuance of the act for the suppression of colleges, free chapels, &c. The inhabitants of Basingstoke, through the mediation of Cardinal Pole, the Pope's Legate, and Archbishop of Canterbury, obtained of Queen Mary the restitution of this guild to its original state; which, having nothing belonging to it of a superstitious tendency, continued uninterrupted until the civil wars, when it was seized on, and the chapel and school shut up; until Dr. Morley, Bishop of Winchester, obtained the restoration of this estate, in 1670, to be applied to the purposes for which it was originally instituted. Camden says, the history of the prophets, apostles, and disciples of Christ, was very curiously described, with their several portraits, upon the roof; and that Lord Sandes, the founder, was buried here.

The Basingstoke station is about half way between Southampton and London. There is little in the town of Basingstoke which is particularly remarkable. The celebrated navigator, Sir James Lancaster, was a native of this place.

The farmer is now on the great chalk formation—and on this he will continue, until he is nearly close into the town of Southampton, for although, after he has passed Winchester, he will speedily find himself gliding amid the water meadows of the valley of the Itchen, yet, even here, he must remember that the great majority of even these valuable meads have the chalk formation for their substratum. This great central division of Hampshire is pretty correctly described in the report, to which I have already referred, as containing about 454,000 acres. The higher portion has the appearance of an elevated plain broken into unequal portions, and intersected by hollows, through which numerous brooks and rivulets, rising in these upland tracts, find their way, for the most part in a southerly direction to the sea. In these hollows are found extensive tracts of meadow or pasture land, and almost all the houses of the inhabitants, the higher tracts being open and extensive sheep downs. On these valuable downs the predominating soil is a thin grey loam, resting on a firm bed of chalk. Particular places have what is provincially called a hazel mould, being light, dry, and friable, resting upon chalk rubble mixed with flint; this yields a short thick grass, affording very capital pasturage for sheep. A third soil met with in these downs is a black vegetable mould, resting on a substratum

scarcely different from the preceding. A fourth soil is a strong and flinty loam, resting from one to eight and ten feet deep on the firm chalk: this is found chiefly on the flat summit of the lesser eminences, the acclivities of which give a fifth description of soil, consisting chiefly of decomposed chalk—this yields large crops of turnips and sainfoin. In lower situations the soil is a strong grey or red loam, rather difficult to till, but highly productive, especially of wheat. In numerous hollows, exclusive of the valleys that are traversed by the running streams, the soil is termed "shrove" formed of small flat flints, sometimes red pebbly gravel, combined with a small proportion of exceedingly tough loam, in a few places, with dry sand or small gravel. Of the deeper valleys (the farmer will see this soil in the Itchen valley, between Winchester and Southampton), the soil is a black vegetable mould, resting on calcareous loam; in these large chasms occur, which are occupied by masses of peat, which is consumed in the neighbourhood for fuel, and in which are found numerous trunks of large trees.

The rotation chiefly followed upon the pretty extensive farms, which occupy the chalk formation between Basingstoke and Winchester, is chiefly a four or five shift. Sainfoin is here sown extensively, and this is allowed to remain one, two, or more years, according to the nature of the soil and the goodness of the plant—they are almost all stock farms.

"The ordinary rotation of crops in this district (as is well observed by Mr. W. Simonds, of St. Cross, in a recent obliging communication), on the four-field system, is wheat, turnips, barley, clover, or grass. On the five-field the same rotation is followed, except that the grass-field remains two years, and is known in the second year as old ley. In many instances this old ley is divided into two portions; one being prepared for rape and turnips, the remainder continuing in grass, both upon being afterwards sown with wheat constituting one field.

"When sainfoin is grown, a portion of the farm is set apart for this crop, and it remains on the land for several years; the remainder of the arable being subdivided, according to its capability, as before stated. The light land farms vary in the proportion of corn; the best soils usually having annually half corn and half green crops; the next quality two-fifths corn and three-fifths green crops; and the inferior only one-third corn, and in some few instances even less. The main-stay of the farmers throughout this extensive district is their flocks, and a vast number of good lambs are annually sold at Overton Fair (Feb. 18) to the dealers, from Buckinghamshire, Essex, Berkshire, and other fattening counties."

The great chalk formation, which the farmer passes over in the eighteen miles between Basingstoke and Southampton, is very accurately described by Mr. John Morton, in his valuable work on soils (p. 33), as extending "from Bridport in Dorsetshire, by Dorchester, Salisbury, Hungerford, Henley, Wycomb, Stevenage, Saf-

from Walden, Newmarket, Thetford, and Swaffham, to Docking, in Norfolk; along the north side of the London Basin, and crossing the Wash, it enters Lincolnshire at Burgh, and extends through South Binbrook to Barton; and after crossing the Humber, it proceeds from Hull, through Beverley and Ganton, to Foxholes. That which forms the south side of the London Basin, begins at Dover, and extends through Chilham, Chatham, Farmingham, Merstham, Guildford, Farnham, and Winchester to Salisbury. There is another branch, which forms the north side of the Isle of Wight Basin, beginning at Beachy Head, in Sussex, and extending through Shoreham, Arundel, north of Fareham, Bishops-Waltham, to Winchester. There is also a very small portion along the middle of the Isle of Wight. The greatest breadth of the chalk formation is about the place crossed by the South Western Railway, not far from Bishop's Waltham, in Hampshire, through Winchester and Whitchurch, to Wantage, in Berkshire, being upwards of forty miles. The water," continues Mr. Morton, "which comes from below the lower chalk, is pure and limpid, and delicious to drink. It contains carbonate of lime (chalk), and is of the best quality for water meadows—hence one reason why the best water meadows are in the chalk valleys. The openness of this formation keeps the whole of the surface very dry, indeed the whole of the chalk soil is dry, and there are no springs in it, except those that are thrown out by the clay below the lower chalk. Many of the valleys, which in the winter have rivers flowing in them, are left perfectly dry in the summer, owing to the openness of this formation, which allows the rain to run through it to the clay below—these valleys are called bournes.

The lower chalk forms a range of low hills, in front of the elevated range of upper chalk—the soil on the lower chalk is also called white land. It is without flints, and has fewer fragments of chalk in it than the soil on the upper chalk. This may be owing to a portion of clay or alumina in the lower chalk, on which the frost and the air have a great effect, and reduce it to a powder, or dissolve it into minute particles, so as to form, with vegetable matter, a chalky loam. This soil is a deep, strong, grey loam, a chalk marl, or a calcareous loam, of a white colour, from the quantity of chalk in its composition—white marl, maln, or marme, are names which are given to it in different districts. This is a much richer and more productive soil than that on the upper chalk, being stronger and more adhesive; it is better calculated, also, for the production of wheat, beans, and clover, but not so well fitted for turnips as the other; for, although it produces great crops, both of turnips and barley, the land is injured by the trampling of the sheep in consuming them on the ground.

A large portion of the upper chalk is in downs and sheep pasture, and most of the remainder is under the plough; little of this, in the southerly counties, is enclosed, though almost the whole

course of the lower chalk is under arable culture. There is a great portion of the upper chalk which is covered with either a thin coating of sand (the sand of the plastic clay, I think) or vegetable mould, in a state of nature, having been occupied as a sheep-walk for ages, and it has been kept in the same state, instead of being increased in value by the improved state of agriculture. The surface of the chalk formation, from being much undulated from the low level of the east coast in Norfolk and Suffolk, to the high hills of Hants, Wilts, and Dorsetshire, makes a considerable variation in the climate; in Norfolk and Suffolk the harvest on this formation is much earlier than in Hampshire, Wiltshire, and Dorsetshire. It is curious that the land on every other formation should be almost wholly enclosed, and that this should be almost entirely an open, extensive plain; this is the case, whether you take Dorset, Wilts, Hants, and Berkshire, on the west, or Cambridgeshire, Norfolk, Suffolk, and Lincolnshire, on the east. Is this to be considered as the cause, or the effect of the sheep fold, as a manure to fallows?

The open and porous nature of the subsoil leaves the surface perfectly dry; indeed so much so, that some yearly expense is incurred by the farmers in making and repairing ponds for catching rain-water for their stock, and wells have occasionally been dug through the chalk to a great depth for water—a great improvement would be made in the chalk district by inclosing the whole.

There are few objects of general interest worthy of notice between Basingstoke and Winchester. At that city, however, there is much to be seen, which will well repay the accomplished farmer's notice. He will here find a splendid cathedral, whose interior will well compare with, by far, the largest portion of the English cathedrals. In it, amidst many other remarkable persons, repose the remains of the celebrated Izaak Walton, the prince of fishermen, who, in this city, long the proud capital of England, passed quietly through the closing scenes of his tranquil life; following till the last, the happy vocation of an angler on the banks of the Itchen. Honest Izaak Walton evidently loved fair play in a fisherman, for he tells us in the fifth chapter of his *Complete Angler*, "And you are to know that in Hampshire, which I think exceeds all England for swift, shallow, clear, pleasant brooks, and store of trouts, they used to catch trouts in the night, by the light of a torch, which, when they have discovered, they strike with a trout spear, or other ways. In this kind of way, they catch very many; but I would not believe it till I was an eye-witness of it, nor do I like it now I have seen it."

Winchester abounds with relics of antiquity. Historical recollections of the highest interest are connected with its history. It was here that, in 827, Egbert was crowned the first king of England. Alfred the Great resided here, and was buried in its Abbey of Hyde. Canute, too, resided in it; as did William of Normandy. Rufus was buried in its cathedral. By Edward the third it

was made a staple for the sale of wool. Queen Mary was married here to Philip of Spain. And in the reign of James the first, the disgraceful trial of Sir Walter Raleigh took place within its walls. The cathedral (which contains an altar-piece by Benjamin West), the college, the Hospital of St. Cross, about a mile south of the city (founded in 1132 by Blois, brother of king Stephen), with many others, are all objects well worthy of the traveller's notice. At this last, all wayfaring travellers are entitled to freely receive, on application, bread and beer.

As soon as the train has passed through the deep chalk cutting at Winchester, the farmer will begin to perceive, and to gradually descend to the level of the excellent water meadows of the valley of the Itchen, which I next proceed to describe.

These water-meadows, the farmer when he is on his tour, will find the most ready of access for close inspection, either when at Southampton, by pursuing his way along the banks of the Winchester or Romsey canals, or, what will be perhaps still more convenient to him, if he stops at Winchester on his way (12 miles from Southampton), for the water-meadows of the Itchen valley extend perfectly close to the walls of that city—are, in fact, within half a mile of the railway-station. These meadows are copiously irrigated by the bright chalk waters of the Itchen, a river whose waters are, perhaps, the most copious considering the shortness of its course, of all the southern English rivers.—The farmer who views the mass of crystal water, pouring under Winchester bridge, will hardly feel inclined to suspect that all this flood is the produce of a few springs which arise within seven miles of the city. When the farmer also notices the fertility diffused by the use of these bright waters—waters which contain such very limited proportions of either earthy, saline, or organic impurities, he will feel assured that it is an error to conclude that it is only very impure waters that are valuable for the use of the irrigator. It is, in fact, a mistake which most persons make, to suppose that even these bright and transparent waters are perfectly pure, and that they do not contain any substances which are the food of plants—for both these popular opinions have been proved to be erroneous. Thus the waters of the Itchen contain, in 10,000 parts, 2½ parts of solid matter, viz:—

Organic matter.....	0.02 parts.
Carbonate of lime (chalk).....	1.89 „
Sulphate of lime (gypsum)....	0.72 „
Muriate of soda (common salt) 1.01	„

Now, that these saline substances are absorbed by plants, from these kind of irrigation waters, has been shown by Dr. Madden (*Trans. High. Soc. v. 8, p. 687*), who found, in a gallon of the water, of some springs issuing from the foot of the Pentland Hills, of

Carbonate of lime (chalk).....	4 grains.
Chloride of sodium (common salt) 10	„

But after this water had been passed over some meadows, it was found to contain these salts in

diminished proportions. The same quantity of water then containing of

Chalk only .....	2 grains.
Common salt .....	5 „

Such facts would appear to confirm the conclusions of some of the ablest cultivators, that the chief advantages of irrigation are attributable to the foreign substances with which the water is charged; although, as I have elsewhere observed, almost every farmer has a mode of accounting for the highly fertilizing effects of irrigation—one thinks it *cools* the land, another that it keeps the grass *warm* in winter. And this was Sir. H. Davy's opinion. He thought that a winter-flooding protected the grass from the injurious effects of frost.

In these conclusions with regard to the theory of irrigation, I have found many excellent practical farmers concur. Thus, Mr. Simonds, of St. Cross, near Winchester, considers that the great benefit of winter flooding for meadows is derived, in the first place, from the deposits made by the muddy waters on the grass; and, secondly, from the winter covering with water preventing the ill effects to the grass of sudden transitions in the temperature of the atmosphere. This gentleman is perfectly aware of the value of the addition of the city drainage of Winchester to the fertilizing qualities of the Itchen river water, and of its superiority for irrigation after it has flowed past the city, having water meadows both above and below the town; and he finds that if the water has been once used for irrigation, that then its fertilizing properties are so materially reduced, that it is of little value for again passing over the meadows; and so convinced is he, by experience, of this fact, that, having in this way long enjoyed the exclusive and valuable use of a branch of the waters of the Itchen for some grass land, a neighbour higher up the stream followed his example, constructing some water meadows, and using the water before it arrived at those of my informant, who, in consequence found the water so deteriorated in quality (though not sensibly diminished in quantity) that he once thought of disputing the right with his more upland neighbour. The experience of other irrigators tends to the same conclusion. In the best managed water meadows of Hampshire the farmer does not procure annually more than three crops of grass; yet in situations where a richer water is employed, as near Edinburgh, four or five are readily obtained.

Almost any description of grass, it is found, will flourish under proper management in water-meadows. Those whose soils consist of peat, resting on sand or on sandy loam, with a substratum of chalk or gravel, generally produce the meadow foxtail, the brome grass, and the meadow fescue, on the tops and sides of the ridges. The furrows and sides of the drains are usually tenanted by the creeping bent, the hard fescue, the rough-stalked meadow grass, and the woolly soft grass. In those water-meadows whose soil consists of a sandy loam on a clay subsoil, the chief grasses are commonly the creeping-rooted soft grass, the crested dog's tail, the meadow barley,

and the sweet-scented vernal grass. But some grasses change their appearance in a very remarkable degree when exposed under favourable circumstances to the influence of the flood waters.

This fact is strikingly exemplified in the case of two small meadows situated at Orcheston, six miles from Amesbury, in Wiltshire, denominated from their great produce "the long grass meads." These, says Davis, "contain together only two acres and a half, and the crop they produce is so immense, that the tithe of their hay was once sold for five guineas." Much discussion took place amongst the Wiltshire farmers as to the nature of the crop of these meads, before it was at last shown that the greatest part of their herbage consisted of nothing else than the black couch or couchy bent, the *agrostis stolonifera*, one of the worst of the grasses or weeds which haunt the poor, ill-cultivated arable soils.

It is a correct conclusion of the farmer, that the grass and hay of water-meadows is not so nutritious as that of permanent pasture lands. The difference, however, is not so great as is commonly supposed. The late George Sinclair determined this experimentally, and he is no mean authority with regard to all that relates to the grasses. He obtained from the rye-grass (*Lolium perenne*), at the time of flowering, taken from a water-meadow that had been fed off with sheep till the end of April, of nutritive matter, 72 grains; and from the same weight of this grass, taken from a rich old pasture, which had been shut up for hay about the same time, 92 grains; from the same grass from the meadow that had not been depastured in the spring, 100 grains; and from the same grass from the pasture which had not been fed off, 120 grains. All the grasses, in fact, where their growth is forced by the application of either liquid or solid manures, are found to contain nutritive matter in diminished quantities—this, too, was determined by Sinclair. From four ounces of a very rankly luxuriant patch of rye-grass, on which a large portion of cow-dung had been deposited, he obtained of nutritive matter, 72 grains. From the same quantity of the same grass, growing on the soil which surrounded this luxuriant patch, he obtained 122 grains; and, in a second trial, the same species of grass, on a soil entirely destitute of manure, afforded of nutritive matter 95 grains. On the same soil excessively manured the grass afforded only 50 grains. In these experiments, the plants were of the same age, and were examined at the same stage of their growth. (*Hortus Gram.*, 384.)

With regard to the construction and management of water-meadows, there are many practical works of the highest authority to which the farmer has ready access, and in the following observations, therefore, I shall merely very briefly paraphrase the accounts given by Mr. Davis and others, of the practice of irrigation in the southern counties—(*Stephens's Practical Irrigator—Brown's Rural Affairs*, p. 263—*Sinclair's Hort. Gram.*, p. 382—*Davis's Wiltshire—Driver's Hampshire*). In this, however, ever since the time when Davis wrote, there has been a great

and steady improvement. The land is better levelled, the slopes more evenly preserved, the water ways, aqueducts, and hatches better constructed, and in many of the more recent improvements in the valley of the Itchen, the sliding water-doors are regulated by a cogged wheel turned by a moveable winch, so as to render them safe from alteration during the absence of the meadow-keeper.

The management of the Wiltshire and Hampshire water-meadows, as well as it can be briefly described, is as follows:—In the autumn, the after-grass is eaten off quite bare, when the manager of the mead (provincially the *drowner*) begins to clean out the main drain and "right up the works;" that is, to make good all the carriages and drains which the cattle have trodden in, so as to have one tier or pitch of work ready for drowning. This is immediately put under water, while the *drowner* is preparing the next pitch.

In the flowing meadows this ought to be done, if possible, early enough in the autumn to have the whole meadow ready to catch the first floods after Michaelmas. The water then being the first washing of the arable lands on the sides of the chalk hills, as well as the dirt from the roads, is then thick and good; and this remark as to the superior riches of the flood-waters, is one that is commonly made in Berkshire and other parts of England. The length of the autumnal watering cannot be precisely stated, as much depends upon situation and circumstances, but if water can be commanded in abundance, the custom is to give meadows "a thorough good soaking at first," perhaps for a fortnight or three weeks, with an intermission of two or three days during that period, and continue for the space of two fortnights, allowing an interval of a week between them. The works are then made as dry as possible, to encourage the growth of the grass. This first soaking is to make the land sink and pitch close together, a circumstance of great consequence, not only to the quantity, but to the quality of the grass, and particularly to encourage the shooting of new roots, which the grass is continually forming to support the forced growth above.

While the grass grows freely, a fresh watering is not wanted; but as soon as it flags, the water must be repeated for a few days at a time, always keeping this fundamental rule in view—"to make the meadows as dry as possible after every watering, and to take off the water the moment any scum appears upon the land, which shows that it has already had water enough."

Some meadows that will require the water for three weeks in October, and the two following months, will not, perhaps, bear it a week in February or March, and sometimes scarcely two days in April and May.

In the catch-meadows, which are watered by springs, the great object is to keep the works of them very dry between the intervals of watering; and as such situations are seldom affected by floods, and generally have too little water, it is

necessary to make the most of the water, by catching and rousing it as often as possible; and as the upper works of every pitch will be liable to get more water than those lower down, a longer time should be given to the latter, so as to make them as equal as possible. (*Davis's Agriculture of Wiltshire*, p. 125—7.)

In Berkshire they first flood their water-meadows about Michaelmas; these are situated principally on the banks of the Kennet. The first flooding they deem the richest in quality: this they keep on the land for about four days, then they dry it for about a fortnight, and then the water is let on for three or four days more: those meadows which are the most readily dried are the most productive. There are none more so, in fact, than those which have a porous, gravelly, or broken flint bottom, from which the flood-water readily escapes, almost without drains. They begin to feed their meadows with sheep about the 6th of April, and continue feeding till about the 21st of May, when the meadows are again flooded for a crop of hay; the land is then flooded and dried alternately for three days until hay time.

The land in Wiltshire under this kind of management has been computed, and with a tolerable degree of accuracy, to be between 15,000 and 20,000 acres. Some considerable additions, however, have been made to the water-meadows of the district since this calculation was made. (*Davis's Wilts.*, p. 122.) About the same number of acres are formed into water-meadows in Berkshire, and a still larger number in Hampshire.

These water-meads are very commonly held by those farmers who hold the adjoining down or sheep-farms; and they are found to be, in connection with these valuable stock farms, exceedingly valuable, as yielding a supply of green food between the period when the supply of turnips usually terminates, and that of the upland spring-feed commences. For, on these skilfully-constructed meadows, their first crop is generally ready to be fed off long before the grasses of the arable farms have begun to make first spring shoot.

These down farms, adjoining the banks of the Itchen, are principally resting immediately on the chalk formation; in fact, their soils are mainly composed of chalk. They are chiefly farmed on the four-course system, and are many of them (in connection with these water-meadows) worthy of the careful inspection of the farmer from other counties. These meads, are a valuable description of grass land, which, as I have before had occasion in other places to remark, may be readily formed in other districts, with considerable advantage to the cultivator.

These meadows extend pretty nearly to the Bishopstoke Station, from whence the Gosport branch of the South Western Railway diverges. At this spot the farmer may notice one or two of the best farms in Hampshire. Passing this station, at the distance of about five miles of a district more noticeable for the beauty of its scenery than its agriculture, the train arrives at Southampton.

The beautiful, and rapidly rising town of

Southampton,\* the farmer will find situated on a peninsula, towards the head of the Southampton water. On one side of this peninsula, the bright, swift-flowing waters of the River Itchen reach the bay; on the other those of the Test.†

When at Southampton, various objects of interest will be readily accessible by the visitor. Within about two miles of the town, on the banks of the Southampton water, are the beautifully situated ruins of the abbey of Netley. They will be most readily found by the tourist, by passing over the Itchen ferry fly-bridge at the bottom of the town of Southampton, and by turning to the right, and keeping as close to the shore as possible—the ride is a very lovely one.

The abbey of Netley was founded by king Henry II. in 1239, who placed in his foundation a small party of Cistercian monks (from the abbey of Beaulieu): these were, says Dr. Beattie, the most powerful and encroaching of all the religious orders. In point of revenue Netley abbey was one of the smallest of the monasteries. At the time of the dissolution it held only an abbot and twelve monks, and their possessions produced, according to Dugdale £100 1s. 8d. The site was granted by Henry the VIII. to Sir W. Paulet, afterwards Marquis of Winchester, one of the most remarkable statesmen of his time. Queen Elizabeth was here in 1560. In the register of St. Michael's parish it is stated "the Queen's Majesty's Grace came from the castle of Netley (a house close by Netley abbey, belonging to Lord Hertford) to Southampton, on the thirteenth day of August." The English monks, in selecting the sites of their houses, always endeavoured to secure a good supply of fish and game. At some distance behind the abbey of Netley the monks had two fish ponds, which are still in perfect preservation. The first is nearly square, bordered with underwood, and backed with flourishing oaks. The upper pond is still more picturesque, being perfectly overhung with fine trees. There are few traces of their gardening or their agriculture, but they obviously, and wisely, never neglected either their vineyards or their woods. The neighbourhood of Netley abbey was certainly more thickly wooded in former times than now. In the steward's book for the town of Southampton under the date, 1469, is an entry of two pounds three shillings and fourpence, paid to the abbot of Netley, for "a grove of woode bought by the maire for to make piles and legges by the sea syde." Horace Walpole was enraptured with what he terms "not the ruins of Netley abbey, but of Paradise. Oh, the purpled abbots; what a spot they had chosen to slumber in! The scene is so beautifully tranquil, yet so lively, that they seem only to have retired into the world." When he visited Netley, there were

\* The population of the town, which in 1821 was 13,343, had increased in 1841 to 27,744.

† These are both celebrated trout streams: the Test, too, is almost the only stream in England where the angler finds the grayling.

standing "fragments of beautifully fretted roofs, pendent in the air, with all variety of Gothic patterns of windows topped round and round with ivy." The last remains of the "fretted roof" have long fallen, and most of the windows have, since Walpole's time, been stripped of their ivy.

It is hardly possible, in the limits of this paper, to even, but slightly describe to the visitor all the numerous objects of attraction which present themselves within a few miles of Southampton. The Isle of Wight, to which there are steamers almost every hour—Portsmouth dockyard, with the Victory, Nelson's flag ship, at anchor just before it—The New Forest (in which the spot is still shewn where William Rufus was slain)—the race course—the new cemetery—the docks—the Victoria pier—are all objects of interest, which will well repay the visitor for the time bestowed upon their examination.

Many historical recollections of the highest interest are connected with this town. It was here that Canute king of England reproached his courtiers when seated on the sea shore. It was here that Henry V. marshalled his army previous to the battle of Agincourt.

But I must conclude these rapid notices. The Royal Agricultural Society of England has never, hitherto, held its annual meeting in so lovely a district; and when I remember the numerous objects of interest which the county of Hants presents to the farmer's notice, I cannot but feel confident that the meeting at Southampton will yield, in its brilliancy and good effect to none of its predecessors.

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#### AGRICULTURAL MECHANICS.

On Friday, the 8th instant, a Lecture on Agricultural Mechanics, was delivered by Mr. Cottam (of the firm of Cottam and Hallen), at the Royal Institution, Albemarle-street, before Lord Prudhoe, the Marquis of Douro, Sir William Codrington, and a numerous audience.

The Lecturer commenced by saying that to state that within the last few years the character of English Agriculture had changed most materially, was perhaps superfluous. The great problem which agriculturists now attempted to solve was, how to draw from the land the greatest possible product, at the least possible expense; and this, not for one year, or for two years, but for many years in succession, and for periods of long and indefinite duration. In this consisted agriculture as an art. Subordinate to this, however, each in different degrees, but all more or less subordinate, was a long range of subsidiary sciences. It was the recognition of the importance of these subsidiary sciences wherein consisted the different and improved character of the agriculture of the present day. It was not enough at the present time to cultivate our lands as either empirical experimenters, or as the indolent followers of established practices: of science, in more than one shape, we called in the aid and assistance. Of the

particular science of chemistry, the bearings and the value need scarcely be pointed out upon the all-important subject of artificial fertilization, or of manures—the labours, first of Davy, and afterwards Liebig, had not in vain been expended. The importation of even *foreign* manure had become a large element of English commerce. We fetched bones from the continent of Europe, and guano from the islands of America; and doubtless in this department of traffic, new sources would be discovered and made available. In the desert, between Egypt and Syria, the bones of unnumbered horses and camels, that had whitened and accumulated during the lapse of centuries, afforded a supply that, according to the report of eye-witnesses, was inexhaustible. Over and above the importance of geology in all matters of drainage, that science had discovered the manures that chemistry had indicated. Liebig had scarcely shown the importance of the phosphates, when Professor Buckland indicated an indefinite supply of them in those remarkable fossils called *coprolite*, which analysis had shown to be rich in the phosphate of lime. Beds of *coprolite* underlaid whole acres of the counties of Huntingdon, Bedford, and Cambridge, which the subsoil plough could reach, and which might be brought to the surface, and exposed to the decomposing influence of the atmosphere. In the Spanish province of Estramadura, a whole stratum of phosphated rock had been discovered. A part equally conspicuous with that of chemistry and geology, was played by the sciences of botany, of zoology, and of physiology. These determined the choice of seed, the culture of artificial grasses, the value of stock, the merits or demerits of particular breeds of cattle, the methods of feeding and fattening; and these, in a manner too direct to be overlooked, influenced the great question of economical agricultural production. The points of agriculture that brought us into contact with the exact mathematical sciences and with natural philosophy, were numerous, varied and dissimilar. The method by which we lightened the draught of the plough or carriage, and the plan by which we converted—by means of drainage—whole acres of unproductive moss into fertile soil, were alike subject to the calculations of mathematics, and alike involved the science of the mechanical philosopher, the skill of the engineer, and the practical ingenuity of the machinist. It was upon the latter subject that he had the honour of addressing the audience that evening; and certain he felt, that in the points which he should attempt to illustrate, namely, the improvements in agricultural implements and machinery, we had not only a department of agriculture far from unimportant, but also one wherein the progress made in late years was quite on a par with the advancement made in the other sciences applicable and subsidiary to the art of agricultural production. The agricultural engineer had to contend against difficulties unknown to all other branches in the whole range of manufactures. In manufactures, we had every thing at command: if we required a high temperature to spin cotton in, it was easily

obtained; if a moderate one for silk, it was easy to be had; if we required a very moist one for flax—or as it was found to be better spun in water—it was easily accomplished. If any difficulty was met with, once removed, it was wholly removed. Not so with agriculture: if contended against this season, it would be met with again the next, or probably change of weather would increase this difficulty the next day. The agriculturist had all the difficulties of the seasons to contend against—when he should have rainy weather it was dry, and when he should have frost he got rain. The seed was to be sown, and then again he had to contend against the temperature and the adverse seasons in this climate; the shortness of the summer, the almost endless variety in the texture of the soils, the strong attachment to old customs, the inequality of the matter to be operated upon, and the great quantity of material to be operated upon at a small cost. The operations of agriculture in which the employment of machinery was required might be divided into five classes: first, implements used in tilling the land, and in the cultivation of the crops; secondly, in harvesting the crops; thirdly, in preparing the crops for market; fourthly, the implements used in preparing the food for the stock on the farm; and fifthly, the domestic machinery. Under the head of the first would come the draining tools, the plough, the harrow, the cultivator, the rake, the roller, the drill, and the various other implements while the crop was proceeding. The most important, and the greatest aid that the agricultural engineer had obtained, had been the great discoveries made within the last few years in the system of draining. That discovery had been made and brought to bear on agriculture, and had been carried out to a considerable extent, by Mr. Smith; it had involved an immense outlay of capital, but that expenditure would be amply repaid. It had been customary to draw stretches on the land, ploughing with three horses in front, following one another in the furrow; and there was, what was called in civil engineering, a pudding surface below the depth of the plough: if the soil was loamy, it was impervious to water—the water could not penetrate, and therefore the plough threw the land up into a round ridge; and, after, the furrow was opened to make a clean course for the water to flow. Now it was evident that if there came a very dry season—and every one who knew anything about a field of corn must have observed that along the centre was the finest portion of the crop—if there came a dry season, there being no depth of soil to hold the moisture, and there being no possibility of capillary attraction, or any other method of getting moisture from below, there was a pudding surface. That had been the case, not only in one season, but for many seasons; and even for ages the land had never been penetrated to the subsoil. Now a great desideratum was to get a depth of soil, not of four, but of six inches, which was the deepest ever employed; and the average depth was four or four and a half: twelve inches was a very great depth, and more than sufficient for all agricultural purposes. Mr. Smith,

by going thirty inches deep—ploughing ten inches for his drain—got twenty inches depth of soil above, when he had drained the land he ploughed five or six inches, then he took the subsoil plough and ploughed, without raising the soil to the surface, twelve, fourteen, or sixteen inches. Thus he carried out the most perfect system of draining ever invented.

The subsoil plough, when compared with others, showed the great superiority of the times in the knowledge of the material. The Kentish plough used to plough only three inches in depth, and with a weight of seven or eight cwt., required four horses, whereas, with three or four cwt., Mr. Smith could plough down to a depth of eighteen or twenty inches, breaking up the soil for a yard forward, making it swell right and left like a little earthquake, allowing the water to percolate through, and get to the drain, thus keeping the whole of the surface, to a depth of six inches, perfectly dry. It also kept the dry land quite moist. Now the subsoil plough, wherever it had been used, had produced advantages so great, that it really had become almost dangerous to meddle with; and so manifest indeed were the advantages attached to its use, that lands, at one time worth only 2s. 6d. per acre, after they had been under the operation of this plough were worth £4 per acre (*cheers*). Many noblemen had testified to the value of this implement. The Marquis of Tweedale had some land worth only 5s. per acre: he asked the tenant to give it up to him, and by cultivating it upon the improved system of drainage, with the subsoil plough, he so increased its value that the man asked him to let him have it back again at 23s. per acre. No one could calculate the value of subsoiling; no sooner had the subsoil plough made its appearance, when no invention or system of agriculture made such rapid progress. The lecturer then described the mechanical action of the plough by reference to a model and diagrams; and he also noticed the Scotch ploughs, the Essex ploughs, and Ransome's ploughs, the Kent turn-wrest, and the Rack-heath plough. At one time, he said, the Scotch ploughs were considered pre-eminent over others, and the Royal Agricultural Society had a great many meetings in different parts of the country—at Bristol and at Liverpool—and a spirit of great emulation was evinced. At these trials a simple Scotch plough with a pair of horses, appeared to beat the English ploughs by far in point of draught, but when it came to be tested by accurate measurement, a great deal of power was found to be unnecessarily expended. An instrument was invented many years ago for the purpose of testing the draught of ploughs, called a *Dynamometer*, but which was found to be not so perfect as was desired. He (Mr. Cottam) was written to by Mr. Pusey, to ascertain the result of several ploughs, and he obtained a pretty accurate notion of the value of the ploughs by a simple improvement in the *Draught-gauge*. The patent dynamometer had been contrived with the intention of obviating the continual vibration of the dynamometer formerly in use, which was

caused (with reference to the plough) by the obstructions met with in the soil through which it was passing; these vibrations were so incessant, that the indicator could scarcely be discerned during the experiment. The improvement made by Mr. Cottam consisted in the attachment of a small brass pump filled with oil, the piston of which had one or two small apertures; there being no outlet from the pump, it was evident that when any shock occurred, caused by a stone, a root, &c., the oil having to pass from one side of the piston to the other, the suddenness was greatly diminished by the resistance, producing a corresponding effect upon the pointer, which, as these shocks were rapid, vibrated nearer the actual draught of the machine, which was the object in view, and not the measurement of any impediment but the mean result of the whole. There was nothing lost here, there was only a change from one place to another; the power of the horses was felt; and instead of moving over a space of six or seven inches from 10 stone to 60, it moved something like one or two stone, so that the whole range of the instrument could be perceived. In applying this instrument to the ploughs, the first time it was tried at Liverpool, twenty-six ploughs were tried; and there it was found that the Scotch ploughs took from 40 to 45 stone to draw through, while the English ploughs went at 32, and as low as 30 with 25 per cent. less expenditure of power; and, in every case, the lowest draught and the best ploughing had been by the English ploughs (*cheers*), none of which were better than Ransome's. Some of the Hampshire ploughs went as low as 28; but that arose from the peculiar construction of the machine, making a narrower bottom, to go through less soil. Now, at one time no attention was paid to the neatness of the ploughs—they were extremely rough; but such was the necessity of making the ploughs go in the ground easily, that it had been found absolutely necessary to give them a polish, making the coulter so bright and sharp that it cut through roots and weeds and a great deal of tough land. Ploughs, now-a-days, had been brought to such perfection, that the young farmers began to feel the necessity of putting them into a dry place, instead of throwing them neck and heels into a ditch, and letting them remain until the next season. Some years ago, he (Mr. Cottam) made some ploughs of shear steel, and they answered very well. Ransomes had made some ploughs, and put such a polish on the steel that they were fit to go into a drawing-room; they slid through the ground with very great ease, and did their work beautifully clean. Mr. Cottam then described the plough introduced some years ago by Mr. Stein, of Kilogie, East Lothian, constructed upon the principle of the wedge share. About twenty-five years ago, he said, there was an endless variety of ploughs; every county, nay every parish, had its plough. This, he supposed, was to be accounted for by the ancient law that every ploughman should make his own plough—and a very wise law for getting a good plough; but it was upon a par with

the ancient practice of attaching the plough to the horses' tails, to abolish which absurdity an act of Parliament was passed, because it was supposed to be painful to the animals. Another description of plough was that contrived by Mr. Rand—a gentleman who devoted his time to agriculture, and certainly rendered it very great services. He constructed a share of a most beautiful curve, on every part of which there were straight lines, and it did its work extremely well. Some 40 years ago, Bailey, a great mathematician, took great pains to try to reduce the plough to a system of mathematics, and when he found that he had made what he thought the best plough that could be made, he discovered that the fallows were much too narrow, the plough produced a great deal of friction. A great contention took place as to the superiority of the swing over other ploughs, but after all it must come to this: if the line were pretty level, and there was no obstruction to the wheels, it would be much easier for the ploughman, and he would do his work regularly without any difficulty; but if the land were rough, it was evident the wheels would not go over the ground so smoothly, and the difficulty would be increased. The system of setting out the plough was this:—while the horse is in the act of pulling, the inclination of his shoulders varies from  $69^{\circ}$  to  $75^{\circ}$  according to circumstances; the medium is  $72^{\circ}$ , and the medium height and the length of the draught on the shoulders of a horse of  $15\frac{1}{2}$  hands is 48 inches. These data being got from experiment, and the depths to be ploughed say 6 inches, draw a right line A B at any point, and a perpendicular line A P equal to 48 inches; with A P as a radius from P as a centre, describe a quarter of a circle A Q, which divide into 90 equal parts or degrees; from P through  $77^{\circ}$  draw a right line to meet A B; in B set out the traces and swing trace from P to H; this is commonly 102 in. = 8 ft.; from H upon A B let fall a perpendicular H I, which, measured on the same scale that A P was taken from, will equal or give the height of the beam about 16 inches; then, at the distance of half the depth the land is intended to be ploughed, draw a line parallel to A B, and from C, where it intersects P B, let fall a perpendicular upon A B to S, which will give the point of the sock; and the line drawn through C, meeting the angle of  $45^{\circ}$  with B A., will be the position of the fore-edge of the coulter. In agriculture, as in manufactures and in the arts, it was necessary to have proper tools for different things—to have ploughs to suit stiff clods, and ploughs to suit light lands, and ploughs for the different depths required, and to have as little expenditure of power only as was necessary. In 1652, a Captain Walter Blythe published a work on agriculture, and dedicated it to Cromwell and the Council of State. He described the Hampshire plough with two wheels; also the famous Gloucestershire plough, which obtained so much credit about 20 years ago; and he gave a drawing of the circular coulter, which he called the Dutch coulter; also a

drawing of the Dutch share, with the shape of the present Essex share. The turn-wrest plough, he said, exceeded all other ploughs in weight and clumsiness, and was used in Kent, Picardy, and in Normandy.

The next instrument to be noticed was the harrow; a very useful instrument, but, as it was commonly constructed, about the worst for the purpose of pulverization. It was quite immaterial whether the harrows were made square or rhomboidal. Mr. Smith had introduced a harrow quite different from all others. It consisted of a number of serrated iron discs like quoits, interwoven and linked together by iron rods, the whole forming a surface of thirty superficial feet, interspersed with nearly four hundred points or discs, which, from the saw-like teeth of their edges, were more than equally effectual with the same large number of common tines. In the common harrow there was but a small number of tines which were drawn through the ground, either collecting or driving before them the couch or large clods, instead of breaking and separating them, or allowing the clods to pass from under it at almost their original size; from which causes, and from the larger clods being forced by it into the furrow, frequent repetitions of the process of harrowing were rendered necessary to reduce the soil to a sufficiently fine state to receive the seed. In its action the chain harrow was totally dissimilar from any implement of the kind hitherto made; from the large number of discs, and their revolving motion it could not collect the couch or drive the clods before it or into the furrow on either side, but allowed them to pass under it, attacking them right and left, when the serrated edges of the discs saved and pulverized them. From its extreme pliability it followed all the inequalities of the ground, fitting it like a coat of chain mail did the body, and rendered a second harrowing totally unnecessary. This harrow would be found of essential service in harrowing after seed, as its construction and rolling motion prevented the possibility of the seed being raised out of the ground, as was the case with common tines. To assist the harrow it was necessary to have rollers to pulverize the clod. Smooth rollers were used when the land was dry, but in wet weather they did not do so well; the clods were sometimes moist in the centre and dry on the surface, and then the teeth stuck fast. A very ingenious maker in Yorkshire contrived a clod presser with a number of discs serrated; it performed its office very well, but it would only work in dry weather. The next series of instruments were the cultivators and scarifiers. In these implements many improvements had been made; instruments had been made by Cook, Finlayson, and Biddle. Finlayson called his a self-cleaning instrument, and it was further improved by another Scotch instrument-maker of the name of Wilkie, who so constructed it as to raise the teeth out of the ground. Another was made by Biddle,

with three rows of teeth to allow of a sufficient distance to prevent choking. It was an immense machine, and was made with very large wheels, and elevated the front and the hind wheels at two different motions; it removed the rubbish and got a good draught. Lord Ducie thought this not very good, and contrived a new machine. The great objection made by Lord Ducie to Biddle's machine was that it was too heavy, and the instrument he made was much lighter but very narrow. Biddle's weighed 24 lbs. to an inch, and Lord Ducie's only 5 lbs to an inch. He (Mr. Cottam) improved upon this, and produced a machine weighing only 300 cwt., and from experiments he found that the cycloidal curve was the best.

With regard to thrashing machines, he observed, two machines were worked at Cambridge. In one hour they thrashed  $61\frac{1}{4}$  bushels of wheat: the corn was cleaned, thrashed, and uninjured, but the horses were quite exhausted. This was not a fair criterion, as they had neither rakes nor fans. The usual average was about (according to the state of the crop) from 30 to 50 quarters in one hour, or 400 bushels a-day. Now, if we took 20 sheaves to a bushel, we should have 8,000 sheaves a-day, or 800 sheaves an hour. Now a good thrashing machine would make 1,000 revolutions per hour, and with six beaters would give 6,000 blows a minute; so that each bit of straw would receive 115 blows, or each sheave 460 blows, or nearly a blow on every tenth of an inch.

In conclusion, he said the importance of any improvement in agriculture would be easily comprehended by the following calculation. The extent of land under wheat in the United Kingdom was about 8 millions of acres, and the average produce about 3 quarters, or 24 bushels. Now, if this average could only be increased to 27 bushels, this would yield 3 millions of quarters, which at the present price, say 50s., would amount to the sum of 7,500,000*l.* It was not only in the weight of the crop that the increase could be obtained by the new system of thorough draining, with an increase in the quantity of food for stock of all descriptions. The very stability of the nation was involved in this question, and he gave it as his firm opinion, that if we continued the improvements lately made, and progressed in the same ratio as we had done during the last five years to carry out the improved systems, the time was not far distant when England would be able to grow as much corn in a moderate season as would amply supply the whole of the increasing population, and in a fine season would produce such an ample supply as be fully prepared against a very bad season; and then England might consider herself really and truly free.

The lecturer, who was listened to with great interest throughout, was warmly applauded on the conclusion of his able discourse.

## PROTECTION VINDICATED.

BY CININNATUS.

*(Concluded from page 208).*

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—The judicious policy of the United States in protecting and encouraging internal industry (commenced during the presidency of general Washington) has been acted upon by succeeding governments, virtually excluding, by heavy duties, those articles of foreign production which impeded either the agriculture or manufactures of America. France, Russia, and Prussia pursue the same wise policy, and they fairly tell you they will pursue it; and common sense plainly indicates that as their manufactures increase, the exclusion of British and all other foreign wares will be again and again more rigidly enforced. Whilst they wanted cotton yarns to employ their own population, Britain was so simple as to supply them, though, by so doing, thousands of hardy British weavers have been driven to the poor-house; now they want machinery, and again the short-sighted policy of Britain has given them every possible assistance; nor does it require the gift of prophecy to foresee that, if the peace of the continent remain undisturbed a few years longer, so as to give confidence to capitalists, our yarns, our piece goods—ay, and our machinery also, will be shut out from the continental market—Spain and Portugal excepted; already British capital and ingenuity are largely engaged in suicidal opposition to British manufacture, and, ere long, when these rival manufacturing establishments come fairly into operation, aided by the low prices of continental labour, British cotton goods will absolutely require a heavy protecting duty, to enable them to withstand unequal competition.

Your Bristol correspondent, "R. I.," in page 205 of the *Farmer's Magazine* for March, correctly states the duties now paid on the importation of various articles of foreign manufacture; without those protecting duties an immense number of industrious artisans would be reduced to penury. Heavy as some of those duties may appear, they are in many cases much too low to counterpoise the low price of labour, and the comparative freedom from taxation on the continent. Were it possible to prevent smuggling, prohibitory duties would, in many instances, be beneficial; for it is grievous to behold magnificent shops, publicly displaying a profusion of continental wares—shoes, boots, hats, gloves, &c., and especially articles of female attire, whilst thousands of Spitalfields silk-weavers, and of respectable females, are unemployed—pining in poverty.

Selfish and cruel must be those Leaguers, who, knowing the miserable effects of free trade, pay despicable itinerant orators to disseminate falsehood, and, by the hypocritical cant of cheap bread, to endeavour to deprive millions of the means of procuring either food or clothing.

Free trade being *impracticable from the fixed policy* of foreign powers, protection is indispensa-

ble. The question is, therefore, not, are we to have protection?—but, how?

The excellence of the Corn Law introduced by the present government has already operated most beneficially by giving stability to the market, and a regular supply of grain at reasonable prices. Speculators detest it; they can no longer raise and depress the market when it suits their purpose; and the Anti-Corn-Law League are almost frantic to see it work so well; to find that it falsifies their predictions; and that the agriculturists, lately cajoled and divided by the destructive measures of the late administration, are now united by the judicious, calm, and dignified conduct of the present government. The leaders of the League are just as angry with Sir Robert Peel now, because his project succeeds, as they were with Providence for blessing the kingdom with last year's productive harvest. The British lion is at length roused from its favourite repose; the yeomanry, the strength of the nation, are again at their post; and the League, despised by all who possess the union of common sense with common honesty, have, for their consolation, the gratifying applause of those sage oracles, the Earls Fitzwilliam and Spencer, and the Marquis of Westminster.

As respects the Corn Law, let the agriculturists throughout the United Kingdom, giving up all differences of party, unite in supporting government on this essential point; then may they bid defiance to their able, active, and wealthy opponents, the Anti-Corn-Law League—then will agriculture flourish, our cultivated land will yield superior crops, our waste lands will be cultivated, our labourers employed, our poor-rates diminished, and the United Kingdom will have a superfluity of grain to export to our colonies; whilst reasonable prices, the certain consequence of abundance, will prevail.

As respects the tariff, great allowance should be made on account of the delicate situation in which Ministers were placed by the acts of their predecessors; a *concession to popularity* is not easily recalled. To please the liberal—the democratic—the anti-corn-law party (*tria juncta in uno*) barilla ashes\* were relieved from duty, to the serious injury of the fishermen on the British coast, who earned their livelihood, when not employed in fishing, by making ashes from sea weed; tallow† was relieved from duty, to the injury of agriculture; and licences were granted for the exportation of machinery, to the great injury of manufacturers. By this sacrifice of revenue and of the interest of sailors, farmers, and manufacturers, Manchester was secured as a pocket borough by the return of Mr. Poulett Thomson, one of her Majesty's Ministers, in a hard contest with an able Conservative. That introduction of the free-trade principle evidently led to its extension, and had Sir Robert Peel attempted to re-

\* The duty on barilla ashes is only five shillings per ton.

† The duty on lard is only two shillings per cwt.

verse what had then been conceded, before the League, by their atrocious avowal of overawing parliamentary elections, excited general reprobation, fatal consequences might have ensued: in passing the Corn Law, and not less by his recent avowal, to the effect that he will not concede an iota to the threats or badgering of a faction, the Premier and his conservative associates have rendered a most important service to the State.

Although it is to be lamented that many farmers have been ruined and a vast number injured by the operation of the tariff, aggravated by the panic it occasioned, if I may be allowed to offer an opinion, it is not to attempt any change during the present session, but rather to give it a fair trial. The protection which the tariff gives to manufacture appears judicious, and if the insufficiency of protection to some agricultural productions be admitted, we should bear in mind that the most important consideration, that of corn, stands right; and that sudden changes, however judicious, are seldom unattended with inconvenience.

In order to explain the PRINCIPLE I took the freedom of recommending in the former part of this letter, let us suppose one hundred pounds value of any commodity to be consumed in Great Britain; if it be produced upon a farm, the whole amount is subdivided amongst labourers, shopkeepers, landlord, tenant, the church, the poor, and the rates and taxes—every part comes into circulation and contributes to the employment and happiness of society; and whatever profit accrues, however minute or subdivided, it adds to the wealth of the nation: or if produced by manufacture, deducting the portion it may contain (if any) of foreign raw material, it also circulates, in like manner, for the public good. Now, if by foreign competition, that which would otherwise have sold for one hundred pounds be reduced to fifty pounds, each of those parties is seriously injured, and the rates and taxes they are by law compelled to pay are doubly oppressive; but by much the largest portion of the sacrifice is borne by the labourers. Again, every individual in this kingdom, from the prince to the peasant, is subject to taxation: not only the luxuries and the conveniences of society, but the coarsest food and clothing of the mendicant have borne their share of taxation. To talk of untaxed food is to speak of that which has no existence—to argue an impossibility—and to allow foreign rivals to have what is called free trade, or, in other words, to have the run of our market, without having contributed to the charges to which British subjects are liable in support of it, and of those institutions, civil and military, which maintain and protect that market, is unjust and injudicious. Foreigners, knowing the value of our market, are willing to pay protective duties, and thereby relieve us from a large amount of internal taxation, but the free-trade mania takes the burden from their shoulders to impose, unnecessarily, a heavier load upon poor John Bull.

The PRINCIPLE to which I have adverted is simply to encourage equally the productions of

British agriculture and British manufacture, and to protect both by heavy duties on every foreign commodity which, directly or indirectly, has a tendency to throw the subjects of Great Britain or of her colonies out of employ.

*March 16, 1844.*

## LORD WORSLEY'S ENCLOSURE BILL.

We take the greatest interest in the success of this measure, as we have before stated, from considering it to be one of considerable importance, in a national point of view, from the encouragement afforded by it for an extended or an improved cultivation over a large tract of land in this kingdom.

Few individuals, we believe, are at all aware of the great extent of commonable and intermixed lands still to be met with in many districts of the country, nor of the natural fertility of many commons and wastes which are kept out of cultivation solely by reason of their not being, separately, of sufficient extent to justify the expense of obtaining a local act for their enclosure. Putting altogether out of consideration the advantages which must necessarily result from the facilities afforded by this proposed measure for the partial cultivation and better regulation of the larger tracts of our common and waste lands, we yet consider it to be one of immense importance, as applicable to the three distinct classes of cases above alluded to; for we cannot doubt but that, under its provisions, the produce of the two first of these classes would be more than doubled in the course of a very few years, whilst the lands comprised under the third class would speedily be made to yield a large amount of victual, though their present produce is of the most trifling value.

Entertaining, as we do, a favourable opinion of this measure, we have observed with deep regret the strong feelings of distrust which exist in certain quarters regarding it, and the open and avowed hostility which it is doomed to encounter in others. With the view, therefore, of satisfying ourselves as to the reasonableness, or otherwise, of the cry raised against it on the ground of its benefiting the rich at the expense of the poor, we have endeavoured to trace out this cry and these feelings of hostility to their sources; and we have no hesitation in stating that we are satisfied that they result from a strange misapprehension as to the nature of common rights, and from ignorance of the provisions of the bill. For we find, to our great surprise, that the general and the prevailing opinion is, that all common rights are of a personal nature, and that any cottager may turn his stock upon any common that he pleases, and which happens to be situated within his reach. That this opinion is a most erroneous one, a moment's reflection must satisfy every one, all common rights being, as we have before stated, indissolubly attached to certain tenements, from which they are incapable of being severed, and that they can only be enjoyed by the actual occupiers of

such tenements. We defy any one to show us an instance of the owner of a cottage entitled to a common right, letting his cottage without asking and obtaining a consideration for the use of the common right attached thereto. It may be that such common right is of very trifling value, or it may be of considerable value; but be its value trifling or considerable, the owner invariably asks a market value for it. In the case of a cottage of the poorest and of the most wretched description, situated at an inconvenient distance from the common on which it has a right, it may be that its owner is unable to obtain any rent beyond the rent for the cottage for such right, in consequence of its being disadvantageously situated for making use of the common, or from the tenant being so poor as not to be able to purchase any stock to turn out upon it, the tenement being too wretched a one to command any tenant but of the humblest order.

In the case, however, of a cottage of a superior description, and situated conveniently to the common (and that common a valuable one), a comparatively large sum may be asked and given for the common right; and, indeed, we can state that within our own knowledge there are instances were so much as £10 per annum has been, and is, at present, given for common rights attached to cottages which are not *per se* worth, as mere dwellings (and without reference to the common right attached thereto), an annual rent of £3.

Instances may, no doubt, be found, where commons are of so little value, that their legal owners have abandoned their exclusive right upon them, and allowed all sorts of trespassers and squatters to take possession of them: such instances are, however, very rare, as commoners are generally most zealous in watching and in guarding their own rights and privileges (when of value), allowing none to trespass upon them with impunity. Now, if our view as to the nature of these common rights is the correct and the legal one, we are utterly at a loss to discover in what respect this bill of Lord Worsley's fails to secure to every one his fair share of interest in commons on which he has a right. It may possibly, however, be alleged that the owner of a cottage asks and is content with a smaller consideration for the use of a common right, whilst its value remains in a great measure contingent upon the ability of its occupier to command a full enjoyment of it, than he would do if such common right was converted into an allotment in lieu thereof; for he would then be able to ascertain and to demand the exact value of his allotment, and possibly might, in some instances, separate the use of it altogether from the cottage. We have not, however, as yet, observed that any objection has been taken to the bill on this ground; and, therefore, we will not at present proceed further with our remarks upon it.

We heard, with great interest, the debate upon the second reading of this bill, and we cordially agree with Sir Robert Peel in thinking that the village-green of a distant and retired parish ought

to be held as sacred as the large common in the vicinity of a populous town; and that, in determining upon the extent of recreation ground to be allotted to trustees for the use and enjoyment of the inhabitants of the district, regard ought to be had, not only to the requirements of the present population, but also to those of the future probable population of such district; and we do hope and trust that further provisions will be introduced into the bill, should the present ones be thought inadequate, for securing a large and a liberal slice of all commons so situated for the purposes of recreation, &c.

We observe, with regret, that Mr. H. Berkeley has given notice of his intention to introduce a provision into the bill, barring its application to any lands within a certain distance of towns containing a certain population; a prohibited ring, in short, within which no land can be enclosed whilst the extent of the ring decreases as the population within it decreases. We had supposed that the provisions of the bill upon this point would have been considered satisfactory as it now stands. The commissioners have the power to withhold their consent to any proposed enclosure. Assuming, however, that they should exercise an unsound discretion, and should authorise the enclosure of a common within a certain distance of a large town, the check already provided by the 27th clause would appear to us to be sufficient to meet the case, namely, that in the event of one-tenth part of the male population of the parish on which such common is situate, or of the parishes adjoining thereto, and in any degree interested therein, should give notice to the commissioners of their intention to petition parliament, all further progress in the matter of such enclosure should be stayed until parliament should have determined whether, under the particular circumstances of the case, the commissioners had decided rightly or wrongly. Suppose for a moment that this bill should pass, and that application should be made to the commissioners to authorise the enclosure of Hampstead-heath or of Wimbledon-common under its provisions, and that they were so ill-judging and so inconsiderate of the interests of the inhabitants as to authorise such enclosures, would not the inhabitants of those parishes and of the neighbourhood at once take the alarm, allow us to ask, and instantly give notice of their intention to petition parliament to put a stop to all further proceedings in the matter of such enclosures? No doubt they would do so, and most properly. But why should it be assumed, we should be glad to know, that any commissioners would so commit and forget themselves? So far from believing that they would be likely to do so, we should expect to find them constantly shrinking from taking upon themselves the responsibility of authorising enclosures, where objections of a nature which appeared reasonable were urged or likely to be urged against such enclosure. We believe that any commissioners would be disposed to err in the withholding rather than in the rashly giving their consent to proposed enclosure applications;

and that, in practice, parliament would never be applied to, unless, indeed, for the purpose of preferring complaints against the commissioners for refusing their sanction to enclosures of doubtful utility.

We have before stated that we agree with Sir Robert Peel in thinking that the village-green ought to be held equally sacred as the land used by the inhabitants of populous places for the purposes of recreation, &c. Now, it appears clear to us that, if the existing provisions of this bill are not considered to be sufficiently stringent to guard, with perfect security, the recreation-grounds of large and populous places, they must, of necessity, be much less worthy to be relied upon in the case of village-greens.

In populous places there are always to be found intelligent and active-minded persons ready to take up and to spread alarm upon the discovery of any invasion, fancied or real, of their rights and of those of the public. In remote and thinly-peopled districts this is not the case, and more especially where the bulk of the inhabitants are hard-working and not well-educated persons, whose daily avocations necessarily occupy the greatest portion of their time and thoughts. In all such places the inhabitants would be, as we conceive, in a great measure powerless in resisting any invasion of their rights upon their village-green, and, indeed, would probably be unequal to even making their case and their grievances known to parliament, but for the aid of some benevolent and intelligent individual. We have no hesitation in stating that we consider the existing provisions of the bill perfectly satisfactory and sufficiently stringent to guard securely against any invasion upon either village-greens or the recreation grounds of populous districts. We have no belief that any commissioners, though armed with the most arbitrary powers, would, in these days, dare to set public opinion at defiance by sanctioning enclosures calculated to benefit the few at the expense of the many.

The objections to the proposed plan of a prohibited ring are great and serious; for within such ring considerable tracts of land will constantly be found, which it would be more desirable, on every account, to see enclosed or otherwise dealt with, under the provisions of the bill. To debar such lands from any participation in the benefits of a public measure of utility, conferred as a boon upon the country at large, would appear to be most harsh and unfair to such lands, and to admit of justification alone upon the grounds that, as the interests of the public at large could not be secured without this limitation, the interest of the few must, under such circumstances, be made subservient to those of the many. In illustration of the hardships that must be imposed upon many districts by the adoption of the proposed prohibited ring, we could adduce many instances, but we will confine ourselves, on the present occasion, to those of Abingdon, the county town of Berkshire, with a population, as we recollect, of about 6,000 inhabitants. Within about half a

mile of the town there is a large common, and a commonable meadow, upon both of which every inhabitant householder has certain rights during a portion of each year; few, however, of such inhabitant householders now make any use of their rights over either of these parcels of land, whilst for the purposes of recreation they are both wholly useless—both being situated in a swamp adjoining to, but lying under the river Ock, and both being liable to be flooded for many months together. It is generally admitted that the damp and the fog arising from these tracts of land are most prejudicial to the health of the inhabitants of the town of Abingdon. They afford no pleasure or recreation to any one but the snipe-shooter. The lands are of first-rate natural quality, and, if dealt with under the proposed bill, the inhabitant householders would receive an allotment in lieu of their rights thereupon. Such allotment might be sold, and the proceeds invested in the purchase of a piece of land in a situation suitable for recreation purposes. But place them within the limits of the proposed prohibited ring, and they must remain as they now are, not only useless and valueless, but actually injurious. In the case of these lands the objection to the adoption of a prohibited ring would not be obviated, even were it qualified by a provision that lands within it might be drained and converted into a regulated pasture.

We must own that we are unable to discover any better plan for the preservation and the security of the village-green, and the recreation grounds of populous places, than the one introduced into the present bill. It is true that it invests the commissioners with large discretionary powers. To us such powers appear to be absolutely necessary to enable them to carry into operation happily and equitably the provisions of the bill; and we will only add, that if no commissioners can be found to whom these large discretionary powers may be safely entrusted, we should then be of opinion that the Legislature would act wisely in withholding their sanction to the bill.

## RESULTS OF TEMPERATURE IN PRODUCING BUTTER.

(FROM THE ALBANY CULTIVATOR.)

The results of the experiments on the night's milk of five cows were as follows:—from the 5th of January to the 9th it was subjected to the following process. As soon as the milk was drawn from the cow it was strained into tin pans and weighed, and amounted to 70½ lbs. After standing twelve hours boiling water was introduced in an under pan, made for the purpose, which is sufficiently deep to hold about the same quantity of water as there was of milk, the top of the under pan fitting closely to the upper part of the other; the under one nearly straight on the sides, the other flaring, by which means sufficient room is left to retain the steam. From the 70½ lbs. of milk, after standing in a room, the temperature of which was from 50° to 55°, thirty-six

hours, 6½ lbs. of cream was taken from it. This cream was churned in a temperature of 60°, and produced 3½ lbs. of butter—time of churning 17 minutes.

On the 11th of January we commenced setting the milk for cream, in the usual way, from the same cows, in the same room, in a temperature ranging from 48° to 56°; after standing 48 hours it was skimmed. It was so managed that the same amount of milk (70¼ lbs.) was used, which produced 14 lbs. of cream, in which unavoidably remained considerable milk. This cream was subjected to the same process and temperature as the former (60°) and produced the same amount of butter; and occupied 12 minutes in churning.

Now, there may have been some ounces difference in the two parcels, as our steelyards mark nothing less than 4 lbs.; but we were particular in noticing the movement of the beam, and did not discover any material difference.

From the above experiments, we have arrived at the following conclusions: that when the milk room is cold, say 30°, it is most advantageous to scald the milk; but when the temperature does not fall below 48°; little or nothing would be gained by adopting it. There is so little difference in the quality of the butter that it would be difficult for the nicest taster to distinguish which was made the one way or the other. The colour too, is so similar that it would be supposed both rolls were made from one churning.

C. N. BESNENT.

Three Hills Farm, Jan. 20.

## REVIEW.

### ON FERTILIZERS.

By CUTHBERT W. JOHNSON, Esq., F.R.S., Editor of the "Farmers' Almanac and Calendar," the "Farmer's Encyclopedia," &c.

London: J. Ridgway, Piccadilly. 1844. Second Edition.

Our object in calling the attention of our readers to this admirable volume, will be at once perceived by all who are interested in the cultivation of land, particularly by those who are aware that a manual such as this before us, which treats of each fertilizer separately, and in a truly comprehensive manner, was much wanted in the present day. We do not wish to depreciate any of the works on chemistry, as applied to agriculture, or as applied to the manures for the earth; many are deserving the highest praise for industrial research, and their development of new powers for the improvement of vegetation; but many—very many—were too complicated, and required a knowledge of chemistry to be as requisite to understand them as it requires a knowledge of good farming to produce rent-paying crops.

The application of science to the useful arts, in the great departments of chemistry, has been as close and untiring as its results have been extraordinary; but its terms have been a sealed book to the farmer for any useful purpose, unless he received the education of, or studied chemistry, and in the following passage which we quote from the first chapter (the "History of Manures"), our view will be borne out, as to those mysteries of chemistry which every one conceives he

has discovered, but which, as yet, no person has been able satisfactorily to explain.

"These difficulties with regard to vegetable chemistry and the phenomena with which it abounds, are, in fact, not few in number: they meet us in every investigation, from the period when a seed first begins to germinate, through its growth, its ripening, its decay; and, finally, when the putrefactive fermentation, by reducing the whole mass of vegetable matter to its constituent earths and gases, puts an end to every trace of vegetable substance, we are still obliged often to content ourselves with examining and noting the phenomena we cannot chemically explain. These mysteries were observed at the very dawn of modern chemistry: that the same mass of earth, the same water, the same atmosphere, could, at the same time, produce the flour of the wheat, the opium of the poppy, the oxalic acid of the sorrel, the vegetable poisons of the hemlock and the nightshade, the sugar of the beet-root, and the timber of the forest, none of which are contained in either the soil, the water, or the atmosphere, were matters of serious and undivided attention; and although the ablest chemical philosophers have investigated these vegetable mysteries, the harvest they have reaped, though highly important, has hardly been worthy of the labourers."

In the present work of Mr. Johnson, the farmer is brought at once to the consideration and applicability of the manures necessary for the land: whether it be to the peat and peaty land and the wide fens in Lincolnshire, or the *weald* or *oak clay* of Sussex, Surrey, and Kent, each manure is treated of distinctly, and its best uses defined. Organic, earthy, and saline manures are explained in separate sections; the permanent advantages, experiments, and analysis of each are plainly brought to the simplest comprehension, and the entire wound up with the adaptation of manures for different soils; forming one of the most complete and valuable publications that has issued from the press for many years. We will take opportunities, from time to time, of giving extracts from this important work. At present we will close with the following interesting particulars as regards irrigation and water meadows:—

"It is easy to see why it is that the impurities of river water are so nourishing to the meadow-grasses. For instance, if the water contains sulphate of lime (gypsum), which it certainly does if the water is *hard*, it must, under ordinary circumstances, on this account alone, be highly fertilizing to the land it irrigates, since many of the best grasses contain this salt in very sensible proportions. Calculating that one part of sulphate of lime is contained in every two thousand parts of river water, and that every square yard of meadow absorbs only eight gallons of water (and this is a very moderate allowance, for many soils will absorb three or four times that quantity) then it will be found that by every flooding more than one hundred weight and a half of gypsum per acre is diffused through the soil by the water; a quantity equal to that generally employed by those who spread gypsum over their clover, lucern, and sainfoin, as manure, either in the state of powder or as it exists in ashes. And if we apply the same calculation to the organic substances, ever more or less contained in flood-waters, and allow only twenty parts of animal and vegetable remains to be present in a thousand parts of river water, then we shall find, taking the same data, that every soaking with such water will add to the meadow nearly two tons per acre of animal and vegetable matters; which, allowing, in the case of water-meadows, five floodings per annum, is equal to a yearly application of ten tons of organic matter."

## REPORT OF EXPERIMENTS ON THE ACTUAL AND COMPARATIVE EFFECTS OF SPECIAL MANURES.

BY MR. JOHN HANNAM, NORTH DEIGHTON,  
NEAR WETHERBY.

(From the Transactions of the Highland and Agricultural Society of Scotland.)

As "the object of the Society, in offering these premiums, is to obtain results which will be as valuable to the science as in the practice of agriculture"—results from which deductions may be safely drawn—the experimenter is aware that, however many points connected with the economy of manures he may have left untouched (and all who have travelled in the field of experimental inquiry know how unbounded is its extent, and how numerous are the paths which, branching to the right and to the left, present themselves at every step of the journey), still if his investigations tend to establish *one new truth* or to confirm *one old one*—to settle that which is *disputed* or to *illustrate* that which is *commonly accepted*—if, in fact, they afford *any* information connected with the operation or the application of special manures on special crops, they will not be unwelcome to agriculturists.

That his labours might be attended with these results, in as high a degree as possible, has been the ambition of the writer. To attain this end some experience, however, in experimental observation taught him,

1st.—That every experiment should be perfectly trustworthy.

2nd.—That each experiment should have some special object, *i. e.*, should be designed to answer some useful question.

1st.—To render his experiments trustworthy, the writer's object was, in the first place, to prevent errors of operation, observation, or detail; and, in the second, to make the circumstances of trial as much alike as possible in all cases where comparative results were expected.

To prevent errors, he made it a point of necessity to design, set out, and measure, every plot upon which an application was to be made, and to weigh every tillage\* himself; to see every operation (sowing, reaping, thrashing, dressing, and weighing) executed; and to record every observation and result with his own hand. To render the circumstances of trial as fair as possible, the possession of a soil of a similar nature throughout, naturally poor, and requiring frequent manuring, one also under a regular system of management, perfectly dry, in new and straight inclosures, without wood, at a moderate elevation, many miles from the sea coast, and free from every sort of local or incidental influence, prejudicial or beneficial, offered *unusual facilities*. In addition to which, in cases where the nature of the application called for it, or the number of applications was great, or where he had reason to expect any variation of the soil, he experimented on small plots; in others, where all circum-

stances were favourable, he has carried out his trials on a large scale. Thus, on potatoes, which depend so much on a large supply of manure, and upon which the effect of an application may be judged as easily and as well from half-a-dozen ridges as from a hundred—upon which, too, he had many varieties of fertilizers to try—he made his experiments on plots of a moderate size. In some cases, on turnips—which are similar to potatoes in their dependence on the tillage, and which afford equal facilities for judging of the effect of an application—where he had necessarily a large number of substances to use, the effects of some of which were quite uncertain (as in experiment E), he also confined himself to plots of a small size. By this proceeding he was enabled to obtain more numerous, more comprehensive, and more correct results, as he was able in such plots to secure, if possible, a perfectly even quality of soil.

In cases, however, where the applications were less numerous, or less uncertain in their effects, and always upon corn—from which correct results cannot otherwise be obtained—his applications have been made on patches of at least a rood, and in some cases of several acres.

2nd.—That each experiment should have some special object, and should be designed, as it were, "to ask a question of nature"—and that that question should be expressed so clearly that it could not be misunderstood, was the next object. To effect this, his course was to conform to the suggestions of the Society, yet, at the same time, not to confine himself to them. Thus, his report; will show that he has made every trial suggested in the instruction to competitors, and at the same time has added such other as, without affecting those requested by the Society, were likely to illustrate either the science or the practice of agriculture.

Of the various experiments executed in conformity with the principles here detailed, the writer now forwards such particulars as are in his possession, and such samples of soil, grain, and manures, as may be necessary for the minute investigation of the results obtained.

To attempt to enter into such inquiries now, or to offer any opinion on the questions arising from these experiments, would be foreign to the object contemplated, and be out of place in what should be, and is expected to be, a report of facts merely—truths newly developed, moreover; and which, therefore, that they may be the sooner understood and the better known, should not be clothed in any garment but their own.

Of the soil, then, it will be merely necessary to state, that it was well adapted for the purposes of experimental inquiry, being, as has been stated in the former page (with the exception of soils Q and F), of one nature—on the limestone range—and under local circumstances favourable for any comparative trial.

The manures used by him, the writer has reason to believe, have been also of fair, even quality—such as any farmer, by a little caution, may easily procure. The quantities he has employed have been such as some experience has

\* It will be observed that the author uses the word "tillage" as synonymous with manure.—ED.

taught him ought to be (*whatever price may be*) a fair dressing—at least such a one as should develop visible results.

In this matter of quantity he would also observe that he has not been at all guided by the *price* of the article used; because he is well aware that the price varies so, according to the locality where it is obtained, that, were it taken as the rule or measure, experiments would be of little value; for in no two places scarcely would the same quantities be employed. One would use too much—*more* than effects would pay for; and another too little—that is, *less* than would have any effect of consequence. The alteration in the prices of several articles used in these experiments will serve as a proof of this. Hence it will be seen that applications which might not pay in 1842, would have done so in 1843; yet was the manure as potent in one year as the other—the reduction of the price of the tillage being the cause.

In the real estimation of the relative values of the various applications, the column of “*cost*” has not so much to do with the subject as is generally considered. In all cases, the experimenter has used such quantities as he deemed in fair proportion, according to quality and not according to cost. In fixing, therefore, the relative values of any two applications, it will be the duty of the reader to consider the *positive effects* of each upon the crop, and to regard the *comparative cost* of each, not as here stated, but as he would *in his own locality* have found it. For instance, the writer has paid 20s. per cwt. for Potter’s guano, though he is well aware that in many places it may be had at 15s. per cwt.

Amongst other applications, the experimenter has employed certain waste matters. Having been specially engaged by the Yorkshire Agricultural Society to report on this subject, these results were in his power, and although they were

not contemplated by the Highland Society, he has no doubt but that the particulars will be welcome: in the first place, because the economy of such matters is a question of importance, and at the present time one of popular interest; and, in the second, because these trials were not made to the exclusion of, but in conjunction with, others especially advised by the Society—by which proceeding the results become the more valuable, comparison lending to each additional interest.

Such, then, are the principles which have directed the experiments of the reporter. And to those who have ever *undertaken and completed a single experiment*—and who, consequently, know the troublesome manipulation (the weighing and measuring of soil and tillage; the reaping, thrashing dressing, weighing, &c., of produce) required to ensure correct results, the time these results have to be waited for, and the anxiety arising from their liability to accidents—it will not be necessary to say that the preparation for “*execution*” and observation of a series like the present—comprising 137 applications—has been attended with some anxiety, some trouble, and some expense. At the same time, he would add that the “*labour*” has been one “*of love*,” and, as such, in some degree, is its “*own reward*.” To no other motive than this—a love of the subject—would the leisure of two years have been so readily sacrificed; yet must he confess that no reward for that sacrifice can be more grateful to him than the approbation of his fellow-labourers in the field of agricultural inquiry.

Annexed is an “*Index of the samples of soil and grain, with the experiments to which they refer, and the distinguishing marks of each*,” also a “*List of the manures used in the accompanying experiments, with the prices paid during the respective seasons of 1842 and 1843, and the number and list of the samples of manures sent to the Society along with the present report*.”

*Index of the Samples of Soil, Grain, &c.*

Distinguishing Marks.	No. of Samples of Soil	No. of Samples of Grain.	Experiments to which the Samples of Soil and Grain refer.	Date.	No. of Applications in Experiments.	Page in Report.
A	1	..	Turnips, (swede) No. 1	1842	12	167
B	1	..	Do. (white) 2	1842	12	169
C	1	..	Do. (do.) 3	1843	9	172
D	1	..	Do. (do.) 4	1843	6	173
E	1	..	Do. (do.) 5	1843	20	175
F	1	..	Rape .. .. 1	1843	2	179
G	1	..	Potatoes .. .. 1	1842	5	180
H	1	..	Do. .. .. 2	1843	15	181
I	1	5	Oats .. .. 1	1842	5	184
J	1	5	Barley .. .. 1	1842	5	186
K	2	7	Do. .. .. 2	1843	7	188
L	1	3	Do. .. .. 3	1843	3	192
M	1	6	Wheat .. .. 1	1842	6	193
N	1	7	Do. .. .. 2	1843	7	195
O	1	5	Do. .. .. 3	1843	5	197
P	1	..	Peas .. .. 1	1842	5	200
Q	1	..	Grass .. .. 1	1842	4	202
R	1	..	Do. .. .. 2	1843	9	203

List of Manures used in the accompanying Experiments, with the Prices paid during the respective Years 1842 and 1843, and the Number of Samples sent with the Report.

No.	Samples sent.	Names of the Manure.	Price paid in 1842.	Price paid in 1843.	Cost of Carriage.
1	1	Ammoniacal liquid . . . .	2d. per gallon.	.. ..	$\frac{1}{2}$ d. per gallon.
2	1	Ammonia, sulphate of ..	20s. per cwt.	.. ..	1s. per cwt.
3	..	Acid, sulphuric, .....	.. ..	1 $\frac{1}{2}$ d. per lb.	1s. do.
4	..	Do. muriatic .....	.. ..	1 $\frac{1}{2}$ d. per lb.	1s. do.
5	1	{ Bones, crushed, rough } and small .....	20s. per qr. of 24 st.	16s. per qr.	6d. per qr.
6	..	Do. dust, .....	20s. do.	16s. do.	do.
7	..	Do. rough, .....	20s. do.	16s. do.	do.
8	1	Bones, burnt, .....	20s. do.	16s. do.	do.
9	1	{ $\frac{2}{3}$ bones dissolved in $\frac{1}{3}$ } sulph. acid, .....	.. ..	Vide prices of 3 and 6.	Vide 3 and 6.
10	1	{ $\frac{2}{3}$ bones dissolved in $\frac{1}{3}$ } mur. acid, .....	.. ..	Vide prices of 4 and 6.	do. 4 and 6.
11	1	{ $\frac{3}{4}$ bones dissolved, after being calcined in $\frac{1}{4}$ acid }	.. ..	Vide prices of 3 and 6.	do. 3 and 6.
12	1	Bones, artificial, .....	.. ..	8s. per cwt.	6d. per cwt.
13	1	Chemical manure, A, ..	15s. per cwt.	.. ..	6d. do.
14	1	Do. do. B, ..	12s. do.	.. ..	6d. do.
15	1	Cropping waste, .....	.. ..	Nominal.	.. ..
16	..	Farm manure, .....	.. ..	{ Say 6s. per load, } { carriage included. }	.. ..
17	1	Flax waste, .....	.. ..	Nominal.	.. ..
18	1	Gypsum, .....	2s. 6d. per cwt.	.. ..	6d. per cwt.
19	2	Guano, .....	16s. do.	12s. per cwt.	1s. do.
20	..	Do. artificial, .....	10s. 6d. do.	.. ..	.. ..
21	1	Do. do. Potter's, ..	.. ..	19s. 6d. per cwt.	6d. per cwt.
22	1	Magnesia, sulphate, .....	.. ..	8s. do.	6d. do.
23	1	Potash, nitrate of .....	36s. per cwt.	.. ..	1s. do.
24	1	Rape-dust .....	22s. per qr.	18s. per qr.	6d. per qr.
25	..	Salt, .....	2s. 6d. per cwt.	.. ..	6d. per cwt.
26	..	Soot, .....	6d. per bushel.	.. ..	.. ..
27	2	Soda, nitrate of, .....	22s. 6d. per cwt.	20s. per cwt.	1s. per cwt.
28	1	Soda, sulphate of, .....	7s. 6d. do.	.. ..	2s. do.
29	1	Singeing-dust, .....	.. ..	Nominal.	.. ..
30	..	Soap liquid, .....	.. ..	do.	.. ..
31	..	Urine, .....	.. ..	do.	.. ..
		24			

No. 1. The ammoniacal liquid varies in price, as well as quality, in various districts. The sample sent is from the York Works, and contains, according to Mr. Spence, chemist, about 1lb. of carbonate per gallon. The quality of the liquor from gas-works depends on the coal used. Thus, I am told by Mr. Bower, chemist, Hunslet, that it is invariably poor where what is termed the "candle coal," or *cannal coal*, is used, while that from the Newcastle coal is full three times as strong. Thus, while from 4 to 5 ounces of sulphate of ammonia may be obtained from a gallon of the liquid from the Leeds Works, from 12 to 15 ounces per gallon may be obtained from the London liquid.

5, 6, 7. The bones crushed (rough and small), the dust, and the rough, are from one stock in both years; but one sample is therefore sent, the dust and the rough bones used being obtained by putting the mixed crushed bones (No. 5) through a sieve.

8. The bones dissolved in sulphuric acid contain 1 bushel of bone-dust, 42lbs. (obtained from the crushed bones No. 5) dissolved with 21lbs. of acid and 63lbs. of water.

9. The bones dissolved in muriatic acid are obtained similarly, and contain 42lbs. of bone-dust, with 21lbs. of acid and 63lbs. of water.

10. The bones burnt, and then dissolved in sulphuric acid, are obtained by taking 1 bushel (42lbs.) of bone-dust (No. 5) and burning it till it weighed 27lbs., and afterwards adding to the mass 10 $\frac{1}{2}$ lbs. of acid, diluted with 31 $\frac{1}{2}$ lbs. of water.

11. The artificial bones are manufactured by Mr. Bower, of the Chemical Works, Hunslet, near Leeds, and contain phosphate of lime, phosphate of magnesia, and sulphate of lime.

12. The chemical manure, A, is made by Mr. Dalton, York, and contains gypsum 112lbs., sulphate of ammonia 30lbs., and nitrate of soda 20lbs.

13. The *chemical manure*, B, made by the same person, and called the "bone substitute," contains 112lbs. of gypsum, sulphate of ammonia 15lbs., nitrate of soda 10lbs., and animal oil "*quantum suf.*"—(For further particulars, see "Lecture on Chemistry of Manures," by Mr. Barker; Transactions of the Yorkshire Society for 1842.)

15, 17, 29, 30, and 31. The *cropping waste*, *flax do.*, *singeing-dust*, *soap liquids*, and *urine*, being *waste matters* have no marketable price, and consequently none is here given. For the four first I am indebted to John Heaton, Esq., of the firm of Pease, Heaton, and Co., Leeds.

16. The *farm manure* I estimate at 6s. per single horse-load on the field, *i. e.*, carriage included.

20. The *artificial guano* is made after the recipe given by Professor Johnstone (*vide* Appendix to Lectures on Agricultural Chemistry and Geology, p. 32) and the carriage of the various ingredients is included in the price.

21. The *artificial guano*, made by Mr. Potter, sells in London at 15s. per cwt. Being so far from town, it cost me 19s. 6d. of the agent of whom I purchased.

22. The *sulphate of magnesia* used was manufactured by Mr. Bower, Chemical works, Hunslet, and can be obtained in any quantity.

24. The *rape-dust* used in both years was

from the same stock. One sample only is there-fore sent.

26. The *soot* was from our own chimneys, and purchased of the sweeps; hence there is no cost of carriage affixed.

27. The two sorts of *nitrate of soda* used, it will be seen, are of very different qualities, that purchased during the present year being very much inferior to that used in 1842.

28. The *sulphate of soda* is from the works of Messrs. Allen and Co., Heworth, Gateshead.

I.—EXPERIMENTS ON TURNIPS.

A.—Experiment on the actual and comparative effects upon the Swede Turnip crop, of Burnt Bones, Crushed Bones, Sulphate of Soda, Farm-yard Manure, Guano, Artificial Guano, Nitrate and Sulphate of Soda (mixed), Dalton's Chemical Manure, A, Dalton's Manure, B, and Gypsum, *as Auxiliaries to Farm yard Manure.*

*Details.*—Particulars of the nature, condition, and management of Soil. Stout limestone, soil, worth 26s. per acre, to rent. Condition, pretty good. Prior crops—*barley* (rape-dusted); *seeds* (pastured with sheep); *wheat* (rape-dusted).

*Management.*—After being properly cleaned, the field was ridged (at 24 inches), manured with six single horse-loads of farm-yard manure per acre, the seed (Matson's purple-top) drilled, and the applications made as follows (May 24, 1842):—

No.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
	Extra Farm Manure.	Bones.	Bones burnt.	Nothing.	Sulphate of Soda, top-dressing.	Guano.	Artificial Guano.	Nitrate and Sulphate of Soda.	Nothing.	Manure B.	Manure A.	Gypsum.
No. 1.	Area $\frac{1}{4}$ acre,	Farm manure, 6 loads (extra) applied in the ridge before drilling seed. . . . . May 24, 1842.										
2.	do.	Bones crushed,	4 bush.,	applied along with seed by drill do. do.								
3.	do.	Bones burnt,	4 bush.,	do do.								
4.	do.	No extra application.										
5.	do.	Sulph. of soda, $\frac{1}{2}$ cwt., applied as top-dressing after hoeing.										
6.	do.	Guano $\frac{1}{2}$ cwt., drilled along with earth with seed. . do. do.										
7.	do.	Art. guano $\frac{1}{2}$ cwt., do. do. do. do.										
8.	do.	{ Nit. of soda, $\frac{1}{4}$ cwt., } mixed with earth and drilled with seed. . . . . do. do.										
		{ Sulph. of soda $\frac{1}{4}$ cwt., }										
9.	$\frac{1}{4}$ acre.	No application.										
10.	do.	Manure A., $\frac{1}{4}$ cwt., mixed with earth and drilled with seed, do. do.										
11.	do.	Manure B., $\frac{1}{4}$ cwt., do. do. do. do.										
12.	do.	Gypsum, $\frac{1}{2}$ cwt., do. do. do. do.										

*Observations.*—Nos. 1, 2, 3, 4, 5, 9, and 12, came up well; Nos. 6, 7, 8, 10, and 11, appeared in patches; No. 6 (guano) and No. 7 (art. guano) *looking very thin of plant*. In all the five portions, some of the seed had been injured by the application. In the course of a month, Nos. 8, 10, and 11 began to fill up the rows pretty well. No. 3 had now the lead of No. 2.

About July 1, Nos. 6 and 7 began to grow away most luxuriantly, and, though one-third of the ground was without plant, promised to make up the deficiency. At this time, No. 4 and 9 shewed symptoms of not being able to go the pace. No. 5 looked pretty well, and continued to thrive longer than Nos. 4 and 9.

On September 1, the various portions stood in the following order in point of excellence :—

- 1st. Guano (No. 6), short of plant, but very luxuriant in foliage.
- 2nd. { Art. Guano (No. 7), do. do. coarse in the bulb.  
Bone-dust (No. 2), very good.  
Burnt bones (No. 3), do. not quite so blooming as No. 2.  
Manure B. (No. 11), do. rather coarse in the bulb.
- 3rd. { Farm manure (No. 1), good.  
Nit. and sul. soda (drilled), (No. 8), do. coarse in bulb.  
Manure A. (No. 10), do. do.
- 4th. Gypsum (No. 12), good.
- 5th. Sul. soda (No. 5), fair even crop.
- 7th. { Nothing (No. 4), fair even crop.  
Nothing (No. 12), do. do.

On January 2, 1843, five perches from each portion were carefully topped and tailed, and weighed, when the following were the

*Final Results per Imperial Acre.*

No.	Extra Tillage.	Quantity.	Gross Produce.			Cost of Tillage.			Increase of Produce.			No. of Turnips, per pole.
			Tons.	Cwt.	St.	£.	s.	d.	Tons.	Cwt.	St.	
1	Farm Manure.....	6 loads.	17	12	6	1	16	0	1	16	6	155
2	Bone-dust.....	2 qrs.	19	2	6	2	1	0	3	6	6	145
3	Burnt do.....	2 qrs.	18	5	5	2	1	0	2	9	5	154
4	.. ..	..	16	2	0	..	..	..	..	..	..	144
5	Sulph. of Soda....	2 cwt.	17	2	6	0	19	0	1	6	6	154
6	Guano.....	2 cwt.	20	5	4	1	14	0	4	9	4	102
7	Art. Guano.....	2 cwt.	19	10	2	1	1	0	3	14	2	147
8	Nit. & Sul. Soda ...	1 cwt. each.	17	11	1	1	13	0	1	15	1	142
9	.. ..	..	15	10	0	..	..	..	..	..	..	153
10	Manure B. ....	2 cwt.	19	0	2	1	5	0	3	4	2	156
11	Manure A. ....	2 cwt.	18	4	0	1	11	0	2	8	0	155
12	Gypsum.....	4 cwt.	18	0	1	0	12	0	2	4	1	144

*Conclusions.*—From the foregoing results we observe—

1°. That it is not always economy to apply a large quantity of farm manure to the turnip-crop—double manure giving here only an increase of 1 ton 16 cwt. of bulbs.

2°. That, as *auxiliaries to manure*, guano, art. guano, bone-dust, burnt bones, manure B, gypsum, in the above quantities, may be applied with greater effect than six loads of farm manure.

3°. That a top-dressing of sulphate of soda has a beneficial effect, and that nitrate and sul. soda (mixed), drilled at same time as the seed, acts as an auxiliary to manure, 2 cwts. giving an increase of 1 ton 15 cwt. of turnips.

4°. That guano is, of all the applications, the most potent, 2 cwt. giving an increase of 4 tons 9 cwt. 4 st. of bulbs.

5°. That guano, art. guano, manures A and B, and the saline matters, have a great tendency to injure the vitality of the seed, if placed in contact with it.

6°. That art. guano and the manures A and B, have a tendency to render the bulb coarse.

7°. That the *inorganic* constituents are the

*chief* fertilizing agents in bones: thus compare results Nos. 2 and 3, where 48 st. of bones, crushed and applied to soil, give an increase of 3 tons 6 cwt. 6 st. per acre; and 48 st. of bones burnt (and thus reduced nearly one-half in weight) give an increase of 2 tons 9 cwt. 5 st.

8°. That burnt bones act quickly, but do not continue that action so long as the unburnt. (*See results.*)

B.—Compound Experiment on the actual and comparative effects upon the white Globe Turnip crop, of Bones, Burnt Bones, Guano, Art. Guano, as *Substitutes for Farm Manure*; also of Rape-dust, Guano, Artificial Guano, Gypsum and Urine, and Manure B, as *Auxiliaries to Bones.*

*Details.*—Soil—moderate limestone, worth, in its present state, 24s. per acre. Exposed on all sides, low fences, and no trees. Former crops—*seeds* (pastured with sheep), *wheat* (rape-dusted), *oats* (rape-dusted).

*Management.*—Drilled on the level, July 4, at 12 inches apart. Seed, Matson's white Globe. Tillages applied in the following order :—

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Bones.	Burnt Bones.	Artific. Guano.	Guano.	Nothing.	Bones and Rape-dust.	Do. and Guano.	Do. and Artific. Guano.	Do. and Gypsum.	Do. and Gypsum and Urine.	Do. and Manure B.	Do. and Nothing.



*Conclusions.*—In the preceding experiment we observe—

1°. That, as *substitutes for manure*, guano, bones crushed, bones burnt, and artificial guano, may be used with success.

2°. That in *positive effect*, as such, guano, in the proportions used, stands first.

3°. That the fertilizing properties of bones depend mainly on the *inorganic* matters contained in them. Thus, in this case, a quarter burnt gives a better crop than a quarter unburnt.

4°. That guano has a great tendency to injure the seed if placed in contact with it.

5°. That bones, in conjunction with other mat-

ters, may be used with great advantage as *substitutes for manure*.

6°. That it is not economical, in some cases, to use a large share of *bones only*—the effect not being in proportion to the quantity used. Thus comparing Nos. 1 and 12, 16 bushels per acre give an increase of only 1 ton 2 cwt. over 12 bushels per acre.

7°. That rape-dust, guano, &c., may be added to 12 bushels of bones, and used with *greater success* than 4 bushels of bones extra. Thus, in experiment, the extra 4 bushels in No. 1 produces 1 ton 2 cwt. increase, when compared with No. 12, but compared with the same—

	tons, cwt. st.	
6 bushels rape-dust extra, give	3 9 1	increase over No. 12.
1 cwt. Guano.....	3 2 2	do.
1 cwt. Manure B.....	2 13 5	do.
2 cwt. Gypsum }.....	2 7 6	do.
32 gallons urine }.....	2 7 6	do.
2 cwt. Gypsum.....	1 6 2	do.
1 cwt. Art. Guano.....	1 10 5	do.

8°. That a slight addition of urine is of use; 32 gallons increasing the crop 1 ton 1 cwt. 4 st. (*vide* Nos. 9 and 10) per acre.

C.—Compound Experiment on the actual and comparative effects upon the white Globe Turnip crop, of extra Farm Manure, Bones, Bones burnt, and Guano; also of the saline substances—Nitrate of Soda, Sulphate of Soda, Sulphate of Ammonia, and Sulphate of Magnesia—as *Auxillaries to Farm-yard Manure*.

*Details.*—Limestone soil, close upon the rock; worth, to rent, 22s. per acre. Former crops—*barley* (rape-dusted); *seeds* (pastured); *wheat* (rape-dusted). (*Vide* sample of "Soil C.")

*Management.*—Land well weeded and ridged, (distance 24 inches). Six loads of manure per acre spread in the furrow, and other tillages applied as below. Seed—Matson's purple Swede, sown June 12, 1843.

SECTION 1st.					SECTION 2nd.			
1.	2.	3.	4.	5.	6.	7.	8.	9.
Extra Farm-yard Manure.	Bones.	Burnt Bones.	Guano.	Nothing.	Nit. of Soda.	Sul. of Soda.	Sul. of Ammonia.	Sul. of Magnesia.
Section 1st. { Section 2nd. {	No. 1.	Area, $\frac{1}{4}$ acre,	Farm manure,	$1\frac{1}{2}$ loads	put in the ridge before the seed.			
	2.	do.	Bones,	4 bush.	drilled with seed, June 12, 1843.			
	3.	do.	Burnt do.,	4 bush.	do.	do.		
	4.	do.	Guano,	$\frac{1}{2}$ cwt.	do. (with earth) do.			
	5.	do.						
	6.	$\frac{1}{4}$ acre,	Nit. of Soda,	$1\frac{1}{2}$ st.	applied upon the manure in the ridge before drilling seed.			
	7.	do.	Sul. of Soda,	3 st.	do.	do.		
	8.	do.	Sul. of Ammon. $1\frac{1}{2}$ st.		do.	do.		
	9.	do.	Sul. of Magnes. 3st.		do.	do.		

*Observations.*—On the first appearance of the plants, they were attacked by the fly, and, in a few days, were completely destroyed. Not wishing to lose the results of the experiment, white Globe seed was drilled (July 3) upon the same ridges, and along the old seam, with a small hand-drill, which deposited the seed just above the tillage.

The plants came up well in every plot, and were soon free from damage from the fly. In the course of three weeks they were decidedly a-head of some which were drilled in another field, two or three days earlier, upon fresh fallowed soil. For some time, no difference was perceptible in any of the plots. During August, No. 4 (guano), 6 (nit. soda), and 8 (sul. ammonia), assumed the lead, having a more vigorous leaf than the rest,

The plants came up well in every plot, and were

On October 2, 1843, I placed them as follows:—

1.	{	Sul. Ammonia.	Very luxuriant leaf, dark and strong.
		Nit. Soda.	Leaf not quite so dark.
		Guano.	Do. do.
2.	{	Farm Manure.	Leaf not so luxuriant as any of the above.
		Bones.	Not quite so luxuriant as the above, but equal in bulb.
3.	{	Burnt Bones.	Nearly equal to do.—Good.
		Sul. Soda.	Do. do.
		Sul. Magnesia.	Do. do.
		Nothing.	Do. do.

Dec. 18th, 1843, weighed two perches from each plot, and ascertained the

*Final Results per Imperial Acre.*

Tillage.	Quantity of Tillage.	Cost tillage.			Gross produce.			* Increase or † decrease of produce.	No. of Turnips per pole.		
		£.	s.	d.	Tns.	cwt.	sts.	Tns.		cwt.	sts.
Extra Manure.....	6 loads.	1	16	0	19	17	2	*4	1	7	148
Bones .....	2 qrs.	1	13	0	20	3	2	*4	7	7	154
Bones burnt.....	2 qrs.	1	13	0	18	11	6	*2	16	3	159
Guano.....	2 cwt.	1	6	0	20	15	3	*5	0	0	143
Nothing .....	..	..	..	..	15	15	3	..	..	..	150
Nit. Soda.....	1½ cwt.	1	11	6	18	6	0	*2	10	5	178
Sul. Soda.....	3 cwt.	1	8	6	16	7	3	*0	12	0	140
Sul. Ammonia.....	1½ cwt.	1	11	6	18	2	2	*2	6	7	162
Sul. Magnesia.....	3 cwt.	0	17	0	15	12	4	†0	2	7	144

*Conclusions.*—In the above experiment we observe—

1°. That certain substances may be used with advantage as *auxiliaries* to manure.

2°. That a moderate application of farm manure, with the above auxiliaries, is more efficacious than a larger application of manure alone.

3°. That the foregoing quantities of bones and guano are equal to 6 tons of extra manure.

4°. That certain saline applications have a beneficial effect upon the turnip crop as auxiliaries to manure: thus nit. of soda and sul. ammonia have a marked effect on the foliage, and also on the produce of bulb.

5°. That sul. soda and sul. magnesia have no decided effect on the turnip crop when applied

along with farm manure.

D.—Experiment on the actual and comparative effects upon the turnip crop (white globe), of bone-dust (fine), bones (½ inch), artificial bones, guano, and Potter's artificial guano, as *auxiliaries* to manure.

*Details.*—Soil—Limestone, worth 22s. per acre, to rent. Former crops same as last experiment, being another portion of the same field. (*Vide* sample "soil D.")

*Management.*—Ridged, manured with six loads of farm-yard compost, and drilled with Swede seed, as in experiment C, and with the same result. Re-drilled with white turnips by small drill in the old seam (July 3), the applications having been made as follows:—

1.	2.	3.	4.	5.	6.
Bones, fine dust.	Bones, rough, half-inch.	Bones, artificial.	Nothing.	Guano.	Potter's guano.

No. 1. Area ¼ acre, Bones (fine dust), 2 bushels applied by the drill, with seed first sowing.

2. do. do. (rough ½ inch), 2 bushels do. do.

3. do. do. artificial, ¼ cwt. do. do.

4. do. Nothing.

5. do. Guano ¼ cwt. do. do.

6. do. Potter's Guano ¼ cwt. do. do.

*Observations.*—No very marked effects from any. The manures were visible for some time, which may be accounted for by the fact that the farm manure applied was very good, well fermented, and full of moisture; hence the young plant would find

ready food independent of any other source.

October 2.—All the patches look well, Nos. 1 and 5 being most luxuriant in foliage.

Dec. 18, 1843. Weighed two perches from each plot, and ascertained the

Final Results per imperial acre.

No.	Tillage.	Quantity	Cost of tillage.			Gross produce.			Increase of produce.			No. of turnips per pole.
			£.	s.	d.	Tns.	cwt.	sts.	Tns.	cwt.	sts.	
1	Bones (dust).....	2 qrs.	1	13	0	19	3	0	2	18	7	146
2	Do. (rough).....	2 qrs.	1	13	0	18	2	2	1	18	1	160
3	Artificial bones.....	2 cwt.	0	17	0	21	2	4	4	18	3	160
4	Nothing.....	..	..	..	..	16	4	1	..	..	..	174
5	Guano.....	2 cwt.	1	6	0	21	8	4	5	4	3	148
6	Potter's Guano.....	2 cwt.	2	0	0	19	12	0	3	7	7	182

Conclusions.—In the above experiments we observe—

1°. That the whole of the above substances are potent auxiliaries to farm manure.

2°. That natural guano has the most beneficial effect.

3°. That the artificial bones have a decided and marked beneficial influence.

4°. That, even as auxiliaries to farm manure, bone-dust is preferable to rough bones as a tillage for the turnip crop.

E.—Compound Experiment on the absolute and comparative effects upon the Turnip crop,

1st, of Farm-yard Manure and Bones variously applied; 2nd, of Guano and Artificial do.; 3rd, of certain Waste Matters.

Details.—Soil—thin limestone, worth 20s. per acre. (Vide "Soil E.") Former crops—seeds (pastured), wheat (rape dust), oats (no tillage)\*

Management.—Ridged at 24 inches wide, and drilled, June 29, 1843, with white Globe turnips—manured as follows:—

\* Left untilled for the purpose of this experiment, in order to test better the real effects of the various substances.

No.	Manures.
Sect. 1.	1. Bones, mixed, rough and small, as from mill.
	2. .. fine dust, separated from crushed bones.
	3. .. rough $\frac{1}{2}$ inch do. do.
	4. .. from same stock as the above, burnt in a kiln.
	5. .. $\frac{1}{2}$ quantity dissolved in sulphuric acid.
	6. .. do. dissolved in muriatic acid.
	7. .. do. burnt, and then dissolved in sulphuric acid.
Sect. 2.	8. Farm-yard manure.
	9. Nothing.
	10. Guano, sown in ridge and ploughed in.
Sect. 3.	11. .. drilled with earth along with seed.
	12. Potter's Guano do. do.
	13. Cropping waste from stuff goods.
	14. .. and soap liquid from mills.
	15. Woollen waste from cloth mills.
	16. Singeing-dust from stuff mills.
	17. Flax waste.
	18. .. and Soap liquid (fermented.)
	19. .. and Soap liquid (mixed fresh.)
	20. .. Soap liquid and Urine.

No.	1.	Area.	$\frac{1}{30}$ acre,	Bones (rough and small) $2\frac{2}{3}$ stones.
2.	do.	do.	do.	(dust) $2\frac{2}{3}$ stones.
3.	do.	do.	do.	(rough) $2\frac{2}{3}$ stones.
4.	do.	do.	do.	(burnt) $2\frac{2}{3}$ stones calcined, reduced to nearly $\frac{1}{2}$ weight.
5.	do.	do.	{	(dissolved in sulphuric acid) $1\frac{1}{2}$ st. bones, $\frac{2}{3}$ st. of acid, with three times its weight of water; after standing three days mixed, diluted with fifty times its weight of water, and applied in the furrow, which was immediately covered up by the plough and then drilled upon.
6.	do.	do.	{	dissolved in muriatic acid, bones $1\frac{1}{2}$ st., acid $\frac{2}{3}$ st., and three times its weight of water, treated as above.
7.	do.	do.	{	burnt and dissolved in sulphuric acid, bones $1\frac{1}{2}$ st. burnt till they weighed nearly $\frac{2}{3}$ st. (42 lbs. weighing after burning 27 lbs.) mixed with $\frac{1}{3}$ of a st. of acid, diluted with three times its weight of water. Applied as in the above cases.

No. 8.	Area, $\frac{1}{20}$ acre,	Farm-yard manure $\frac{3}{4}$ load.
9.	do.	Nothing.
10.	do.	Guano (sown or spread in the ridge like manure) 1 st.
11.	do.	do. (drilled, mixed with earth, under the seed) 1 st.
12.	do.	Potter's Guano (mixed with earth under the seed) 1 st.
13.	do.	Cropping waste $2\frac{1}{2}$ st., applied in the ridge like manure.
14.	do.	do. $2\frac{1}{2}$ st., and soap liquid 5 gals., do.
15.	do.	Woollen waste $2\frac{1}{2}$ st., applied in the ridge.
16.	do.	Singeing-dust $2\frac{1}{2}$ st., do.
17.	do.	Flax waste $2\frac{1}{2}$ st., do.
18.	do.	do. and $2\frac{1}{4}$ st., soap liquid, 5 gals. do. (fermented.)
19.	do.	do. and do. do. do. (unfermented)
20.	do.	do. and $2\frac{1}{2}$ st., do. and urine 5 gals.

*Observations.*—The whole of sections 1 and 2 came up well, with exception of No. 11 (guano drilled), in which some of the seed was injured, and No. 9 (nothing), upon which, for some time, scarcely a green leaf could be seen. In the same manner the whole of section 3 appeared a failure (the young plants scarcely appearing to grow at all for some weeks), and were quite as backward as No. 9. No. 20 and No. 15 were, however, slight exceptions, being a little better, and No. 16 was, if anything, worse (half the seed never vegetating) than No. 9.

Of the other patches (sections 1 and 2) Nos. 14 and 15 (burnt and unburnt bones and sulphuric acid) started off with the lead, which they continued to increase, *being at hoeing time full a week in advance of every other except No. 6*, which followed them up very closely. At this time they almost touched in the ridges, while No. 9 (nothing) could scarcely be seen.

In the second rank, and thriving most vigorously, came farm-yard manure, bone dust, and burnt bones (Nos. 8, 2, and 4), and next rough and small bones (No. 1), and guano (No. 10), all looking well. After these, guano drilled (patchy,) Potter's guano, and bones (rough) No. 3.

In this position, the whole stood at hoeing time; the most remarkable features being the decided lead taken by the dissolved bones—especially those in sulphuric acid—over every other, and the equally decided lead taken by the *fine* bone dust over the rough, and the same superiority of the burnt bones and the mixed (rough and small), over the rough alone.

The superiority of the ridge-sown guano over the drilled was also evident—the young plant not being retarded by the quick action of the manure.

The effect of a slight application of urine along with flax waste was particularly marked.

Towards the beginning of September, a change in many of the patches was observable. First, the plants on the dissolved bones appeared to stop growing in the top, and to form a quicker bulb than the other lots, while those on the guano (natural) and farm manure still continued to put forth a luxuriant dark foliage—in point of bloom, guano now being decidedly first on the whole list. Burnt bones, too, appeared to stop, being now surpassed by the bone dust (No. 2), and the bones mixed. Potter's guano at this time looked well, having made good progress after hoeing. Of the bones in their ordinary states, the

fine dust still kept the lead. I would notice, however, that the whole of the patches manured with bones have a smaller and lighter-coloured foliage than those dressed with farm manure or guano. The whole of section 3 is, comparatively speaking, a failure.

October 12.—Having noticed the appearance of the respective patches at various periods, the position of each at this time will not be uninteresting.

*Lot 1st.—Very Good.*

No. 10. Guano (sown).—Very luxuriant; splendid dark foliage.

No. 11. Guano (drilled).—Very luxuriant; short of plant in a few places.

No. 8. Farm manure.—Very luxuriant; foliage like No. 10.

*Lot 2nd.—Good.*

No. 5. Bones and sulphuric acid.—Bulbs equal to lot 1st.; top small, and light colour.

No. 6. Bones and muriatic acid.—Bulbs equal to lot 1st.; top a shade darker.

No. 2. Done-dust (fine).—Bulbs not quit so large as Nos. 5 and 6.

No. 1. Bones (mixed, dust and rough).—Bulbs and top same as No. 2.

No. 12. Art. guano (Potter's).—Bulbs same as No. 2; top more luxuriant than any of the bones.

*Lot 3rd.—Moderate.*

No. 3. Bones (rough).—Have improved lately; will be a moderate crop.

No. 7. Burnt bones and acid.—Not so good in appearance as they were a month since.

No. 4. Burnt bones.—Fallen much off in luxuriance.

*Lot 4th.—Bad.*

No. 15. Woollen waste.—Much worse than lot 3rd; still, better than remainder of that lot.

No. 20. Flax and urine.—Much worse than lot 2nd; the urine has had great effect.

*Lot 5th.—Very Bad.*

No. 9. Nothing.—Bad as can be imagined.

All the rest, viz., Nos. 13, 14, 19, 18, 17, 16, equally bad.

It will be remembered that the soil in this case is naturally hungry, and that it had a crop of oats after wheat, (oats, too, *without manure*), in order that the land might be left *poor* for this experiment, and thus show more decidedly the effects of the various articles used as substitutes for farm-yard manure.

On December 21, 1843, the produce was weighed from all the plots, and thus were ascertained the

Final Results per Imperial Acre.

No.	Manures.	Quantity.	Cost of Manure.			Weight of Produce.			*Increase or †Decrease.	No. of Turnips per perch.
			£.	s.	d.	Tons.	Cwt.	Sts.		
1	Bones (mixed) . . . .	2 qrs.	1	13	0	15	3	4	*8 2 6	181
2	Bone-dust (fine) ..	do.	1	13	0	15	17	3	*8 16 5	177
3	Bones (rough) . . . .	do.	1	13	0	13	3	7	*6 3 1	169
4	Bones (burnt) . . . .	do.	1	13	0	9	0	4	*1 19 6	156
5	Bones and Sulph. } Acid. . . . . }	{ 1 qr. bones } { 12 st. acid }	1	15	6	13	7	6	*6 7 0	173
6	Do. and Muriatic } Acid. . . . . }	{ 1 qr. bones, } { 12 st. acid }	1	19	6	17	9	1	*10 8 3	166
7	Bones (burnt) and } Sulph. Acid. . . . }	{ 1 qr. bones, } { 6 st. acid }	1	6	0	17	7	1	*10 6 9	173
8	Farm Manure . . . .	15 loads	4	10	0	22	10	3	*15 9 5	194
9	Nothing. . . . .					7	0	6		200
10	Guano (sown) . . . .	2½ cwt.	1	12	6	22	10	3	*14 19 5	174
11	Do. (drilled) . . . .	do.	1	12	6	13	17	6	*6 17 0	158
12	Potter's Guano . . . .	do.	2	10	0	11	12	1	*4 11 3	190
13	Cropping Waste ..	50 st.				2	9	4	†4 11 2	106†
14	Do. and Soap Li- } quid. . . . . }	{ 50 st. } { 100 gallons }				3	1	4	†4 19 2	118
15	Woollen Waste. . . .	50 st.				7	2	6	*0 18 0	194
16	Singeing-dust . . . .	do.				2	7	4	†4 3 2	113
17	Flax Waste . . . . .	do.				3	5	3	†2 5 4	136
18	Do. and Soap Li- } quid fermented }	{ 50 st. } { 100 gals. liq. }				4	5	2	†2 15 4	134
19	Do. and Soap Li- } quid (fresh). . . . }	{ 50 st. } { 100 gals. }				3	17	3	†3 3 3	141
20	Do. and Urine . . . .	{ 100 st. } { 50 gals. }				8	10	5	*1 9 7	152

Observation.—The small number of plants in the plots manured with the waste matters arises from the fact of there being so many without any bulb at all—having nothing but a slender fibre. These, of course, did not count.

Conclusions.—We here observe—

1°. That all the above substances, with the exception of the waste matters, act beneficially upon the turnip crop, and may be used for such, as substitutes for manure, even on poor over-cropped soil.

2°. That the waste matters, in their dry, undecomposed states, do not improve, but even deteriorate, the turnip crop.

3°. That natural guano has a more beneficial effect on the growth of the turnip than any other of the above tried substances.

4°. The guano should not be applied too close to the seed, as in such case it has a much worse effect, even should it not destroy the seed entirely, than when it is spread in the ridge by the hand.

5°. That bones, in all the various conditions used, act very well, though that action is much affected by such condition.

6°. That bones ground fine have a readier action, and increase the crop more, on the plant, than those left rough.

7°. That bones mixed, rough and small, are also better than those entirely rough.

8°. That burnt bones have a ready action on the plant, but sooner fail in their influence than those unburnt; they, therefore, are not adapted for the turnip crop on a poor soil.

9°. That burnt bones dissolved in sulphuric acid have a more beneficial effect than burnt bones undissolved, and promote the early maturity of the crop.

10°. That bones dissolved in sulphuric acid or in muriatic acid have an extraordinary beneficial effect upon the turnip crop, hastening the early growth, encouraging the formation of the bulb in the early season, and increasing the gross produce. (See prior remarks.)

11°. That Potter's guano acts well, and in all its effects resembles natural guano.

12°. That the saturation of any vegetable fibre or compost with liquid manure or urine is of great use to the crop. Witness the astonishing effects of urine when used with flax waste.

II.—EXPERIMENTS ON RAPE.

F.—Experiment on the actual and comparative effect of bones and guano on the rape crop.

Details.—Soil—good sandy loam, worth 45s,

per acre to rent. Perfectly dry, and free from any local injurious influence. Former crops—*wheat* (after-seeds pastured), *barley* (after turnips, cat).

*Management.*—Prepared for, and drilled with, turnips, June 22, with tillages at same time. Turnips being destroyed by the fly, the patches sown with rape on the level, July 20, 1843, as follows:—

1.	2.
Guano.	Bones.

1.—Guano (2 acres), 4 cwt.—drilled with earth, along with turnip seed.

2.—Bones (3 acres), 6 qrs.—drilled, dust and rough, do.

*Observations.*—The plant appeared quickly, guano taking the lead, which it has maintained up to the present period. This superiority was at first very manifest; for, as the manure was drilled and the seed sown on its level, the effects were very visible—the plant appearing as though it had been drilled—the lines formed by the manure being marked by the superior luxuriance of the rape immediately over them. Upon the bones this was not the case—the whole plot looking even in quality.

October 12—The guanoed plot was better than the other considerably—both, however, considering the late period they were sown at, are good.

(To be continued.)

AGRICULTURAL CHEMISTRY.

BY PROFESSOR BRANDE, F.R.S., &c.

(From the Civil Engineer and Architect's Journal.)

Lecture II.

The next most important constituent of the soil is lime. Now lime is found in nature in various states of combination, but principally either as carbonate, phosphate, or sulphate. As carbonate it exists in most fertile soils. It is added, also, largely to fields as a fertilizing agent. But for this purpose it is not used in combination, but in a free state, as caustic or quick lime, in which condition it is obtained by exposing limestone rocks, which are carbonate of lime, to a strong heat in properly constructed kilns; this drives off its carbonic acid, and reduces it to the state of pure lime. If chalk, for instance, is heated, water first escapes, then carbonic acid, and the heat should be continued till it ceases to lose weight. As the limestones are not all pure, but are mixed with other ingredients, so the resulting lime is of different qualities, and receives various names, such as hydraulic lime, fat lime, and meagre lime, each being adapted for some particular object, some being used largely in mortars and cements. In lime-burning there are several circumstances that must be attended to, or success will not be obtained; one is, that the proper degree of heat be maintained; another, that a good current of air be kept up. It has been found, by the experiments of Sir James

Hall and others, that when carbonates of lime are heated to the most intense heat in closed vessels, only a part of the carbonic acid escapes; indeed, they have shown, that if heated under pressure, none of the gas escapes from it, but that it is converted into a semi-crystalline mass resembling marble; in fact, it is supposed that in this manner marble has been formed in nature, by the intense heat of streams of volcanic lava acting on the chalk whilst imbedded beneath other strata, the pressure not allowing the gas to escape, and during its slow cooling assuming a crystalline arrangement. Hence we see the importance of constructing the kiln so as to allow a good current of air to carry off the carbonic acid as fast as liberated; which is also assisted by the steam produced from the moisture in the chalk. Now the change of quality produced by this burning, was by the old chemists, and is even by many of the unscientific agriculturists of the present day, attributed to something that it abstracts from the fire, and hence, say they, its caustic quality. But Dr. Black showed, long ago, that such was not the case. He found that when 50 lb. of pure chalk were converted into lime, it only weighed 28 lb., hence 22 lb. had passed off as an invisible gas, which by further experiments was proved to be carbonic acid, and the remaining 28 lb. of lime has been shown by Sir H. Davy, to consist of 20 lb. of a metal which he named calcium, together with 8 lb. of oxygen gas, forming oxide of calcium, or lime. Hence the composition of pure carbonate of lime may be represented thus:—

50 carbonate of lime.	{	carbonic acid	{ carbon. . . 6
			{ 2 oxygen 16
	{	lime . . . . .	{ calcium 20
			{ oxygen 8
			—
			50

When lime is exposed to the air it crumbles down into a fine powder, and if then examined it will be found to have combined with water from the air and become what is termed slaked. The same effect may be produced by pouring water on to lime. By taking a portion of fresh lime and pouring water on it, it will be observed to swell considerably, and to become very hot, sufficiently so even to char wood and to fire gunpowder, at the same time falling into a dry powder, which weighs much more than it did originally, every 28 lb. of lime having combined with 9 lb. of water, forming 37 lb. of hydrate of lime or slaked lime. If left longer exposed, it is found then to combine with the carbonic acid always present in the air, parting again with the water and returning to the state from which it set out, of carbonate of lime.

There are other methods of getting the carbonic acid from a carbonate than by heat. If to 1,000 grains of chalk, an acid be added which has a stronger attraction for the lime, the carbonic acid will be set free, and may be collected as gas in a glass vessel inverted over water. This is the ordinary method of obtaining carbonic acid for experiment. But the lime in this case is not obtained pure, as it combines with the acid em-

ployed. Then if an equal weight of chalk be heated so as to drive off, in that manner, all its carbonic acid, and then placed in the glass vessel full of gas, it will be found that after a time the water will rise in the glass, showing that the lime is absorbing the gas, and again becoming carbonate.

Lime is soluble in water, and though it requires 800 times its weight of water to dissolve it, the solution will exhibit most of the properties of lime. It strongly reddens turmeric test paper, showing that it is alkaline: it absorbs carbonic acid from the air, the surface becoming covered with a crust of chalk: added in excess to rain or river water, it produces a cloudiness, proving that they contain carbonic acid; but if the water containing the carbonic acid is in excess, the carbonate first formed is redissolved, on account of the formation of the very soluble bi-carbonate of lime. To this latter property is owing a beautiful appearance frequently met with in limestone districts; the rain, falling on the surface, becomes impregnated with carbonic acid from the soil, and then filtering through some crevice in the limestone, renders some of it soluble; it then, perhaps, finds an outlet at the roof of a cavern, and here, being exposed to the air, parts with the extra quantity of carbonic acid, depositing the insoluble carbonate of lime, which first encrusts the roof, then by constant dripping, forms a series of beautiful crystalline icicles termed stalactites, the remainder falling on the floor, forms large stony masses termed stalagmites.

The consideration of these properties of quick lime will explain its utility when added to the soil. Its first action when strewn on the field, is to absorb moisture, to swell considerably, thereby loosening the texture of the soil—then, when acted on by rain, to form a solution which is destructive to animal life, killing all grubs and worms—when brought in contact with organic matter, to decompose it, which may be illustrated by mixing sawdust, lime and water into a paste, when it becomes dark brown, evolving carbonic acid—to decompose salts of allumina and iron which might be pernicious to the young plant—and, ultimately, by uniting with carbonic acid, to diffuse carbonate of lime through the soil in a finer state of division than it can be obtained in by other processes. One of the uses of lime which has till lately been overlooked, because taking place more slowly, is the property it has of disintegrating several kinds of rock, such as felspar, clay slate, and mica slate, setting free their alkali, which is highly necessary for vegetation. This accounts for the power attributed to lime, by many agriculturists, of awakening the dormant energies of some soils, bringing them, in the course of four or five years, into excellent condition.

The tests for lime are few and simple. In limestones, the application of an acid causes effervescence, as it generally exists in the state of carbonate. In river water, such, for instance, as the Thames, it exists as carbonate, and on boiling, is deposited, as is evident by the fur which accumulates in kettles. In spring water, so that it is

not too near the chalk, in our blue clay, for instance, it is found as sulphate. Oxalate of ammonia is a very delicate test for the presence of lime in solution, causing turbidness even when a very minute portion is present. Ammonia causes no precipitate in solutions of lime, and is therefore useful, in analyzing soils, in order to remove first those substances which are precipitated by it, and then the addition of carbonate of ammonia will throw down the lime.

A fourth ingredient of the soil is magnesia, which, though not in so great quantity as the former, is still important. This is found as carbonate in some limestones, which are then termed dolomites, or magnesian limestones. They are very excellent for building purposes, being very strong and durable, and were highly recommended by the Commission appointed to select stones for the Houses of Parliament. A curious point in their history relates to their use as manure in Yorkshire where they abound. It was found that when burnt for lime, they killed the young plant. Now this is owing to the fact that the carbonate of magnesia, when burnt, is reduced to the caustic state, or pure magnesia, similar to the lime; also, when strewn on the soil, it absorbs carbonic acid, but so much more slowly than the lime, that when the young plant shoots up, it still retains its causticity, and destroys it. This difficulty is, by careful management, got over, and it is now much used. Magnesia is found as pure carbonate in some parts of Asia and America. It is also a constituent of the serpentine rocks of Cornwall, and forms a large part of steatite, augite, hornblende, and meerschaum. Many of these are characterised by a peculiar greasy feel, hence steatite is well known by the name of soap stone. It is also abundant in sea water; when the salt has been crystalized from it, it imparts a very bitter taste to the residue, which, on that account, is termed bittern. From this it is separated in large quantities and used in medicine as Epsom salts, or sulphate of magnesia. Pure magnesia is almost tasteless, but possesses a slight reddening power on test paper; it is therefore an alkaline earth. From solutions of magnesian salts, carbonate of potash throws down the insoluble carbonate of magnesia, which bears the same relation to pure magnesia that chalk does to lime. Carbonate of ammonia does not produce any precipitate, which may therefore be used to separate lime from magnesia; but if to the mixture phosphoric acid be added, a precipitate is slowly deposited, which is therefore a very characteristic test for magnesia.

To these four earths, which are all metallic oxides, may be added, as a common ingredient of the soil, oxide of iron. There are two oxides of iron, the red, which is insoluble and consequently harmless, and the black, which is very noxious. Both of these frequently impart colour to soils. The one is commonly known as rust of iron, the other, as slag. Dissolved in acids, and lime or ammonia added, the respective oxides are precipitated combined with water, as hydrates. But the lower or black oxide has always a strong

tendency to pass into the higher state of oxidation, even by exposure to air. This may often be seen in ferruginous springs, which at their source are quite clear, but as they flow along, the protoxide of iron is converted into the peroxide, and is deposited on the banks as an insoluble red powder. The best tests whereby to recognise iron are striking and delicate. One of the best is a solution of any astringent matter, green tea for instance, but a solution of galls is best, which changes it to a dark purple, forming indeed, ink. It is on this account that spring water, which frequently contains iron, spoils tea. Prussiate of potash, also, may be used, which gives a dark blue, which is Prussian blue.

These are the principal constituents of the soil. But there are other substances also present, which, though only in minute quantity, and once overlooked as unimportant, are now considered to be of vital consequence to plants, and which will be considered in the next lecture.

### LECTURE III.

If the agricultural chemist had been asked, a few years ago, what were the essential ingredients of the soil, he would most assuredly have said that the earths and the organic matter present were all that were important; but that the principal part of the nourishment was due to the organic matter, and that the saline ingredients were of very little use. Now, however, he would have quite a different story to tell, and it is principally to Liebig that we are indebted for a more correct view of the subject; for it is now proved, beyond doubt, that although the salts present in the soil may form a small per centage of the whole, yet they must not be considered as accidental, but as being perfectly indispensable to the plant, which, according to its nature takes up one or other into its circulation, and without which it could not exist. By the salts must be understood all the substances consisting of a base united to an acid. The principal bases are potash, soda, lime, and magnesia; these are always present in fertile soils. The acids with which they are generally in combination are the carbonic, sulphuric, and phosphoric acids, and frequently silica, so that when the chemist talks of flint, he sometimes speaks of it as an acid, which it really is; for although not sour to the taste, being insoluble, it combines with bases, forming neutral and frequently soluble salts, which is a better proof of being an acid than the action on the tongue. When plants are burnt so as to destroy their organic part, their saline constituents alone are left, forming the ashes of plants, and the quantity of ash varies greatly with different plants and with different parts of the same plant, as will be evident by inspecting the following table:

Quantity of Ash in 1000 parts of			
Hay..... 90	Potato..... 40	Birch..... 3	
Red Clover 77	Turnips .... 70	Oak ..... 2	
Wheat... 12	„ leaves 130	Elm leaves 120	
„ straw 60	Elm..... 20	Willow „ 82	
Oats ..... 40	Willow .... 5	Beech „ 42	
„ straw 50	Beech..... 4	Birch „ 50	

An investigation of the properties of the principal salts in the soil and their components will make this part of our subject more intelligible. And first of their bases. These are metallic oxides, the metals of which were first obtained in a separate state by Sir H. Davy. They are named respectively, of potash, potassium, of soda, sodium, of lime, calcium, of magnesia, magnesium, of baryta, barium, &c. But potassium, which is, perhaps, the most easily obtained, may be taken as the type of the class. It is a white metal, like silver, lighter than water, which is also the case with sodium. When thrown into water it runs over the surface, decomposing it with great rapidity, liberating its hydrogen, which ignites from the heat evolved, and combining with the oxygen, forms potash, which is instantly dissolved. The alkaline property of the solution may be rendered evident by its action on vegetable colours, turning yellow to brown and frequently red to blue. If acids be added they will combine with it, forming neutral salts, which may be obtained by evaporation. The other alkaline metals go through the same process, although none so energetically as potassium; though sodium approaches very nearly to it in this respect. The proportions in which they combine are—

- 40 parts potassium to 8 oxygen, producing 48 potash, or
- 24 parts sodium to 8 oxygen, producing 32 soda.

From these figures it will be evident that wherever soda can be used as a substitute for potash, 32 lb. would do the work of 48 lb. of potash.

As it is very important to the agriculturist to ascertain whether a soil contains salts of potash or of soda, the distinguishing tests must be borne in mind. In order to get them in a proper state for testing, boiling water is poured on to a portion of the soil, and then the whole poured on to a filter; the water running through carries away all the soluble portions. If this be then evaporated, the resulting salt will frequently indicate, by its shape, solubility, and behaviour in air, which base it contains. They are generally in combination with sulphuric acid, and if it be the sulphate of potash present, it will be found to be very slightly soluble, and remaining unchanged by exposure; whereas if it be the sulphate of soda, it will be very soluble, and by exposure to air, become covered with a white powder, or efflorescence, as it is termed. This arises from its giving up to the air some of the water which it had combined with when crystallizing, and so falling into a white powder. The tests most commonly used in the laboratory, are tartaric acid and chloride of platinum. When the former is added to a solution containing soda, no precipitate is produced; but if to one containing potash, a very copious crystalline precipitate is produced of bi-tartrate of potash, or as it is commonly called, cream of tartar. When there is very little potash present, it forms very slowly, but it may be hastened by rubbing the sides of the vessel with a glass rod, when the crystals are deposited on the parts where the rod has rubbed, as though a little

tickling coaxed the solution to deposit its crystals more rapidly. With the chloride of platinum, soda gives no precipitate, but potash yields abundantly a yellowish brown deposit, consisting of the double chloride of platinum and potassium.

Some plants absorb but little alkali from the soil, whilst others take an immense quantity. Amongst the latter is the common wormwood, which impoverishes a soil of its alkali in a very short time. Indeed, so well known is that, that it has, for years past, been collected and burnt, and its ash, known as salts of wormwood, applied to many purposes on account of the quantity of alkali it contains. Similar to this is the grape, which appropriates to itself abundance of potash, which it deposits from its juice in fermenting, as salt of tartar. The alkalis are seldom found combined with carbonic acid, for although they are so in the ashes of plants, it arises from the decomposition by heat of other organic acids, they being converted into carbonic acid. In the wood sorrel, for instance, the juice is intensely sour, owing to the presence of binoxalate of potash; but after being burned, the oxalic acid is all decomposed into carbonic acid, the whole of the salt having become carbonate of potash.

But it will be interesting here to notice the bases of the inorganic acids. Silicic acid or silica has already been touched upon. Sulphur, the base of sulphuric acid, familiar to every one as brimstone, is found in nature, both free and in combination; free, in abundance in Sicily, and in combination plentiful in our own islands. With iron it is exceedingly common as iron pyrites or sulphurate of iron; recognised in coal by its bright yellow colour, and washed out of our chalk cliffs in rounded masses of almost every size, which are commonly looked upon as thunderbolts. When sulphur combines with oxygen, it forms sulphuric acid, which takes place spontaneously when iron pyrites is exposed to air and moisture. This acid may be formed artificially on a small scale by immersing a lighted mixture of sulphur and saltpetre (nitrate of potash) into a jar of oxygen gas standing over water; the sulphur then burns with a beautiful blue flame, combines with the oxygen, and forms sulphuric acid, which is dissolved by the water, forming a weak solution of oil of vitriol. Now this is remarkable for its fixity, so that it may be placed in a proper vessel over the fire, and the water boiled away, leaving the sulphuric acid. This is the method commonly employed in the manufactories for strengthening it. The acid consists of 16 parts of sulphur, 24 of oxygen, and 9 of water, forming 49 parts of the strongest oil of vitriol. This acid is very rarely found free in the soil, as its noxious properties would make it the most sterile of land. But, as will be shown hereafter, some plants possess the property not only of separating the acid from its alkali, but even of separating from it the sulphur, which it employs to form new combinations, as for instance, the essential oil of the mustard and the radish, in which there is a considerable quantity of sulphur. But decaying vegetables will do the same, the sulphur

in this case combining with the hydrogen which is being given off, and forming the offensive gas, sulphuretted hydrogen, familiar to all who have smelt a foul gun barrel, or a rotten egg. It is to this decomposition is due the nauseous smell of water in which vegetables have been boiled, and is continually taking place at the mouths of rivers, which empty into the sea vast quantities of rotting vegetable matter, which there meets with the sulphates in the sea water, and the decomposition takes place. Ships anchored in such situations have their copper corroded off in one-half the usual time, and to the same cause is also attributed the unhealthiness of several African rivers. But although sulphuretted hydrogen is known to be very destructive of life when present in considerable quantity, it is doubtful whether it is so injurious to man when in the minute quantity which it must be in the open air, even in the worst situations; the daily experience of the chemist would seem to confirm this, for, from its being so much used as a test, he is continually breathing an atmosphere sensibly impregnated with it, and yet with impunity, as it has never been known to produce any effects analagous to the eastern fevers. To other causes, then, must be attributed the contagious influences present in the air of these shores, and nothing seems more probable than that it is due to certain decomposing organic particles, acting on the blood in the manner of a ferment. The best test for its presence, either in solution or in the air, is a solution of sugar of lead, which it blackens even if present in a very minute quantity, producing sulphuret of lead. Though sulphuretted hydrogen is undoubtedly very pernicious to animal life, it is not so to plants, and its solution in water has been used with advantage even in horticulture, by Sir E. Solly. Indeed it is essential that many plants should be supplied with sulphur in some shape or other, as they require it to assist in forming some of their constituent parts. The gluten of wheat, for instance, could not be formed without it, and it is essential to the mustard, cabbage, turnip, water cress, and indeed to the whole of the large class of cruciferous plants. From this it is seen that the alkaline sulphates are frequently doubly useful in the soil, as being the source of alkali and also of sulphur. Their presence in solution is readily ascertained by baryta dissolved in nitric or muriatic acids, which forms the very insoluble white sulphate of baryta, not redissolved by nitric acid. By this means it is proved that whereas in wood ash the alkali is present as carbonate, in coal ash it is as sulphate, which is therefore a good top dressing for many crops.

When combined with lime, sulphuric acid forms sulphate of lime or gypsum. It is found in great abundance in many parts in the neighbourhood of Paris, as plaster stone, where it is rendered anhydrous by burning, converting it into plaster of Paris, as it is termed. It crystallizes beautifully as selenite, found in clay districts. Satin spar is also a very beautiful variety of this substance. It is found anhydrous also, but not

frequently. It exists in considerable quantity in the rock salt of Cheshire. In some countries it is found to form so large a portion of the rock salt, even of some kinds which are eaten at table, that if the table salt be dissolved from it, it still retains its form, as a spongy mass. In this way whole mountains are said to be disintegrated. This will also serve to explain an expression of scripture, which is otherwise obscure to us who use salt in a state of purity, respecting salt losing its savour; if a mass of rock salt containing much sulphate of lime, be exposed to heavy showers, the table salt is dissolved out, the original shape still being retained; and thus salt may be said to lose its savour. Of the virtues of gypsum as a manure, the agriculturist has lately heard a great deal, but there is no doubt that its virtues have been highly exaggerated. There is very little proof of its being useful to any plants which do not include sulphate of lime in their composition; but as lucern, saintfoin, clover, and turnips, contain a portion, there is no doubt it is of use to them, when applied as a top dressing. There are cases in which red clover may spring up, promising luxuriantly, but ultimately die away—the soil is tired of clover, as the farmer says; in this case sulphate of lime is frequently of great service, though it is by no means the only substance clover requires. We have Johnstone's evidence that clover and vetches are both improved by its use. Indeed the ashes of many plants show that they require it, as their sulphates frequently amount to as much as 10 per cent. of the ash. A waggon load of gypsum is said to be sufficient for 30 or 40 acres. The water falling on the surface slightly dissolves it, one part requiring 500 or 600 of water for solution. It may be owing to its sparing solubility in water, that we have so many contradictory statements of its efficacy, as the farmer who uses it on very dry land, or during a very dry season, would perhaps derive but little benefit from it.

The consideration of the phosphates, of bone manure, with the relation of the inorganic to the organic constituents of plants, will form the subject of the next lecture.

#### LEOMINSTER FARMERS' CLUB.

The usual monthly meeting took place upon the second of February, when the breeding, rearing, and general management of cart colts was the subject of discussion. The great importance to farmers of improving the breed of cart horses was generally admitted, as the expense of keeping a good horse, and that of one not able to do as much work by the one-fourth, is frequently found to be as much. In order, therefore, to economise the expenses of the farm, every possible attention should be paid to the breeding and rearing of colts.

1. Resolved—that particular care should be taken in the selection of the horse and of the mare as regards their form and constitution; by no means to have either of them aged, unsound,

or blemished, there being scarcely a disease to which the horse is liable that is not hereditary. Contracted feet, spavin, thick wind, and blindness, are generally allowed to be so.

2. The mares should have shortness of leg combined with compactness of form. Not younger than four years old, and in general not more than sixteen, though in some few instances where she has been always well kept and not over worked, she may breed good colts for two or three years longer.

3. That it would be an advantage to the farmers of the neighbourhood to have more active horses in place of the heavy slow horse, which is only calculated for bad roads and for a heavy undrained soil.

4. That the most convenient time for the mare to foal is the end of April or the beginning of May; that is, as soon as the earliest paddock of grass is expected to be ready to turn into, which of course will depend upon the situation, soil, &c. of the farm.

5. That during the time the mare is with foal she may with advantage be moderately worked, at the same time being kept in a fair average condition till the end of the fifth month, when she should be fed a little better, allowing her then one or two feeds of corn in the day. "This is, (says Youatt, in his valuable work on the horse) about the period when they are accustomed to slink their foals, or when abortion occurs; at this time, therefore, the eye of the owner should be frequently upon them. Good feeding and moderate exercise will be the best preventive against this."

6. Great attention should be paid to the health of the colt after foaling, being then as well as the mare peculiarly liable to take cold. Bran mashes to be given to the mare night and morning for the first few days,—and afterwards, should the grass be short, a feed of oats night and morning. The mare at the end of five or six weeks may, if *wanted*, be put to gentle work.

7. When the colt has been shut up from the mare five or six hours, the mare at the same time being at work, great part of the milk should be drawn from her before she is turned to the colt. The milk formed during the time she is at work when taken freely is found to disagree with the colt, causing it to scour.

8. The colt when five or six months old may be weaned, and have a feed of bruised oats, bran, and chaff, night and morning through the first winter, with a plentiful supply of good hay, and a warm open shed to run into. It is of the utmost importance that the young animal should be well fed, in order to develop a proper form; so much of the future usefulness of the horse depending upon the colt having a sufficient supply of nourishing food, that it cannot be too often impressed upon the breeder; it being invariably the case that colts that have when young been badly kept, never attain the excellency of shape requisite in a good horse.

9. That the management of the colt afterwards may be thus summed up—good pasture in the

summer, and in the winter to be treated the same as in the first, with an enlarged quantity of food requisite for the increased growth of the animal. It was remarked by several members that they preferred having the mare to foal at Michaelmas, letting her have an open shed to run into during the winter, feeding her plentifully with hay, oats, and Swedes, or carrots; as by experience they found that then the colts generally made better horses, which they attributed to their having the advantage of being the winter with the mare, and having an entire summer to grass immediately after being weaned; and that where there is much summer fallow to work, it would occur at a time when the mare could be best spared.

The attention of the club was called to the want of an additional fire engine, there not being at present one properly mounted to go into the country, and several parties having handsomely offered to contribute. Mr. W. Bennett gave notice that at the next meeting of the club he should propose that a committee be appointed to procure subscriptions for that purpose.

The diseases of wheat being a subject highly important to the agriculturist, Henry Rudge, Esq. kindly complied with the solicitations of the committee to deliver a lecture upon that subject.

**CROWN ESTATE AT KING WILLIAM'S TOWN, IN THE COUNTIES OF CORK AND KERRY.**

By J. FRENCH BURKE.

(From the Journal of the Royal Agricultural Society.)

Three years ago, some Parliamentary Reports respecting experimental improvements on the crown estate of King William's Town, in the

counties of Cork and Kerry, were forwarded to this society by the commissioners of Her Majesty's woods and forests; and a summary of their contents was drawn up, which is published in the first volume of this Journal.

In December, 1841, two further Reports were made on the subject, and transmitted on the part of the commissioners to the Duke of Richmond—as being then president of the society—accompanied by a letter of which the following is an extract:—

“In the course of the experimental improvements now in progress on the crown's estate at King William's Town, in the counties of Cork and Kerry, in Ireland, a suggestion was made, in the year 1840, by your Grace to the then first commissioner of this board, as to the importance of a trial being made of the comparative value of Scotch and Irish cows, in respect to their relative produce in milk and butter; and the commissioners accordingly directed the purchase of six Scotch heifers of the Galloway breed, in order to such an experiment being instituted at King William's Town, in regard to their produce as compared with a like number of Ayrshire and Kerry cows then on the estate.

“The result of this trial, so far as circumstances would permit its being instituted, has been submitted in detail to the board by Mr. Griffith, under whose superintendence the several operations on the crown lands have been carried on, in his report, dated 13th of August last, detailing the proceedings of the previous two years.”

From these reports (as may be seen by their summary) it appears that the milk of the Kerry cows was richer in cream than that of either the Ayrshire or the Galloways; but rather inferior to the former in point of quantity.

**KING WILLIAM'S TOWN DAIRY.**

*Experiments on Ayrshire, Galloway, and Kerry cows, from the 18th day of April to the 17th day of June, 1841.*

	Total No. of qts. milked.	No. of qts. set for butter.	No. of qts. given to calves.	No. of qts. sold.	No. of lbs. of butter produced from milk set for butter.	
3 Galloway cows	1,134½	1,115½	17	2	117½	9½ qts. of milk produced 1lb. of salt butter.
Average number of quarts milked from 3 Galloway cows from the time of calving till the present date, 6¼ quarts per day each.						
4 Kerry cows.	1,769	1,698	64	7	191	8¾ qts. of milk produced 1lb. of salt butter.
Average number of quarts milked from 4 Kerry cows from the time of calving till the present date, 7¼ quarts per day each.						
9 Ayrshire cows	4,313½	3,086	1,202½	25	302	10½ qts. of milk produced 1lb. of salt butter.
Average number of quarts milked from 9 Ayrshire cows from the time of calving till the present date, 9 quarts per day each.						

The above nine Ayrshire cows, when milked their first calf, and each three years old, gave, in the first summer in 1838, having then produced in the month of July, 67½ quarts per day, being an

average number of  $7\frac{1}{2}$  quarts to each cow per day. The same Ayrshire cows, being six years old at May, 1841, each having produced four calves, gave, in the month of June, 1841, 93 quarts per day; average number,  $10\frac{1}{3}$  quarts to each cow per day for the month of June, being an increase of  $2\frac{5}{8}$  quarts of milk to each cow per day for June. The above four Kerry cows had each produced their first calf, and were four years old at May, 1841. The above three Galloway cows had each produced their first calf, and were three years old at May, 1841.

This, from the press of other matter, remained overlooked, but was recalled to recollection by a "Statement of the comparative quality of milk from Alderney and Kerry (*Irish*) cows, upon the farm of the Hon. Robert Clive, M.P., at Oakley Park,"—as published in the second volume of the Journal: which shows the Alderneys to have been superior both in quantity of milk and cream. It was, however, accompanied with a note by the writer of this, doubting the experiment to have been satisfactory, and calling for further trials of a more accurate kind; which it is to be hoped will be complied with, as it is very important to have duly ascertained the real value of a stock so well suited to the cottager and the occupier of poor land as that of the Kerry breed.

With regard to the improvements made on the estate, from the period of the former reports up to this communication, it is only necessary to observe generally—that they have been carried on assiduously, and so judiciously, "that 139 acres of nearly unprofitable mountain-land have been reclaimed, manured, and cultivated, and thereby raised in value from about 4d., to from 8s. to 9s. per acre; while twenty-six new farm-houses and cottages have been erected."

In regard to the roads—which were formerly impassable for wheel-carriages—they are now so improved, that during the last two years to which the reports allude, 5,100 barrels of limestone (equal in weight to about 1,000 tons) have been drawn to the estate, from the quarry at Carrindulkeen, for the use of the tenantry; of which 3,540 were used as manure; and additional limekilns are in course of erection, to afford every facility for the reclamation of the land: it is, therefore, reasonably expected that, within a few years, the value of the estate will be more than doubled.

It is also gratifying to learn, that the effect of this experiment has so favourably improved the habits of the peasantry, in point of temperance and industry, as to hold out a striking example to the neighbouring country, and a powerful inducement to the holders of poor, unimproved soils to adopt similar measures.

## AN ESSAY ON ARTIFICIAL AND OTHER MANURES,

To which a Premium was awarded by Sir Charles Lemon, Bart., M.P., through the Cornwall Agricultural Association, by W. F. Karkeek, Truro, Secretary to the Association, and Author of the Prize Essay on Fat and Muscle to which the Premium of £20 was awarded by the Royal Agricultural Society of England—1843. Published by E. Head, Truro; Longman, Brown, Green, and Longmans, London.

It appears from the short introduction to this essay that the agriculturists of Cornwall had been in the habit of using many of the various artificial and other manures, which have been recommended from time to time, in a very extensive manner—that some of them had answered the farmer's purpose, whilst others had been used with unfortunate results; and the Committee of the "Cornwall Agricultural Association" considering that a report of the results of many of these experiments would prove valuable and interesting, inasmuch as it would not be the opinion or experiments of one individual, however talented and accurate he might be, but the combined experience of some of the principal agriculturists in the county, and thus the errors and mistakes of one party would be corrected by the experience of others. The better to carry the object into effect, Sir C. Lemon, one of the committee, offered a premium for the purpose, which was awarded to the essay before us. It is published in a cheap form—3s. 6d. per dozen, or 4d. each—in order to be generally circulated amongst the Cornish farmers.

The first experiments recorded in this essay, are some that were made as early as the year 1835, on the effect of bone-dust, by Mr. Trethewy, of Trewehen, on a piece of *common*, which, in the Cornish language, means a barren waste, sometimes covered with heath and furze, which was the case in this instance, and, previous to being taken under the management of Mr. Trethewy, had been let at 2s. per acre. These experiments show in a most striking manner the advantage of bone-dust as a fertilizer, and its permanent effect on the land afterwards for eight years.

"A field of several acres was broken from the common, the largest portion of which was manured with bone-dust, at the rate of three quarters to the acre; the other portion of the field was merely dressed with the ashes obtained from the breaking and burning of the land. The turnip crop was completely carried off by the fly. In the years 1836 and 1837 it was cropped with oats, and then laid down to permanent pasture up to the present time. There was more than double the quantity of oats on that portion where the bones had been applied, and at this period its effect can be plainly distinguished, as if a line of demarcation had been drawn between rich and scanty herbage, or between a green meadow and an uncultivated soil."

The effect of the bone-dust in this experiment

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WOOLLEN RAGS.—SIR,—If either of your correspondents will, through the medium of your highly-instructive magazine, state how the above articles can most easily be applied as manure for turnips, he will confer a favour upon your reader,  
HENDRE LEU.

is extremely satisfactory, inasmuch as it proves that its fertilizing principle is a permanent one; and, in my opinion, completely sets at rest the question which is frequently agitated amongst farmers, as to whether the manuring property of bone exists in the animal matters, which constitute about one-third of its substance, or in the earthy matters, constituting the remaining two-thirds, since it is almost impossible to suppose that any other than the earthy matters could have remained so long in the soil—the animal matters being probably decomposed in the first and second crops. The second experiment confirms the previous one.

“In 1836, another piece of the ‘waste’ was broken, which was sown to oats, and on the following year a similar crop was taken. One portion of the field was manured with bone-dust only. The oats on this part was equal to the first experiment. After this, the whole was laid down to pasture; and at the present period, the line of distinction can be plainly seen where the bones were applied, at more than four miles distance.”

The same beneficial effect is also plainly seen in two large patches, broken in 1837 and 1838. They have been sown with turnips and manured with bone-dust only, which produced most excellent crops; after which a crop of oats was taken,

and then pastured up to the present period. And in another piece of about six acres, which was broken in 1839, and sown with Swede turnips, an excellent crop was produced; since which, other crops have been taken, and the clover at the present time is very luxuriant, being equal to land let at 40s.  $\text{r}$  acre.

In 1840, another piece was broken and sown to turnips, with bone as before, and oats in the following year; both crops were excellent. In November, 1841, it was ploughed *once* only, and, without any other cultivation, sown to turnips in June, 1842. This crop was also good, and plainly proved that turnips after grain may be produced without either spring or summer ploughing. In 1841, another large portion was broken, sown with Swedes and afterwards cropped with oats, using the bone manure only, which answered as well as before.

The next experiments are some that were instituted by Messrs. S. and R. Davey, of Redruth, in enclosing a portion of the waste of St. Agnes Common. What was literally a waste previous to being enclosed, since then there was sufficient turf found to make the hedge.

The experiments of the Messrs. Davey are given in tables, as follows (A, B, C, D, E):—

A. A. R. P. 6 3 12 statute.	When sown.	Manures per acre.	Produce per acre.	Second sowing.	Manures per acre.	Produce per acre.	Third sowing.	Manures per acre.	Produce per acre.	Seeds and manure.	Present appearance.
Broken in 1839.	Wheat in autumn.	3 qrs. of bone. $\frac{1}{4}$ acre had 30 bush. lime.	Fit only for pigs & fowls.	Oats in 1841.	Nitrate of soda 1 cwt.	36 bus. imp. of oats $\text{r}$ acre.	Barley in 1842.	Truro town dung, £9 $\text{r}$ acre, including carriage, &c.	18 bus. $\text{r}$ acre.	Seed. 2 cwt. guano.	Very superior grass.

It will be seen from this experiment, that the soil was not sufficiently powerful to produce a crop of wheat, manured over with bone-dust three quarters to the acre. In the oat crop the following year, manured with one cwt. of nitrate of soda, we have 36 bushels of oats and no seeds, in consequence of which the field was tilled to barley in 1842, and dressed with Truro dung (scavengers' dung), at a cost of £9 per acre, including carriage. Here we have another failure, the produce being only 18 imperial bushels  $\text{r}$  acre. The seeds in

the early part of the spring of 1843 made but little progress, in consequence of which it was dressed with 2 cwt. of guano per acre, and its growth shortly after this was surprising. So abundant was the grass during the summer, that it was a wonder to the neighbourhood how so much stock could have been kept for such a length of time. Where the lime had been employed for wheat, the grass was not nearly so thick as on the other parts

B. A. R. P. 4 0 2 statute.	First crop. When sown.	Manures used per acre.	Produce per acre.	Second crop. When sown.	Manures used per acre.	Produce from guano $\text{r}$ acre.	Produce from dung and compost.	Seeds.	Manures.	Present appearance.
Broken in 1840.	Wheat in Nov.	Bone-dust, 3 qrs.	None.	Oats in 1842.	2 cwt. guano. 10 loads compost, dung, earth, &c.	77 bush. white oats.	29 bush. black oats.	1843.	2 cwt. guano.	Very superior.

In this second experiment, it will be seen that the wheat failed as in the first, evidently showing that wheat was not adapted to the new soil; whilst in the following year we have a beautiful illustration of the effect of guano on a crop of oats, producing 77 bushels per acre. The Messrs. Davey had now learned by experience that the method

of cropping and manuring which they commenced with was not such as would be likely to prove successful, and accordingly, in the following experiment, they began cultivating the next piece of "waste" by taking a green crop first, followed by a crop of oats:—

C.	When sown. 1st crop.	Four separate acres manured each with				2nd crop.	Manure per acre.	Produce per acre.	Seeds.	Present appearance.
		Dung 25 load.	Sea weed.	1 ton of horn, &c.	Bone-dust 4 qrs.					
Statute A. R. P. 4 1 0 Broken in 1841.	Turnips in June.	Produce.				Oats in 1842.	2 cwt. of guano.	72 bush. black oats.	1843. 15 loads farm yard dung.	Very superior.
		Pasture 15 tons.	none.	none.	Swedes 18 tons.					

In this experiment, the first thing worthy of attention is the trial between bone-dust and Truro dung, the result showing a profit in favour of the bone-dust, and a loss of £5 15s. on the dung; the horn, &c., (being the sweepings of a button and

comb manufactory, consisting of filings of bone and horn, and ivory,) and the sea weed, producing no effect whatever. The difference per acre in the expenses in this trial between bone and dung may be estimated as follows:—

DUNG.		£ s. d.	BONES.		£ s. d.
25 loads dung, at 5s. ....		6 5 0	4 qrs. bone, at 23s. ....		4 12 0
Carriage of do., at 4s. per load. ....		5 0 0	Carriage of do. ....		0 6 0
Spreading of dung on the land ....		0 10 0			
		£11 15 0			£4 18 0

Value of Manure.	Produce.	Value per ton.	Value of produce.	Difference between crop and manure.	Profit & Loss.
Dung, £11 15s....	15 tons pasture.	6s.	£. s. d. 4 10 0	£. s. d. 7 5 0	Loss.
Bone, £4 18s.....	18 tons Swedes.	8s.	7 4 0	2 6 0	Profit.

Again, in the second crop we have as much as 72 bushels of *oats* produced by two cwt. of guano per acre. Where the horn and bone sweepings had been used previously for turnips, the oats and seeds were decidedly the better part of the field—bone next, dung next, and oar-weed the worst part of the piece. Where the horn had been employed, the land has, at the present time, a far better appearance than any fields in the neigh-

bourhood. These three fields, A. B. C., kept 30 ewes, 30 lambs, 4 oxen, 3 horses, and 30 pigs, from the commencement of May until the harvest. The grass was cut and carried into the stable for the horses; since which, the field has been well stocked with sheep.

The next experiment was on a similar piece of "waste" adjoining the former ones.

D.	1st crop sown.	Manure per acre.	Produce per acre.	2nd crop sown.	Manure per acre.	Produce per acre.	Seeds.
Statute A. R. P. 4 0 25 Broken in 1842.	Swedes in July.	4 qrs. bone-dust and 1 cwt. guano.	20 tons Swedes.	Barley in 1843.	10 cwt. of hoofs of * animals and 1 cwt. guano.	12 imperial bushels only.	The clover and the barley was early choked by the rye-grass.

\* Cost at the farm £10 per ton.

The circumstance most worthy of notice here, is the powerful effect produced by the hoofs of animals, in conjunction with guano, on the oats and rye-grass; the latter growing in such an astonishing degree, that it completely choked the clover and very nearly the barley. The field has now the appearance of an old coarse pasture. We also see the effect of guano and bone-dust mixed,

in an excellent crop of Swedes, 20 tons to the acre.

We have, in the following experiment, a similar effect produced by a mixture of bone and guano manures on Swedes, and in the following year another excellent crop of oats, with only 2 cwt. of guano per acre:—

E. Statute. A. R. P. 8 2 37	1st crop sown 1842.	Manures per acre.	Produce per acre.	2nd sowing 1843.	Manure per acre.	Produce per acre.	Present appearance.
Broken from the common 1842.	Turnips and Swedes sown late.	4 qrs. bone, 1 cwt. guano.	18 tons.	Oats.	2 cwt. guano.	60 bushels per acre.	Very superior.

The whole of the expenses are fully stated in carrying out these experiments, shewing a Dr. and Cr. account, in which it appears that the profit arising from the two first crops, during the latter part of the experiments, was nearly equal to the expense incurred in breaking and cultivating the waste.

The next portion of the essay which we select is some experiments instituted the present year, on Tregothnan farm, the seat of the Earl of Falmouth, by Mr. Rope, his Lordships hind, between dung, bone, and guano, as fertilizers for grass and

hay, upon a piece of permanent pasture, which had not been ploughed up for fifty years. The field had alternately been mown and grazed during this period, and had received no dressing in the shape of dung for the last ten years. The soil is of a heavy loam, resting on a clay-slate subsoil, having a northern aspect. **THREE HALF-ACRES** were carefully selected, measured, and manured, on the 24th of march—the hay cut on the 10th of July and weighed on the 15th. The result will be seen in the following table:—

Manures per half-acre, statute.	Cost of manures, including carriage.	Weight of new hay per statute acre.	Value of hay at 30s. per ton.	Profit.	Loss.
	£. s. d.	tons. cwts. qrs. lbs.	£. s. d.	£. s. d.	£. s. d.
15 loads of Plymouth dung. . .	4 8 0	1 8 0 0	2 2 0	.. .. .	2 6 0
10 bushels of bone dust. . . . .	1 12 0	1 2 2 0	1 13 9	.. .. .	0 1 9
134lbs. of guano. . . . .	0 17 0	1 12 3 0	2 9 0	1 12 0	

Here we have a decided loss on the part of the Plymouth dung, which consists of the sweepings of Plymouth streets, night-soil, rubbish, &c., of 2l. 6s., and a decided gain on the guano of 1l. 12s. per half-acre. There cannot be a question after this and the other experiments which I have related, that guano is a most astonishing fertilizer; still this experiment, valuable as it is, is incomplete as it regards the bones, till we see the effect of these manures on the next year's crop, which should be grown without manure, and cut and saved in the same careful manner. The after-grass was very good on each of the pieces, the cattle preferring the part manured with bone.

Mr. Rope tried the guano in various ways. On a piece of ground adjoining, he sowed double the former quantity per acre; and on some young clover also a similar quantity; and the rapid growth of each was extraordinary. The spots where the guano was applied could be distinguished at a great distance. In another instance, he dressed half an acre of barley, with which fifteen sorts of grass seeds and three of clover had been sown, and at the present period they are looking remarkably well; there was also an increase of about eight imperial bushels of

barley per acre compared with other parts of the field. I mention this circumstance connected with the seeds, in consequence of its having been stated that guano is injurious to clover and young grasses.

The next experiment to which I would direct your attention was a trial between bone and guano, also made by Mr. Rope, of Tregothnan.

Upon a field of five acres in Swede turnips, which was of a very inferior description, valued at 10s. per acre, a mixture of 15 loads of farm-yard dung, and 5 loads of calcareous sea sand (the coralline deposit found in Falmouth harbour), and 22 loads of soil taken from the ditches, was laid per statute acre—at a cost, including carriage and spreading, &c., of 4l. 2s. Three acres dressed in this manner were measured out—one of them having 2½ cwts. of guano, and another 2½ quarters bone-dust extra. The seed was of the purple top variety, and was drilled in at 18 inches distance, on the 15th of June. The difference between the acre which was simply dressed with the dung, sand, and earth, compared with the two acres dressed with bone and guano, was as follows:—

Manures.	Value of Manures per acre.	Weight of crop per acre.	Value of crop per acre at 8s. per ton.	Difference between crop and manures.	
				Profit.	Loss.
Dung, sand, &c.	£ s. d. 4 2 0	7 tons.	£ s. d. 2 16 0	£ s. d. .....	£ s. d. 1 6 0
Dung, sand, &c. 2½ cwt. guano ..	4 2 0 1 14 0	22 tons.	8 16 0	3 0 0	.....
	5 16 0				
Dung, sand, &c. 2½ qrs. bone ..	4 2 0 3 0 6	25 tons.	10 0 0	2 17 6	.....
	7 2 6				

In this experiment, the advantage is decidedly in favour of bones, since there cannot be a doubt but that the next crop will derive a much greater benefit from them than from the guano. This experiment is chiefly valuable in proving that, had it not been for the outlay in these manures, the crop would never have paid for the dung and sand.

The next experiment was also a trial between bone and guano, giving the advantage to the

latter. It was made by Mr. C. Parks, of Michell. The field was a wheat stubble, manured for that crop with a compost of dung, earth, and sand. When put into turnips, one part was manured with bone-dust at the rate of 3 quarters per acre, the other part with guano at the rate of 2½ cwt. per acre. The following calculation was made by selecting an average statute yard of turnips grown with each of these manures, and the result was as follows:—

Manures.	Cost of manures per acre.	Produce per acre.	Value of crops at 8s. per ton.	Difference between crop and manures.
3 qrs. bone .....	£ s. d. 3 12 0	Ton. cwt. qr. lb. 15 4 1 4	£ s. d. 6 1 6	£ s. d. 2 9 6
2½ cwt. guano ....	1 10 0	21 15 2 24	8 14 3	7 4 3

"I have made as few remarks as possible," says the author, "on the effect of the different manures which we have passed in review, leaving the experiments to speak for themselves; but in this last one, it must be understood that the land was of a heavy loamy character, which is more suitable to the use of guano than bones."

The next experiment was one between bone-dust, Peruvian guano, Potter's artificial guano, and bone-dust and Peruvian guano mixed, instituted on a crop of Swedes, on Trelowarren estate, by Mr. Foot, the hind of Sir R. Vyvyan, Bart. The land is of a loamy description on a clay-slate subsoil, having a north-west aspect.

Kinds of manures.	Quantity of manures per acre.	Price of manures per acre.	Weight of turnips per statute acre.	Prices at 8s. per ton of crop per statute acre.	Difference between prices of manure & crop.
Bone dust .....	2½ qrs.	£ s. d. 2 12 6	tons. cwts. 23 8	£ s. d. 9 7 3	£ s. d. 6 14 9
Peruvian guano ..	350 lbs.	2 2 0	25 0	10 0 0	7 18 0
Potter's guano....	350 lbs.	2 9 0	22 0	8 16 0	6 7 0
Bone dust .....	1½ qrs.	1 6 3	} 26 0	10 8 0	8 0 9
Peruvian guano..	175 lbs.	1 1 0			

From this experiment we see that the bone-dust and guano mixed, gave the heaviest crop, and yielded the largest profit per acre.

"Ere I conclude this part of the subject," says the author, with reference to guano, "I should say that it proved itself a most valuable and cheap manure in Cornwall this last season. For corn crops, such as barley and oats, it was generally sown, either before or after the seed, at the rate of 2 cwt. per acre. For Swedes, it was usually applied from 2 to 3 cwt. per acre. In many instances, where this manure was drilled in with

the turnip seed, from not being mixed with a sufficient quantity of earth, wood, or turf ashes, a very large portion of the crop was destroyed. This is occasioned by the large per centage of actual ammonia contained in the Peruvian guano—for where the guano had been sown broad-cast, the crop was invariably successful, and superior to the drilled turnips. I should say that in every case where it was drilled in with the seed, not less than a ton of earth or ashes should be mixed with each cwt. of guano, or the guano and ashes might be drilled in the land by itself, and the seed sown

*broad-cast.* The plants would be certain to come up much stronger in the drills, and could be as easily hoed afterwards as if the seed had been drilled in with the manure. I have heard of some instances of failure from another cause, viz., the impurity of the manure. This is very likely, for there cannot be a doubt that a plenty of inferior stuff will find its way into the market, particularly as, from its very recent introduction, the farmers can scarcely be considered judges of the real from the manufactured.

Then follows a series of experiments with Lance's carbon, Poitteven's and Clark's composts, and the urate of the London Manure Company. Speaking of the first of these manures, he says, that very considerable quantities of Lance's carbonized manures were used in the county about two or three years since; and in justice to the preparation, he says, that in very many instances it produced a much better crop

of turnips than bone-dust, and at a less expense. We select the following experiment made on Helegan estate, the seat of J. H. Tremayne, Esq., and conducted by the hind, Mr. Reynolds.

The field selected for the experiment was a wheaten arish, with a soil not over rich in quality, and not at all qualified to produce an abundant turnip-crop, as will be seen in the sequel, having a north-west aspect, and consisting of a heavy loam, resting on a subsoil of a fine-grain argillaceous schist. Having been prepared in the usual manner, four equable acres were selected, which were divided into half-acres, and these thrown into ridges, one-half at eighteen inches, and the other half at 27 inches distance. The seed was sown by means of a drill, which conveyed the manure along with it, sowing one ridge at a time. The following table will give the different manures used, and their results:—

Manures.	Width of drills.	Quantity per acre.	Cost of manure per acre, including freight, &c.	Weight of turnips per statute acre.	Value of crop at 8s. per ton.	Difference between crop and price of manures.	In favour of 27 inch or 18 inch drills.
	Inches.		£ s. d.	tons cwt.	£ s. d.	£ s. d.	
Caff—a mixture of fish refuse and earth—mixed . . . . . 2 parts of fish to 20 parts of earth . . . .	27	20 tons.	2 10 0	9 16	3 18 4	1 8 4	
	18	Do.	2 10 0	9 11	3 16 4	1 6 4	
				0 5		0 2 0	27 inches.
Rich dung . . . . . Do. . . . .	27	20 tons.	4 0 0	12 18	5 3 2	1 3 2	
	18	Do.	4 0 0	13 12	5 8 9	1 8 9	
				0 14		0 5 7	18 inches.
Bone-dust . . . . . Do. . . . .	27	2½ qrs.	3 0 0	15 1	6 0 5	3 0 5	
	18	Do.	3 0 0	12 0	4 16 0	1 16 0	
				3 1		1 4 5	27 inches.
Poittevin's manure .. Do. ..	27	30 bush.	3 11 0	11 17	4 14 9	1 3 9	
	18	Do.	3 11 0	10 17	4 6 9	0 15 9	
				11 0		0 8 0	27 inches.
Ammoniacal compost Do.	27	20 bush.	3 15 0	7 4	2 17 7	0 17 5	} Loss.
	18	Do.	3 15 0	8 2	3 4 9	0 10 3	
				0 18		0 7 2	
Lance's carbon . . . . . Do. . . . .	27	26 bush.	2 14 6	11 4	4 9 7	1 15 1	
	18	Do.	2 14 6	10 9	4 3 7	1 9 1	
				0 15		0 6 0	27 inches.
Urate . . . . . Do. . . . .	27	} 26 { cwt. {	4 16 0	7 7	2 18 9	1 17 3	}
	18		4 16 0	10 0	4 0 0	0 16 0	
				2 13		0 1 3	
Clark's compost . . . .	18	26 bush.	3 5 0	11 6	4 10 4	1 5 4	18 inches.

The next experiment we select from Mr. Karkeek's essay, is one made at Carelew, the seat of Sir C. Lemon, Bart., in 1843, for the purpose of testing the relative merits of certain manures when applied as a top-dressing to corn crops. The field selected for giving the whole a fair trial was one with a high open exposure, sloping to the south. The soil is a free light loam, not ex-

ceeding a foot in depth, on a yellow clayey sub-soil mixed with spar. It had been well manured the previous season, and cropped with turnips. After these were removed, it was prepared and sown with barley in the latter part of April. The manures were applied on the 15th of May. In this case, the *tenth part of an acre* was allowed for the experiment.

Kind of manure.	Quantity used.	Price.	Produce.		Average produce per imperial acre.
			Straw.	Corn.	
		s. d.	lbs.	lbs.	
1. Nitrate of soda, sown dry .....	33½ lbs.	6 4	199	178	48 bushels.
2. Sulphate of soda .....	33½	3 0	264	215	45 bush. 6 gal.
3. Guano.....	16½	2 0	280	252	50 do.
4. Sulphate of ammonia .....	22½	3 11	269	232	47 do. 4 gal.
5. Stott's soluble manure.....	12	4 0	288	257	54 bush.
6. Wash from farm-yard.....	100 gal.	....	300	256	52 do. 4 gal.
7. Average of the field.....	....	....	233	200	40 do.

From this table it will be seen that, where the nitrate and sulphate of soda were used, the produce is less than from either of the other applications. From guano we have a large return, considering the small quantity of it used, averaging only 1½ cwt. per acre. The return from sulphate of ammonia is also large. This salt and No. 5 were forwarded to Sir C. Lemon by Mr. G. L. Stott, of Ashley-hill, near Bristol. The sulphate of ammonia is prepared from the refuse of gas-works. No. 5 is probably manufactured in the same way, having a very strong smell of ammonia—one pound to ten gallons of water is the proportion in which it was directed to be used. The return from it was greater than that of any of the others. It appears also from this experiment that the sulphate of soda (which is the common *Glauber's salt*) proved to be nearly as powerful a fertilizer as the nitrate of soda.

This experiment should be tested on other farms, since the sulphate of soda can be manufactured in our country at a very considerably less expense than the nitrate of soda, which is obtained from South America, can be purchased for.

There are a number of experiments with nitrate of soda given in the essay, many of which had proved complete failures. The following is one instituted by Mr. Richard Doble, of Probus; it shews that the nitrate had a very beneficial effect on the wheat crop. On the 20th of April he sowed 70lbs. weight of nitrate of soda on half an acre of wheat; in about a fortnight the effect of the nitrate could be perceived as far off as the field could be seen; the wheat grew considerably stronger and thicker on that part, and at harvest the straw was full six inches higher. Mr. Doble carefully cut half an acre of wheat adjoining for comparison, and the result was as follows:—

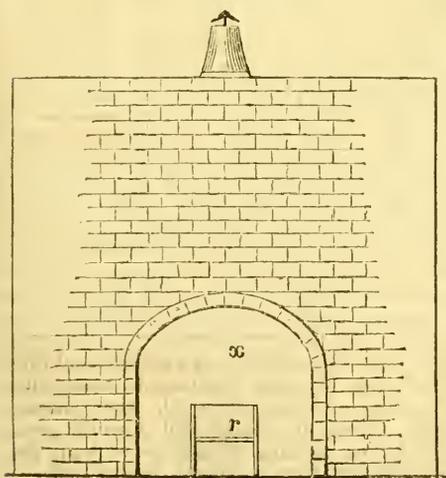
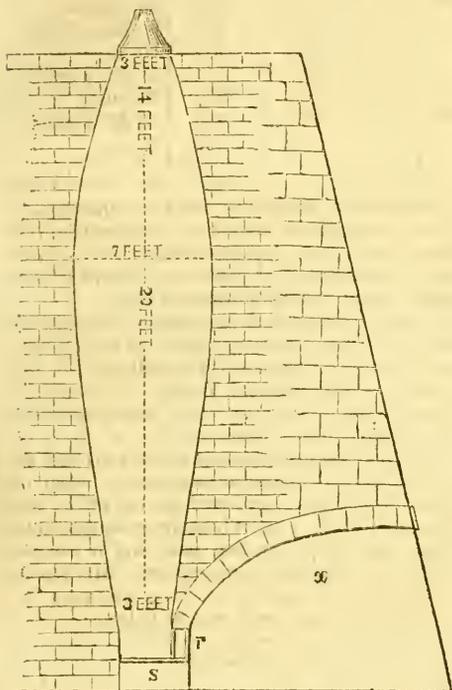
NITRATED WHEAT.			NON-NITRATED.		
	£	s. d.		£	s. d.
60 sheaves, 1,456lbs., at 3d. each	1	6 0	36 sheaves, 857lbs. ....	0	15 0
Straw, 1,192lbs. ....	0	10 6	Straw, 940lbs. ....	0	8 6
19 bushels 1 gallon best wheat, at 7s. 4d. per bushel.....	6	14 9	14 bushels 1 gallon best wheat, at 7s. 4d. ....	5	7 3
7 gallons seconds.....			7 gallons seconds.....		
		8 11 3			£6 10 9
		6 10 9			
Difference.....	£2	0 6			
Deduct value of nitrate, 70lbs., at £1 1s. per cwt., the present price .....	0	13 1½			
Profit.....	£1	7 4½			

After this we have experiments with gypsum, Daniel's patent manure, guano (natural and artificial), &c., &c. We recommend this little publication to the practical farmer who may intend to use any of the artificial manures now so frequently advertised and recommended to his

notice, containing as it does a legitimate and correct account of many experiments made with them—some of them successful, others unsuccessful. Even the failures will prove of great benefit to him, seeming as they do to warn the experimentalists from striking on similar rocks.

## IMPROVED LIMEKILN.

Having represented to Mr. Duffus, the scientific curator of the Royal Dublin Society's Agricultural Museum, that we had received very many inquiries respecting an improved Limekiln, and requested his assistance to enable us to present the plan of one to our readers, he has kindly complied with our request, by sending us a sketch, from which the accompanying wood-cut was prepared, together with the following description.



SIR—The Limekiln, of which I have sent you a sketch, is one of the best and cheapest of those in use at Closeburn. The interior is circular, and the outline, as seen in the sectional elevation, resembles that of the body of a salmon; the diameter at the fuel-chamber is 3 feet—at 20 feet from the grating the diameter is 7 feet, contracting again to 3 feet at the top; and the entire height of kiln is 36 feet, two feet of which are below the grating. There are double cast-iron doors for the fuel-chamber, placed at 9 inches or a foot asunder; the space between being filled with air, the escape of heat is effectually prevented. These doors are at r; they are 3 feet wide by 1½ ft. high. One door of the same size is on the ash-chamber. The grating over the ash-chamber, S, is constructed of hollow bars of iron; the hollow admits a current of air, and prevents the decay of the bars. The bars are 2 inches wide, 3 inches deep, and the metal ¼ inch thick. Through the door above the grating, the burnt shells are withdrawn; through the door below, the lime-ashes are taken out.

Besides the air admitted through the ash-chamber, there are side openings for additional supplies of air, and by means of which the draught may be regulated. This is an important object to keep in view; if the draught be too strong, the limestone is apt to be vitrified. To save the expense of doors, the side-openings may have stones fitted to them, to be put out or in at pleasure. X is the covered area under which the lime lies to cool, and carts are loaded; it is 12 feet high, by 10 feet wide at the mouth.

The internal masonry of the kiln should consist of fire bricks; the masonry in front may be either brick or stone.

The kiln, of which you have here a sketch, is built on the side of a bank, which is always the most convenient site when the nature of the place affords it. A bank beside a limekiln is, in fact, a machine erected and worked without cost, inasmuch as it saves the inclined plane, or tackle, that would be necessary if the kiln was built in the midst of a plain.

The kiln is furnished at the top with Booker's conical cover; it turns on a pivot in its periphery, and rests on a curb-ring fixed to the masonry. It is 3 feet in diameter at base, and 3 feet high, with an opening of 1 foot at the top. Over this opening, Menteth places a lid for regulating the draught, or for keeping out rain; instead of which, I would add to the conical cover a small iron *umbrella*, that might be screwed up or down at pleasure. This I have sketched in the front elevation. It is necessary to put on the lid of a rainy day, at a time, perhaps, when the greatest draught of air is required. The umbrella cover would have this advantage—it would admit of a great draught, and yet effectually exclude the rain.

A kiln of this construction possesses many important advantages. Some of these advantages will be readily seen by an inspection of the sketch. The double doors, by confining the air between them, economise the heat—an object, towards the attainment of which, the shape and proportion of the entire structure greatly contributes.

The cover keeps in the heat, and keeps out the rain. When the rain is freely allowed to fall on the kiln, it wastes the heat, and also the space, by slackening the lime.

As respects the useful effect, Mr. Menteach says, (*Highland Soc. Trans. vol. viii.*)—"These narrow kilns admit of their being drawn out of them every day, if fully employed, more than two-thirds, or nearly three-fourths of their contents of well-burnt lime, and afford fully three of line-shells for one measure of coal, when large circular kilns will not give out more than one-half of their contents every day, and require nearly one of coal for every two measures of lime."

I have not attempted to give you an estimate of the expense, as that can easily be done by any builder in the locality where a kiln is intended, who must, of course, know the expense of fire-bricks, workmen's wages, &c., in that locality. Suffice it to say, that a kiln of this construction will be found one of those things that soon affords abundant remuneration for the original outlay.

I remain, &c.

J. DUFFUS.

12th Feb., 1844.

#### TENURE OF LAND.

At a late meeting of the Farmers' Club at Ruyton-of-the-eleven-Towns, Shropshire, the subject for discussion was the following:—

"What is the best system of tenure of land, having due regard to the interests of the landlord, the tenant, and the community at large, with the view of the best possible state of cultivation?"

On this subject, Mr. Samuel Bickerton addressed the club at considerable length; and as many of his remarks are judicious and important, we lay before our readers the following extracts from his speech:—

"The better the land of this kingdom is cultivated the more abundant will be the necessities of life, and the more *employment* will be given to the labouring class of society. In my opinion it is the bounden duty of government and the legislature to promote, by every proper means, the highest possible state of cultivation of the soil of these kingdoms. But at the same time, I am quite satisfied that that state will never be attained under the yearly system of tenure which is the general custom in the present day, and especially of this and some other counties.

"Every man of prudence, on his taking a farm (having an intention of doing justice to it), would, in the first instance, satisfy himself of the probable security of the tenure. No man of common prudence, having a capital commensurate with the size of the farm, be it large or small, would enter upon one knowing he must quit in a year or two—and what security is there beyond that period in annual tenure? The landlord may die; the land may be sold or exchanged; a new agent may be appointed. And generally in either of these cases the land is taken as it is found. Is

it then at all likely that improvements to any extent will take place under annual tenure? The tenant will keep just within the limits of his agreement. It is a matter of prudence to do so.

"I know there are gentlemen connected with this county, who can boast of families as tenants upon their estates during many generations standing, and whose tenants consider themselves and their children to be fixed for life as securely as if they possessed a lease. But in discussing this question we must consider the tendency of the principle of annual tenure as a system; and take it upon its own merits as such. And in so doing I can come to no other conclusion than that it is bad for both landlord and tenant. For the landlord, because he will not have his land improved to its full extent: for the tenant, because he cannot prudently enter upon those improvements, without which he cannot benefit his circumstances, and keep pace with the times in which he lives.

"I now come to the subject of leases, and I doubt not but many of my brother farmers now present would hesitate in taking a lease at the present rents with the future prospects before them, even if the landlord should not hesitate before he refused to grant one. And I must confess they would prudently hesitate at taking one upon a fixed money-payment. It would be quite a different thing if land was in a state of nature, and the rent, consequently, in the first instance, merely nominal, as was the case on Mr. Coke's estate in Norfolk some years ago, when first brought into cultivation.

"Having rejected annual tenure, as being prejudicial to both landlord and tenant, and questioned the propriety of lease upon a fixed money payment of rent, you will begin to inquire what tenure then do I propose that will give full confidence to the tenant without sacrificing the interests of the landlord.

"It strikes me there are but two modes of attaining this end: either to give the tenant a vested interest in improvements made upon his farm, or a lease upon a corn rent, viz., a rent regulated by the price of grain from time to time.

"There can be no reasonable objection to giving the tenant a vested interest in improvements made upon his farm, upon quitting, if he has not had time during his occupancy to reap the full benefits thereof. If a tenant injures a farm, the common law of the land gives the landlord a claim upon the tenant in the shape of damages. Why not give the tenant a claim for extra improvement—improvement beyond the ordinary course of husbandry? It is well known that I have both publicly and privately long advocated this principle, as founded, in my opinion, in common justice. And it is gratifying to me to see the same principle advocated and taken up upon public grounds by a gentleman of such high standing as my Lord Portman, who last session of parliament, brought in a bill for the express purpose of giving the tenant a *legal claim* upon his landlord (in case of quitting), for any *extra* improvements upon his farm, provided he has not

had time to reimburse himself for his outlay in effecting the extra improvements. I admit there are difficulties attending a system of this kind. There would be difficulty in ascertaining what really was a permanent improvement, and the proper cost attending it; what amount of benefit had been derived; and what amount was still not reimbursed. Improvements in agriculture and the mode of carrying on its operations are making such rapid strides in the present day, that what was considered a great improvement, and judiciously done a few years since, would not be so considered now. I have dwelt perhaps too long upon this branch of the subject; but the principle is founded in justice, and I have advocated it for many years, as necessary upon public grounds. Having thus touched upon different modes of tenure, and stated what appears to me objectionable in each, I will proceed to that which I consider the most equitable both for landlord and tenant, and upon which I was solicited at last meeting, more particularly to give my opinion at this—viz., corn rent, which means rent regulated by the price of corn from time to time. As my neighbours and brother farmers whom I see here are not in general acquainted with the mode of fixing a corn rent, I will first explain it as well as I can to the best of my judgment. It is merely converting the amount of rent into a given number of strikes of grain at a given price. It may be fixed upon one kind of grain only, or upon more than one, and in various proportions. This is merely a matter of private arrangement between landlord and tenant. But this arrangement once made, the rent will afterwards fluctuate according as the price of grain fluctuates. But in general there is a limit, beyond which no reduction of rent takes place, however low the price of grain may be. And on the other hand, no advance beyond a given point in rent takes place, however high the price of grain may be.

“It will, perhaps, tend to illustrate the thing by giving an example. Thus, suppose the rent is £250 per annum, and I will suppose also that sum to be a fair rent with wheat at 9s. per strike of 75lbs., and barley 5s. per strike of 38 quarts, and two-thirds of the rent fixed upon wheat and one-third upon barley. It will then stand thus—

364½ strikes of wheat at 9s.	£166 13s. 4d.	}	£250
333½ ditto barley at 5s.	£83 6s. 8d.		

Thus the rent in future would be the value of the number of strikes of each kind of grain as here stated, to be paid for according to the Gazette prices. If the price at market ranges for wheat below the price specified in the averages in the London Gazette, then the rent will be lowered accordingly upon that proportion of rent fixed upon wheat; and if, on the other hand, the price of barley ranges higher than the price specified, that portion of the rent fixed upon barley would be raised accordingly, and *vice versa* in continuation for the term agreed upon.

“I have named a part of the rent as fixed upon barley; and if in any part of it is fixed upon barley, I think the proportion I have stated to be a fair one; it certainly ought not to be in a greater

proportion. Take a barley district. You could not, under a proper course of cropping, grow more acres of barley than wheat, and although you may grow more strikes per acre of barley than wheat, there would not be more strikes brought to market. There would be more seed required, more loss from damage in harvesting, and more loss in the various subsequent processes. Besides, it is only the *malting* qualities that would be brought into the averages. The damaged and inferior qualities would be consumed at home, and consequently would not find their way into the Gazette. But although I have named a portion of rent as fixed upon barley, I by no means think any portion ought to be fixed upon that or any other kind of grain except wheat. Wheat is an article of universal consumption in all civilized countries. It is the staple article of produce. It is an article, the price of which influences the price of all other farm produce. It regulates the price of labour. It influences the manufactures of the country, and our commercial relations with other countries. It affects the price of gold itself, and consequently the issues of the Bank of England, and all other banks of this country. Therefore, I am decidedly of opinion that the rent ought to be governed by wheat alone.

“Having thus explained the nature of a corn rent, and given my opinion as to what kind of grain ought to govern the rent, and my reasons for that opinion, I will just observe, that the rent may be too high or it may not, with a corn rent, as well as upon a fixed money payment. The number of strikes of corn may be too many, according to the quality of the land, or the price at which it is fixed may be too low. This is a matter of private arrangement. But I will suppose an arrangement upon this point is fairly made. Still the principle of a corn rent is worth nothing without a lease; and I should say a lease for not less than twenty-one years.

“There are many improvements in agriculture that require a great outlay of capital, and many years before that capital can be reimbursed. There is scarcely an experiment connected with the cultivation of land, but requires several years to determine its utility. The late Earl of Leicester (when Mr. Coke) laid it down as a maxim, not to give a decided opinion upon any point of the kind without first having had three consecutive years of trial. So much depended upon the seasons in this changeable climate. My Lord Portman, in the bill I have alluded to, proposes to give the tenant a claim for improvements made, if he quits his farm in less time than twelve years after the improvements have been effected.

“In discussing this question, we should take it upon the broad principle of equal justice to both landlord and tenant, and therefore, perhaps, as the system has not been in general practice, there may be no impropriety in having a revision as to the price of corn periodically—say every seven or eight years—more especially when we consider the difference of opinion existing upon the question of the corn-laws, in the leading

characters of the two great political parties of this country, and who, to all appearance, seem determined to push their several interests upon this, to the farmer, all important question.

"Before I sit down I would just observe, that it is my firm opinion, that if this principle of tenure were carried into general practice, there would not be a labourer out of employment or a bushel of foreign grain wanted to supply our growing population."

## LECTURE ON ORGANIC CHEMISTRY,

IN ITS APPLICATION TO PHYSIOLOGY, AND THE REARING AND FEEDING OF ANIMALS. BY MR. KARKEEK.

*Delivered at St. Austell's Farmers' Club, Feb. 22.*

Mr Karkeek commenced his lecture with an account of the principal elementary substances, such as carbon, hydrogen, oxygen, nitrogen, sulphur, phosphorus, with a few of the alkaline, earthy, and metallic bodies of which all organized substances were composed, showing how these, moulded into being, by the hand of creative wisdom, and endowed with the mysterious and incomprehensible principle of life, became converted into the endless race of animals and vegetables. There was this difference, he said, in the assimilating powers of vegetables and animals, that a plant could grow at the expence of the elements by which it was surrounded, where no living substance ever previously existed; but animals, on the contrary, could only exist upon matter previously organized, either by plants or other animals. The lecturer then showed how, by the union of those simple elementary bodies, according to certain laws which he briefly explained, proximate elements were formed, which were divided into two groups, the azotised, and non-azotised — vegetable fibrine, albumen, casein, animal fibrine, albumen, casein, constituting the first group, and fat, gum, sugar, starch, &c., constituting the latter. In the first there were four of the ultimate elements, whilst in the latter, only three, the presence or absence of the azote or nitrogen constituting the difference. He then went on to show that vegetable and animal fibrine, albumen, and casein, were composed of the same ultimate elements, and in fact were identical in their chemical composition. This fact he illustrated by a number of tables, containing the analyses of these different substances, by Playfair, Boussingault, Liebig, and others. He then explained some of the laws vital and chemical which regulated the metamorphoses of these elements, and of the interchange of atoms which occurs between the blood and the structures in the process of nutrition, plainly and distinctly showing the farmer, that in the rearing of young animals, substances rich in nitrogen, such as peas, beans, oats, barley, &c., these articles of diet, containing a large per centage of albumen, are particularly required for the growth of the va-

rious parts of the body. In the rearing of horses, in particular, where the object is to produce a great development of muscle, the young stock should be sufficiently sheltered in the winter, and have a fair allowance of hay, oats, peas, &c., which contain from 8 to 20 per cent. of albumen, and it was from the want of these requisites that so many thousands of horses are yearly rendered altogether worthless. The young animal, he said, is placed in our globe tolerably perfect from the hands of the Creator, but its degeneracy is frequently owing to the treatment pursued in the rearing. Only compare a yearling colt that has been well housed and properly fed during the winter with one that has been turned out and exposed to the weather, and fed chiefly on hay, straw, and turnips, the two latter articles containing little more than 1 per cent. of the fleshing principle, and good hay containing 8 per cent. of albumen, and although equally fine and clear in their respective points when separated in the autumn, yet they will bear no kind of comparison, either in size or beauty, in the spring. Again, pursue the same plan the following winter, and you fix the shape for life — the one a handsome, clean grown, muscular animal, the other a coarse and plain one. It is by proper feeding, he said, and a proper degree of shelter given to the young stock during the first three winters especially, that some horses are got to such high perfection, as we sometimes see them, having clean limbs, large powerful muscles, and good action; for had those identical colts been kept hard, and exposed to the weather, they would never have attracted any attention. In the rearing of breeding cattle, he said, the same method of feeding was desirable, since the object of the breeder was not to obtain fat, but muscle, in which the weight of flesh, strength of constitution, and the capability of propagating their race chiefly depended; whilst in rearing of *store* cattle the same care is not required, the object of the feeder in this instance being to obtain as much profit as possible from the food which the animals consume, substances containing fatty matters, such as Swede turnips, straw, &c., answering the purpose. But even in this case he wished the farmers to particularly understand that nearly the whole of the fleshy part of an animal which will afford any profit to them, is assimilated chiefly during the period of its growth, which depends on its age and breed; the addition made to its bulk afterwards is chiefly an accumulation of fat which surrounds, and is intermingled with the substance of the muscle; and as the animal body is incapable of producing an elementary body, such as nitrogen, out of the substances which do not contain it, it obviously follows that the larger the per centage of these elements contained in the food, the greater will be the growth of the animal. Hence the object of the farmer is, to force on his stock during the period of their growth by such kinds of food as will produce the largest quantity of muscle at the least expense. This part of the lecture was illustrated by a table, which showed, at a glance, both the fleshing and fattening properties of various kinds of food contained in an

acre—either of beans, peas, oats, hay, potatoes, carrots, Swede turnips, wheat straw, oat straw, and barley straw, &c. With reference to this table, he explained that although the per centage of albumen, gluten, and casein, the fleshing properties of food, appeared to be exceedingly trifling in the turnip when compared with that of peas, beans, or barley, yet the immense weight of these roots which could be grown on an acre, frequently as much as 40 tons, gave a much larger quantity of albumen than any other crop. Thus an acre of peas, calculating 25 bushels to the acre, will give 380lbs. of this substance, whilst an acre of white turnips, calculating only 20 tons to the acre, gave 6,000lbs. The Swede yielded a larger proportion of albumen than the white turnip, so that these roots might well be called the raw material for the manufacturing of beef. He then went on to show how the carbonaceous kinds of food, such as turnips, hay, carrots, &c., might be economized on a farm. Animal heat, he said, was the produce of the union of the starch, gum, and sugar, contained in the food, with the oxygen of the atmosphere in the lungs; and the amount of nourishment required for any animal would depend on the quantity of oxygen consumed in the system in this manner. In the winter months the air being more condensed than in the summer, the same volume of air in the winter contains a larger volume of oxygen gas than in warm weather when it is more rarified; hence a larger supply of food is required, to keep up the proper temperature of the body during the cold weather. In this respect the lecturer compared the animal body to a room heated by a furnace, which in order to be kept up to the same degree of temperature at all times, and all seasons, the furnace is required to be supplied with fuel accordingly. So with the living animal; if the vital functions are to be maintained alike at all seasons, the heat of the body must be maintained by a proper supply of food, and this might be done, he said, in either of two ways—by adding fuel to the living furnace, which is food, or by protecting its body from the cold, in which case a less quantity of food would be consumed. This part of the lecture was illustrated also by tables. The want of space prevents our giving this lecture at greater length.

At the conclusion, some conversation arose on subjects treated of in the lecture. In reply to the chairman, Mr. Karkeek said, it would be economical, with respect to milch cows, to carry their fodder to them, particularly in winter; and in summer, if they were taken into the straw yard, and there fed on roots and grass, they would yield a greater quantity of milk than if turned out to search for food themselves. In reply to Mr. Drew, Mr. Karkeek said he certainly wished farmers to understand that protection from cold was equivalent to food. Mr. Wheeler asked if the quality of the meat was equally good, and Mr. Karkeek replied “there could be no doubt of it.” Mr. Karkeek proceeded to observe that his remarks on the economy of stall feeding were only

intended to apply to stock intended for the butcher. He had always endeavoured to show the mischievous consequences of fattening *breeding* cattle. Mr. Karkeek spoke further of the necessity of young animals having a proper amount of exercise for the development of their muscle. Mr. Prater wished it were possible to impress on the Cornish farmer the necessity of obtaining an improved breed of horses, and spoke in approval of the Yorkshire mode of breeding. The breeders there bred from fillies of two years old; and thus got two colts from them before they were brought into work at four years old. A fine breed of horses was thus obtained, the produce of mares when young, and before broken by work. In Cornwall, and not in Cornwall only, the young animals were crippled by injudicious treatment before they came to maturity. They were put to work at two or three years old. He thought it would be advisable to take two colts from the young mare before she was put to work, as in Yorkshire, from which county some of the finest horses were produced.

Mr. KARKEEK said he believed there was, at present, a miserable set of trashy horses, not only in Cornwall, but throughout England. There were, perhaps, as many good horses now as there were 50 years ago, but the number of bad ones had greatly increased. M'Culloch had stated there were 1½ million of horses in Great Britain; and he (Mr. K.) believed he should not be far wrong in affirming, that two out of every ten were not worth the food they consumed (*hear*). He believed, also, that 8 good horses would do more work than 10 bad ones. (A member called out “more than 20.”) He had taken the lowest possible calculation. If, by an improved system of breeding, and the introduction of better horses, they could get rid of only one horse out of 10, there would be a saving to the country, in the rearing only, of more than £2,000,000 a year (*hear*), reckoning the cost at £5 a year. And an equal amount would be saved annually after the rearing to 3 years old, supposing the cost of keeping the horse to be £15 per annum. In reply to Mr. Prater's observations, Mr. Karkeek gave it as his opinion that a two years old filly was too young to breed from. Her powers were not properly matured. He thought they ought not to breed from a mare under three years old. With reference to the Yorkshire horses, Mr. Karkeek said that at the last meeting at Doncaster of the Breeding Society, they boasted of their having the best sheep and cattle in the world, but actually acknowledged that their breed of horses had deteriorated during the last 50 years.

Some conversation followed between Mr. Geach and the lecturer, on the ventilation of houses for stall feeding sheep, and on the modes of drainage; after which Mr. Shilson proposed the thanks of the meeting to Mr. Karkeek for his interesting and valuable lecture. The motion was agreed to with acclamation. Mr. Karkeek briefly returned thanks, and the meeting separated.

ON THE SUMMER-FEEDING OF FARM-HORSES.

At a recent meeting of the Chepstow Farmers' Club, the subject for discussion, "The best method of summer-feeding farm-horses," was introduced by Mr. J. Sandford, of Mountain, who read a paper from which we extract the following :—

"The best and cheapest method of keeping farm-horses through the summer, is to feed them on lucerne. You will be enabled to cut the lucerne three or four times through the summer ; so that I think two acres of land, of middling quality will be sufficient to keep four horses five months in the summer ; and I should give the lucerne to the horses out of doors ; I mean in cribs, in a fold-yard where there is a shed, instead of in the stable ; this being, I think, more healthy for the horses, and it is less trouble also. I prefer lucerne to any other summer food, knowing it is quite as good, or better keep than vetches, and it is also much cheaper ; and when you have once got a fair plant of lucerne, it is much more sure than vetches, the winter or slug sometimes destroying the vetch crop, but not the lucerne. Lucerne will last in the same land twenty years in as great vigour as ever, mowing three, and sometimes four, times in a season. Its cheapness will be evident from the following calculation. Take four acres of middling land for vetches, which I consider equal to keep four horses five months. Now I shall charge two of these acres at half the full rent, &c., because the vetches will be off in time to sow turnips, and the other two acres I shall charge at the full rent, being too late to sow turnips ; and I shall take two acres of lucerne, which I consider equal to keep four horses five months, the same quality of land, and at the same price per acre :—

	£.	s.	d.
Two acres for vetches, including rent, tithes, and taxes, at 30s. per acre..	3	0	0
Two ditto, ditto cleared for turnips..	1	10	0
Seed for four acres, 10 bush. at 7s...	3	10	0
Sowing and harrowing four acres at 5s .....	1	0	0
Cutting four acres.....	0	8	0
	9	8	0
Per horse for five months	2	7	0
<hr/>			
Two acres for lucerne, including tithes and taxes.....	3	0	0
Cutting three times, 2s. per acre....	0	12	0
Allowance for seed per year .....	0	4	0
	3	16	0
Per horse for five months	0	19	0"

The discussion then turned on the best manner of cultivating lucerne. Mr. John Sandford and Mr. Hall advocated the broad-cast system—one

of the reasons being, that they consider hoeing likely to injure the crown of the root, which in this plant spreads considerably after the first year, and sends up shoots all round ; and, provided the land is clean when the lucerne is shown, they think that it is likely to thrive better for any little surface grass that may come among the plants, as this tends to keep the ground cooler, which is preferable to exposing the surface of the soil to the hot summer sun. Several of the members stated they had tried manure on lucerne without any apparent effect. Mr. Hall manured two ridges with guano, last summer, at the rate of two cwt. to the acre, but there was no visible effect produced on the lucerne plant.

COLONEL M'DOULL'S (OF LOGAN) GALLOWAY STOCK AND IMPROVEMENTS.

'This is truly a remarkable age for agricultural inquiry, discussion, and improvement. Some time ago we took, on several occasions, some hasty glances at a few of the changes and improvements on Culhorn Farm ; then we adverted, in the preceding introductory notice, to some of Sir John M'Taggart's farming operations ; and now we have briefly to allude to Col. M'Douall's excellent Galloway stock and agricultural improvements, which, too, stand pre-eminent, and as such are well worthy of the consideration of the enterprising agriculturist. In going over to Logan Home-farm, some time ago, we had the good fortune to be accompanied by Sir John M'Taggart, whose attention, and whose experience and judicious opinions in such matters we cannot well over-estimate. In proceeding from Ardwell, and entering upon the pretty access through the wood which stretches along the bank, jutting out on the Bay of Luce to the right, you are faced by a verdant pasture field rising into a gentle hill ; the picturesque scenery, the Ardwell woods, mansion, and old Pictish camp, to the right in the distance, forming altogether a pleasing landscape. The green hill here mentioned is part of Auchness, farmed by the factor of the estate, Mr. M'Culloch—a practical agriculturist of tried ability, and one who studies to apply the principles of philosophic husbandry to the common sense purposes of that useful art. Mr. M'Culloch's own farm shows farming none need be ashamed of. We then proceeded through a level tract of land leading towards Logan mansion-house, and which seems to be good. It has a good face on it ; but naturally, and before recent improvements made on it by the present proprietor, we understand this land was in a comparatively worthless state. It has been levelled, ploughed, part trenched, and the whole subsoiled at much expense ; and forms now a pleasant access, instead of being an eye-sore on the approach to the family mansion. One of the fields, forming part of this flat, was in course of being fed off with a goodly lot of Cheviot wadders and cross-bred hogs in good condition. The crop was a good and sound

one, considerably above the average, showing good management, cleanness, regularity of drilling, and very superior care in properly thinning of the plants. With a black and apparently inferior soil, they were, in fact, a superior crop. We then proceeded to an outshed or feeding-house, alongside the turnip-field and in which there was a large lot of heavy cattle, partly Galloway and partly crosses. Every justice seemed to be doing to them; and we doubt not that, ere long, with abundance of good keep, and the bone and bulk of such cattle, this lot may be turned out to the tune of 15*l.* or 16*l.* a-head—a good price for three-year-olds in these depressed agricultural times. But we hurry on to the Logan Galloway prime cows, prime queys, prime fat bullocks, prime two-year olds, prime calves, and finally the extraordinary Galloway bull of March, 1843; these were all leisurely shown to us by the intelligent and attentive grieve, Mr. M'Kie. The three-year old bullocks, five in number, were exhibited at last Rhins of Galloway show of stock, and of course carried off the prize. They are greatly filled up since then, are kept in a fine sheltered but open covered shed, fed with abundance of good cut turnips, hay, &c. They are prime fat all of them, greatly improved since they were in Stranraer, sleek, docile, and thriving. They allowed us to handle them as quietly as a Newfoundland dog would. They are intended, we believe, to be kept for some time; and yet we should not be far off the mark in stating them each from 90 to 100 stones in weight. In point of symmetry, countenance, thinness of hide, softness of hair, as well as weight, there are among the five three magnificent animals, two of which, at least, we mistake much if they do not show themselves—and most creditably, too—for Wigtownshire at the Highland Agricultural Society, to be held in Glasgow, in autumn. Such animals form the subject for salutary study. They show a fine kind of cattle, which ought never to be allowed to decay or become extinct in Galloway. Whether pure, or as in the first cross with other excellent kinds of feeding stocks—the short-horn, the Ayrshire, the Highland, or the best Irish cattle—sure we are that a cross, with pure Galloway cattle, will be found to be a staple commodity, if properly fed from youth to—say, two rising three year old; and in this way, when well fed off, will pay the farmer well. The pure breed of the Ayrshire is also a very excellent and profitable kind of cattle to encourage, both on account of dairy and crossing purposes, to feed; and we are glad to see Mr. M'Bryde, of Balkerr, introducing the breeding of the best short-horned kind of cattle for the same purpose. Judicious crossing to feed is—now that long-kept and long-fed cattle will not pay—matter of the first consequence; and to our mind it cannot be matter of any difficulty in the Rhins, or in the Machers of Wigtownshire, to obtain good crosses, provided the pure breeds of the Galloway, the short-horned, and the Ayrshire, are attended to; and provided the

farmers extend their turnip husbandry, consuming one-half of that crop upon the land, and the other by their young and stall-feeding cattle. The whole of the Rhins is well adapted for such a system of management, and we say so without disparagement to several excellent farmers, who clean, cultivate, and manure their land so well and heavily that they can afford to lift large crops of potatoes off their lands, and wheat thereafter, in such excellent tilth and richness as to grow heavy crops of wheat. Where such tillage can be followed—which, however, is the exception, not the general rule—of course it will pay the tenant best, and yet keep the lands in good cropping and grassing condition. This, however, we consider all but impracticable, except where such tenants have access to large quantities of good and cheap sea-wreck; and whether such vegetable and marine manure is, in fact, cheaper than guano or bones, when used with farm-yard dung, is a matter which greatly depends upon the lasting or permanent nature of these portable manures. But we digress from Logan cattle, and must, return. Our space meantime, however, suggests that our further facts and details should form a future sketch.—*Dumfries Times*.

Calico printers, for a long time, have used the solid excrements of the cow, in order to brighten and fasten colours on cotton cloth. This material appeared quite necessary, and its action was ascribed to some latent principle or material derivable from the living animal. But since the action of cow-dung was known to depend on the phosphates contained in it, it has been completely replaced by a more cleanly mixture of certain salts, of which the most prominent is *phosphate of soda*. So, in medicine, for many centuries, the mode of action or the active principle of all remedies was veiled in obscurity; but now these principles have been presented to the world in an extremely active and concentrated form. The extraordinary efficacy of Peruvian bark in the cure of fever, is found to depend on a minute quantity of a crystalline substance termed *quinine* contained in it. The inhabitants of Savoy are much infested with the disease known amongst us as “Derbyshire neck.” They have springs which are famous for its cure; we derive benefit from the use of burnt sponge. Now, burnt sponge contains iodine; and, upon examination, these springs contain iodine in small quantities. Apply all this to agriculture, and we may be sure that a time will come when fields will be manured with saline solutions, with the ashes of burnt straw, or with salts of phosphoric acid prepared in chemical manufactories, with as much certainty as now, in medicine, iodine cures the “Derbyshire neck,” or as quinine is substituted for the bulky powdered bark in fever.—*J. A. Smith on Productive Farming*.

### BRAINTREE AND BOCKING FARMERS' CLUB.

The annual meeting of this club was held on Wednesday, Feb. 28th, at the White Hart Inn, Bocking, when the following interesting report was read of the proceedings of the club for the past year:—

The fourth anniversary of the Braintree and Bocking Farmers' Club, having arrived, it becomes the duty of your committee to present a brief report of its proceedings during the past year. And although they feel a pleasure in congratulating you upon the amount of useful information elicited at the monthly meetings, they cannot but express their regret that those meetings have not been so numerously attended as they could wish, considering the practical nature of the subjects selected for discussion. Your committee consider that, the more numerous the expressions of opinions on those occasions, the more likely are the results arrived at to be generally useful.

It being an admitted fact, that more information can be obtained by a mutual interchange of sentiment, in the way of friendly conversation and discussion, than by any other means, and as there are no institutions (but the Farmers' Club,) which afford farmers the opportunity of meeting for that purpose, your committee conceive that these societies deserve the particular encouragement of the agriculturist, as offering to him the means of comparing the results of the several systems of cultivation, and the success or non-success of the various experiments which may have been tried by their members, and by such comparison enabling him to select the most profitable to carry into practice. They also afford the most ready and economical means (by a small advance from their funds), of trying the many experiments which are being daily suggested by the professors of chemical and geological science, some of which have been, and others will, your committee have no doubt, be productive of highly interesting and important results—results which in their consequences will ultimately be as beneficial to the farmer as those of the former science have already been to the manufacturer.

As the present appears to be a most important era in the history of the agriculture of this country, your committee considers it becomes the paramount duty of every cultivator of the soil to endeavour to become acquainted with the means of obtaining the greatest quantity of produce at the least possible expense, believing that, in future, the prosperity of the farmer will mainly and essentially depend upon his adopting the most improved systems of cultivation.

That as affording the means of expanding the mind, and of increasing the knowledge of the practical farmer, your committee believes there are no associations equal to farmers' clubs, which by bringing together persons from different localities enables them to impart to each other, for the benefit of all, a knowledge of the several systems of culture most successfully followed in each

locality, as well as of the various methods of management required on the several varieties of soils.

Your committee believes that the benefits referred to above are but a few of those likely to be derived from farmers' clubs, not only to farmers themselves but to the community generally; and earnestly and respectfully urge upon the members the necessity and importance of a regular and punctual attendance at the monthly meetings, and of exerting themselves to maintain the usefulness and efficiency of this the first society of the kind established in the county.

Your committee annex a summary of the principal discussions which have taken place since the last annual meeting.

First, on "*The best method of laying down land as permanent pasture, and the grasses best adapted for that purpose in this district.*"

This subject afforded matter for a long and interesting conversation, in which many members took part: entering fully into the several methods practised—inoculation, sowing, &c. But few adhered to the old one of sowing rye grass, white clover, &c., except as a temporary layer, but recommended instead, inoculation or sowing a considerable number of those varieties of grasses congenial to the soil. Where good turf could be procured, inoculation was by most of the members considered the best method, and several who had tried it said, that taking the turf from an old pasture, if properly done, did but little injury to it, that with a light dressing of manure and a few seeds (as white clover, &c.) it would quickly become a close sward again. If sowing was preferred or rendered necessary, by an inability to procure turf of a good quality, a member stated that the seeds of many varieties might be collected from the hedgerows and pastures, by employing women and children, at a very little more expense than the purchasing them of the seedsmen. He instanced the cocks foot (*dactylis glomerata*), and the oat grasses (*holcus avanaceus*, &c.) from the former; the meadow foxtail, (*alopecurus pratensis*), the fescues (*festuca pratensis*, *duriuscula*, and others), crested dog's tail (*cynosurus cristatus*), sweet-scented vernal (*anthoxanthum odoratum*.) &c. from the later. These, with a small portion of white clover (*trifolium repens*), and red suckling (*trifolium repens*, var. *minus*), would quickly form a permanent sward. Most varieties of rye grass would disappear in a few years, and leave the land unproductive, until they were replaced by the spontaneous growth of those to which the soil was favourable.

The expense of inoculating was said to be about 20s. per acre for manual labour, while that of sowing could not be calculated at less than 30s.; rendering the former not only the least expensive, but the most certain means of obtaining a pasture containing all the qualities of an old one in a short time, usually in the second season after being laid down. Those members who had tested the two methods uniformly gave the preference to inoculation.

The following resolution was agreed to, as embodying the opinions of the members:—

“That it is the opinion of this meeting, that the best method of laying down land to permanent pasture is inoculation, care being taken to select the turf from the best old pasture; but, if necessary or desirable to sow seeds, it recommends a selection of a considerable variety of those kinds indigenous to the soil to be laid down.”

At a following meeting a lengthened conversation took place upon *the nature and probable effects upon the farmer of the Canadian corn and flour bills*, then recently introduced into parliament. A notice was afterwards given, “That at the next monthly meeting the subject of the said bills be taken into consideration, with a view that the club express its opinion thereon, either by petition or otherwise.”

Petitions against them were, at the next meeting, read and agreed to, and forwarded to the two houses, praying that they might not pass into law.

The next subject, which produced much discussion, was—“*Wheat, its history, cultivation, and the varieties best adapted to this district.*”

This produced from a member a somewhat elaborate paper, entering at considerable length into its history, and showing that it had been cultivated from the earliest ages, but more as an article of luxury than as the common food of man. From a number of quotations which he gave from different authors, your committee select the following from a writer (Gervase Markham, 1648-9) of the middle of the seventeenth century, showing that at that period wheat was but little used in the bread eaten by the common classes of the people:—“For bread for common use, take of barley two bushels, peas two pecks, wheat or rye one peck, and malt one peck; these to be ground together and put through a meal sieve,” a mixture consisting of, at the most but one twelfth part of wheat. Since which time, it appears that that grain has been gradually superseding the others, until it has become the only one used for domestic purposes, excepting in a few places in the northern parts of England and in Scotland.

He then entered fully into the various modes of cultivation practised in different countries; the several ways of wetting or preparing the seed, sowing, &c. &c., quoting those followed by Lord Western, the late Lord Leicester, &c., and giving as his opinion, that from one to two bushels of seed per acre were sufficient for most of the land in this neighbourhood, varying the quantity a little, according to the condition of the seed and the state of the land.

The kinds or “varieties best adapted to this district,” which he mentioned, were the Syer, the Smoothy’s, and the Golden Drop, Reds, and the one-eared or Russell, and the Harcastle Whites, as those with which he had been most successful. Of the Spalding and one or two other new varieties he had heard good reports, but could not speak of his own knowledge of their productive

qualities. He strongly recommended change of seed and sowing pure stocks, in preference to mixtures, and concluded by quoting the subjoined remarks, with which he stated he fully agreed:—

“No sub-variety ever continues long in favour, nor is it fitting that it should, as degeneracy soon takes place, and a better is sought for as a successor. Hence, the only recommendation that can be given as to the choice of sub-varieties, is to select the best from those in use among the best farmers in the given situation or nearest well-cultivated districts.”

Several other members stated their opinions, and the results of their experience, and one member made several observations upon the practice of “thinly sowing,” so strongly advocated by a Mr. Hewett Davis, and observed that he had seen Mr. D’s crops, but that the opinion he formed of them was not sufficiently favourable, either for him to adopt it himself, or to recommend it to his brother farmers, further than a small piece by a way of trial.

The following resolution was suggested and agreed to:—

“That in the opinion of this meeting, from one to two bushels of seed per acre is sufficient, for most of the land in this neighbourhood; that the ‘varieties best adapted to the district are—red wheats, the Syer, the Smoothy’s, and the Golden Drop—and of white, the One-eared or Russell, and the Harcastle;’ that several of those newly introduced are worthy of a trial; but that more ‘thinly sowing’ is an experiment which requires further proof of its reported advantages, before it can be generally adopted.”

The last discussion to which your committee refers, was—“*On the disadvantages of small enclosures and hedge-row timber.*”

This was briefly opened by a member, who stated that he considered it one which required the most careful and attentive consideration of the club; that it was one of great importance, not only to landowners and their tenantry, but also to the community, inasmuch as “small enclosures, and hedge-row trees” rendered the farmers’ crops much less productive than, with the same expenditure of labour and manure, they would otherwise be, hence increasing the cost of production, and enhancing the price to the consumer. The immediate interest of landowner and tenant might perhaps be adjusted by a diminution of money rent, but the injury to the public was still left unredressed. He thought that if it was fairly shown to landowners, by a careful statement of facts, that the profit which they derived from hedge-row timbers was very trifling compared with the disadvantages to their tenantry and the community, many would be induced to remove them. In many instances where, from various causes, landowners were prevented reducing their rents to meet altered circumstances and prices, they might very materially benefit their tenantry by removing useless fences, &c., as well as improve their estates. He was not desirous of

seeing the country entirely denuded of timber: there were mostly places on a farm where it might be raised, doing but little injury, but he preferred having a portion set apart and planted for that purpose.

A member stated that he considered that where enclosures were small and the trees numerous, a crop of wheat or barley was deteriorated to the extent of eight bushels, or one quarter on ten acres, which, taking the wheat at 50s. per qr., and the barley at 30s., made 80s. on the two crops, or, in other words, an additional rent of 2s. per acre. He, in calculating the value of a farm to hire, always made that difference. He believed that many landowners would, if the disadvantages of useless fences and hedgerow trees were fairly pointed out to them, consent to their being removed. He thought it might easily be shewn that the additional rent which a tenant could afford to give was more than equal to the annual value of the growth of the timber. He considered the estimate he had made a fair one. He did not wish to state the injury done more than it really was. On estates where the enclosures were very small, and trees much encouraged, he was aware the injury was much greater. He should decline such farms altogether, at any rent.

Several members considered 2s. per acre a very low estimate of the injury done by hedge-row timber on many estates.

Small enclosures, it was stated, might be necessary previously to under-draining being so much practised, but were now very detrimental, not only to corn crops but to stock, the hedges and trees attracting sheep and cattle by their shade in summer, and causing an accumulation of their droppings where they are not required, besides encouraging flies, &c. In open countries the fly or maggot in sheep was scarcely known. On fair sized heavy-land farms, fields ought not to be less than from eight to ten acres, and on the lighter lands from twelve to twenty acres. It was further observed that, in addition to the preceding disadvantages, in a low flat situation, with small enclosures surrounded by hedge-row trees, it was very difficult to get the corn dry in harvest; that corn was frequently injured from that cause, while those who farmed more open and exposed lands, were enabled to carry their crops unharmed.

The late Mr. Comyns Parker discouraged hedgerow trees, and recommended a portion of an estate to be set apart for the growth of wood and timber, if the proprietor was desirous of growing them. Woodland timber, was of much superior value to hedgerow for all purposes.

Some further conversation then took place upon the subject, after which the discussion was adjourned until after the annual meeting, to afford further opportunities for the members to express their opinions upon it, before coming to any resolution.—Feb. 28th, 1844.

Mr. W. Fisher Hobbs was elected President for the ensuing year, and Mr. Beddall, vice-President; and a vote of thanks was passed to Mr. Baines for his services in the past year.

## THE DINNER.

At half-past three, between thirty and forty gentlemen sat down to dinner in the Assembly Room, Mr. John F. Baines in the chair; and there were present Messrs. W. Low, James Beadel, W. Hutley, W. Fisher Hobbs, William Hobbs, H. Hobbs,—Piggott, O. Johnson, E. Woolmer, Foster, F. Smoothy,—Nunn, Morris, Baker, Rhodes, S. Lungey, Firmin, Taylor, &c.

After the cloth was removed,

The PRESIDENT gave the usual toasts.

On "The health of the Committee" being given, Mr. Low's name having been coupled with it, he rose and said:—When this society was organised a few years ago, I certainly did anticipate highly beneficial results from it, but I regret to find that as the novelty of the society ceased, the members became lax in their attendance and lax in their exertions in referenc to it. This circumstance I particularly regret, because I am convinced of the importance and the real necessity of societies of this description. You could not suppose that a slight acquaintance with a society like this could be of any real good to you. I always supposed that the utility of farmers' clubs resulted from practical association and practical conversation on the subjects brought before them for discussion; but I know many were led away with the erroneous idea that if they attended a few of our meetings they should be at once informed of all subjects connected with agriculture (*Laughter*). Gentlemen attended well for the first few meetings, and they entered into the spirit of the thing; but if a dry subject was proposed, or if the discussions did not meet their notions of the thing, they absented themselves from the meeting. I do not think that argues well for their good sense (*Cheers*). I am disposed to think that if ever there was a moment when it became the duty of the farmer to awake from his lethargy, that moment has now arrived (*Cheers*). We find that knowledge has progressed largely in the world—we find that the manufacturer has resorted to every method that ingenuity and skill can devise to produce something that shall astonish the world—we find that the mechanic and others are doing the same in their respective callings—we find that the scientific man, too, is giving to the world the result of his interesting and important pursuits; and is the farmer to remain as a drone in the human state—is he to rest on his oars, while all other classes are doing everything they can to carry out, in the best possible way, their concerns and occupations? (*Cheers*). But I rejoice in the fact that circumstances which have lately occurred have shown us that the farmer is not altogether asleep at the present moment, and he appears to me like a beautiful butterfly that has just come out of its chrysalis state of inactivity, and is flitting in the sun-beam of a May-day morning (*Cheers*). He is showing to the world that he is not what men supposed he was. I trust the farmer will continue to manifest that feeling that circumstances have induced him to show to the world. I am

persuaded that the perfection of agricultural art is not yet nearly found out. I am not sure that nature in her all-wise arrangements ever intended that a large proportion of our land should be exposed for a whole year under the influence of the burning sun, the wind, and the weather, without realizing any thing to the farmer—I am not aware whether by scientific research and practical application we may not arrive at that period when what is called a “long fallow” will be altogether unknown. (*Hear.*) To effect this is an important object; and we must pay especial attention to our system of cultivation, to our drainage, to our manures, especial attention to our ploughing, and this must be followed up by manual labour in the tillage of our land, under the secure tenure of a lease. (*Hear.*) I state this because we are met for practical purposes, and these hints may be advantageous. However, it appears to me that if we can have recourse to circumstances of this description we might produce out of England's soils such crops as were never yet known; and can you be pursuing a more patriotic course than that—can you do anything to better your country and your fellow creatures more than bringing out of the land the largest possible quantity of human food? You thus place England in the proud position to produce food enough to feed her teeming population; she would thus feel herself independent of foreigners for a supply of corn, and you place yourselves in a more secure position than by anything you can fortify yourselves with, either by protection or anything else. (*Cheers.*) If the English farmer can do this he is doing not only that which is patriotic, that which is a public benefit, but he is bettering his own condition, the condition of his family, and of his own prospects. England is at this moment placed in a proud position as the mistress of the waves, and the mistress of the world; and if we look at her colonial position—if we go to the vast extent of her territorial boundaries, and see the teeming population over which England's Queen is wielding a peaceful sceptre, I ask you if anything can be more patriotic than to produce the largest quantity of human food out of our own soil? (*Cheers.*) All her Majesty's subjects require feeding; and I greatly admire the state in which England's cultivation now is, for every foreigner who comes here and sees the richness of our fields, our beautiful waving corn, and our luxuriant meadows, must return to his own country with admiration of England's agriculture. (*Cheers.*) How can we carry this out further? It is by practical conversation—by our informing one another of any experiments we may have tried; and how can we bring this to bear better than by friendly associations like this? (*Cheers.*) I think the fundamental principle of farmer's clubs is a wholesome principle. We are unshackled by party feeling or political combinations; we meet solely for business purposes; we have no other object in view than that of communicating information, and endeavouring to enlighten each other's dark and benighted understanding; and if any member is able to inform

another of anything that is likely to be useful to him in his pursuit, then our end is attained. (*Cheers.*) I have known many say they have attended the meetings and did not like the opinions advanced and the views taken of things and therefore they did not come again; but I like to hear a variety of opinions upon a question—I like to hear some hostile to my opinion, for then I can weigh and consider the arguments and the judgments of others, and form my own conclusions on all; and as much may be learned by contrary and opposing opinions, as by those that are in unison with our own. If, for instance, a gentleman told me I followed a course decidedly wrong, if I felt it was right I would follow it still, but if I thought on consideration that it was not right I would not; if he told me that I was never to have a long fallow, it does not follow that I should never have a long fallow. I should exercise my own judgment on the matter; and it is only by comparing conflicting opinions that we can come to that which is right. (*Cheers.*) Therefore I think if gentlemen would come to meetings of societies like this, and do what is important in maintaining them, they would be benefiting the country and themselves. The agriculturists of Great Britain have come out of their hiding places—they have shown they are men of knowledge and practical opinion—they have shown to the world that they know more than people thought they knew. If we look to Essex, where we were called calves and all kinds of nicknames, we find you have shown you are not the men of mean intellect that the world supposed you were. (*Cheers.*) Therefore I trust that agriculture will continue to hold the proud position she is now holding. I cannot bear to see agriculture—the main-stay of England, the main-stay of every country that has attained a high standard in the scale of nations—sought to be injured and trampled on. What was the case with the nations of antiquity, with the mighty empires of Greece and Rome? I find on reading their history attentively that they date their eminence from the success of their agriculture, and the moment they began to neglect their agricultural concerns, from that moment the sun of their glory set, and they began to go down in power and importance. (*Hear.*) It is agriculture that is the mainstay of the world, and I cannot bear to see it sacrificed to manufactures or commerce. I have always thought these interests the mighty ingredients that make up and hold together the power of this empire; I want to see them go hand in hand, each supporting the other; and if we can see a better state of feeling between these parties, then I hope we shall show that each is going on better, and all are prospering more than they are now. (*Cheers.*)

After a few other toasts had been drunk, Mr. I. BEADELROSE said:—A toast has been placed in my hand to propose, and in doing so I must observe, I greatly regret that I could not join you earlier; but such was my attachment to the club, that I made up my mind to be amongst you to spend the heel of the evening; and it is ex-

ceedingly gratifying to me to find ourselves assembled round the old board, at the old time, for the old purpose—and that not a selfish purpose, not to benefit ourselves alone, but to give information to the world at large, and to discuss those principles which bear on the pursuits of life in which we are actively engaged. (*Cheers.*) The toast which I have to propose is one that I am sure you will all drink, because it is one that commends itself to your best wishes and best interests; and when I tell you it is “Liberal landlords and prosperous tenants,” I feel certain you will drink it with as much enthusiasm as you have done any to-day. (*Cheers.*) I think that liberal landlords make prosperous tenants; but I have some peculiar notions on the subject of liberality, and I do not consider that, strictly speaking, to be true liberality that gives everything to the tenants; I call that a judicious liberality that will only let the land to a tenant who will well farm it, and produce from it all that it is capable of growing by a fair investment of capital. (*Hear.*) That would be my definition of a liberal landlord; and when I travel about this country and sometimes find land so bedevilled as it is, I must say, if you have liberal landlords they are not men of that liberality which is calculated to benefit the country. An old friend and neighbour of ours used to say that the only way to make a man a good farmer, was to make him pay a high rent. That is sharp practice; but if you would not farm well with a low rent, I would put a large one on. (*Hear.*) We owe it to all classes—because we are only a portion of the community—to cultivate the land well, and if we do this our objects are attained, for does it not afford employment for the labourers? does it not strip the poorhouses of their inmates?—and will probably give you a profitable return for your capital. (*Cheers.*) I have a great dislike to the apology which is sometimes made for bad farming, that the party has not sufficient capital to farm well. We must be prepared to meet the truth in the face. I ask, would it be any excuse for a shopkeeper to tell us that he failed because he over-traded,—(*cheers*)—and why is the exception to be made in favour of the farmer in difficulties? If the landlord has been too ready to take the highest bidder, and get the highest rent for his land, the tenant, on his part, has been too ready to take two hundred acres, when he had only capital sufficient for the cultivation of one hundred. (*Hear.*) And this is a mistaken course, because I contend that the proper amount of capital judiciously applied to the requisite number of acres, will yield a better profit to the farmer, than when spread over a larger quantity of land. (*Cheers.*) I would advert to one or two observations made by Mr. Low. I gathered from his speech that he was inclined to look with some degree of suspicion and fear on the prospects of this society, and that there is not so much interest taken in its meetings as he could desire. Now in considering this, you should look to the object we have in view, and to the means we take to accomplishing it. The object in view is to secure benefits for ourselves and others. This is an object

which ought to be attended with prosperity. We ought not to find people leaving us when that object is to benefit others as well as ourselves. (*Cheers.*) The means we adopt to attain that object is to meet once a month to carry out our views, by imparting and acquiring information that will be useful to us in our calling. Therefore, it cannot be our object, or the means we adopt to carry it out, that has produced the effect to which Mr. Low alluded, but I am afraid it arises from our apathy as a class, and I am fearful we are not sufficiently alive to our own interests; we are alive to political and exciting interests, but not to those means which, steady in their operation, are certain in their result. (*Hear.*) We have often been told that “knowledge is power;” then why should we not endeavour to possess it? We know that education is spreading her wings, and covering the whole face of society; and we can, most of us, find men in our parishes, below us in station, yet better educated than we are. There is a mastership in mind that will place it in the ascendant; and though you may be able to fill a dung-cart as well as another man on your farm, if you have not more intrinsic knowledge than that man, he will be in the ascendant in the end, and you will be put down. (*Hear.*) You must go with the times. It is not for you now to enquire whether you will educate the people—the people are educated, and if we mean to keep our places in society we must be educated too. (*Cheers.*) This society, then, is what I call an academy for grown gentlemen—(*laughter*),—to teach them their profession, and to give them hints, and supply them with practical knowledge which they cannot get in any other way; for though you might have agricultural schools for them, you would have no scholars. Therefore, it is desirable and advantageous for the farmers who join this club, to attend to give their own ideas, and hear what others have to say as to the practice and principles of their calling. (*Cheers.*) I may be travelling rather out of the way, but I was thinking whether it might not give new life and interest to the meetings of the club, if we could make them of a more popular character; and I throw it out for consideration, whether we could not in the course of the year, have three or four lectures, which any person, whether a member of the club or not, might attend if he pleased. We could, in the course of the year, have three or four lectures on practical subjects, connected with the pursuits we follow; and this might have the effect of inducing many persons who do not frequent the meetings now, to come at least four times in the year. It may be that our meetings come too often, and that parties cannot spare an evening every month; but once in three months, a person must be engaged indeed who could not attend a popular lecture. Agriculture embraces in its circle, and requires a knowledge of all the sciences, and thus a wide scope is afforded for discussion and enquiry: if you go into matters of politics or religion, you cannot talk five minutes without getting angry; but this is not the case with science: and if we confine our objects to that we shall do well, and we shall go on

in the acquirement of sound practical knowledge in that department of life in which we are engaged. (*Cheers*.) I now give you the toast entrusted in my hands with a great deal of pleasure; and I am sure you are not alive to your own interests if you do not give a cordial reception to it. I give you, "Liberal landlords and prosperous tenants." (*Drunk with cheers*.)

Mr. S. LUNGLY proposed the health of their excellent Chairman, when Mr. BAINES said:— I think Mr. Lungley has shown too much partiality, and certainly by the manner in which he has spoken of me, he has made it more difficult for me to return thanks. I have attended the meetings pretty regularly throughout the year; I have felt anxious for the prosperity of the club, for I can see that the united opinion of a body of men like those who form this club is likely to have great weight, not merely in the first instance, but that weight, like a snowball, will become larger as it travels on (*cheers*). I know there are many anomalies in the tenure of land and in other things connected with farming that require alteration; but without good feeling between the landlord and tenant no good can be done (*hear*). I wish to express my opinion on this point openly and fairly, for I consider that an enterprising tenant makes a good and improving landlord; on the other hand, an improving and liberal landlord makes a good and skilful tenant; and if they do not go hand in hand together, agriculture cannot succeed (*cheers*). There are many things that the landlord can do for the tenant. It is not exactly the money rent that the landlord can benefit the farmer by considering; there are many other things that come into the calculation; and the man who keeps a great number of hedge fences and trees upon his estate, is deteriorating the crop of the tenant and indirectly taking a large rent (*hear*). In other instances the tenant is not able to do that justice to the land that he ought to do. It is admitted, that unless stock be well sheltered it cannot be profitably grazed; and, therefore, unless there be a good understanding between the landlord and tenant, and they work together, this accommodation cannot be attained. Yet it may be managed in a very simple way: a few rough poles from the hedge-rows would serve to make sheds, and we know that good sheds for cattle will make a heavy rent lightly felt. I agree that it is the duty of the landlord to give facilities to the tenant for growing the largest quantity of corn, and producing the largest amount of stock; it is the duty of the tenants to endeavour to give effect to the liberal ideas and wishes of his landlord; and I repeat that they must go hand in hand together, or agriculture cannot prosper (*cheers*).

Mr. PIGGOTT. I rise to propose the health of a gentleman who is known to all England, and who has done much to advance agriculture. I allude to Mr. Fisher Hobbs (*cheers*). He has done himself honour as an agriculturist, and he is done additional honour by being year after year elected a member of the council of the Royal Agricultural Society. Observations have been

made as to a falling off of the club, but I see around me all the elements of success—I see old members who are able to guide the young, and I see young members who, I hope, will endeavour to put old heads on their shoulders, and show they feel an interest in improving the farmers in that knowledge that is likely to be useful to them (*cheers*).

Mr. W. FISHER HOBBS. After the flattering manner in which Mr. Piggott has introduced me to your notice, I feel considerable diffidence in rising to thank you, because as your chairman elect, I feel that my exertions in the past year may be taken as a criterion of my future conduct; but since the formation of the club I can conscientiously declare I never absented myself on any occasion when I had an opportunity of attending. I trust that in the future year I shall be a more constant attendant. As you have done me the honour of electing me your president, I shall feel it my duty to attend the meetings, and I take the liberty of urging you to support me on those occasions. You know I am warm and energetic in the cause of agriculture, and I trust you will rally round me and give me that support I shall stand so much in need of. I think the members of the Braintree and Bocking Farmers' Club have a right to meet and express their opinions and to collect information, whether on scientific points or on public matter bearing on agriculture; and I trust that in promoting this object we shall all unite for the common interests of the land (*cheers*). I shall feel it my duty to call the committee of the club together at an early day to decide on the proceedings; I shall propose a plan for selecting the subjects for discussion, and to carry out the proposition of Mr. Beadel, for having three or four lectures in the course of the year. I have some friends who I think will come down and give us such lectures as will be of a scientific and practical nature (*hear*). I think there are many subjects that if fairly discussed and made public would be of great benefit; and I believe if the landlords were aware of the feeling of the tenants they would come forward and assist them more. There was one thing brought forward at the last meeting which cannot be made too public—that is, the disadvantage of small hedge-rows and of hedge-row timber (*hear*). I think the landlords are not aware of the great loss sustained in this way by the tenants and the public at large; and if there was a good practical man to come between the landlord and his tenants and do what was right, they would be in a better state (*cheers*). Unhappily we have often seen that men in London have the management of estates, who know nothing of land, and thus it frequently happens that the landlord is censured when it ought to be laid on the agent. I know a person in that situation who has the management of a landed estate not fifty miles from here, who lets it on leases of four years; and I ask you if the tenant can properly cultivate land on so short a term? At the end of every four years there is some alteration, by which the tenant is put to the expense of £10 or £15, merely by a slight altera-

tion in the lease. I think these are matters we might do good by discussing, and if laid before the public they will do good to the community at large (*cheers*).

Mr. BEADEL gave "The health of their old and tried friend Mr. Lungley," whose exertions in the cause of agriculture were of the utmost service (*cheers*). He would mention one circumstance connected with an experiment Mr. Lungley had been trying, and from which it appeared that by wetting wheat with vitriol vegetation was retarded for a considerable time. This was one point to show that by meeting in these clubs, and thus giving and receiving information, they should arrive at good practical results. Mr. Lungley did not sit at home and think, but he went into his yard and acted, and they knew that they had received from him valuable practical information. (*The toast was drunk with three times three.*)

Mr. LUNGLEY returned thanks, and said, he was a plain practical farmer, who endeavoured to ascertain practical results, and nothing gave him greater pleasure than in trying experiments of this nature. As to the seed wheat alluded to by Mr. Beadel, he found there were 14 days' difference in the vegetation between that wetted with lime or arsenic and with vitriol. He had now experiments going on as to fork cultivation and deep ploughing; and he should like to see some of his young friends try the experiment of rotten dung exposed to the air. He had now some manure making, part exposed to the air and part kept stirring up, and they would have, he hoped, an opportunity of seeing the result. He had also a quantity of straw which he was making into manure without any of the dung of cattle with it, and he thought they would see that it was good for nothing, for he considered that it was what they fed their cattle with that gave the quality to the dung; it was not the large heap, but how the heap was made, whether from vegetables, or corn, or cake, that made it valuable. He hoped they would all come and take luncheon with him, and he should be happy to show them the experiment going on (*cheers*).

Mr. FOSTER said much had been said of leases, and as Mr. William Hutley had been effecting great improvements on a farm he had taken by stubbing up the small hedge-rows, and by deep draining, he thought that gentleman could give some information on the subject.

Mr. WM. HUTLEY said that he was an advocate for long leases, and he had had them on all the farms he occupied; he took this ground, that he never would occupy unless he had a long lease, and it behoved every one to make that stand, for then the landlords would comply. Not perhaps all, for some fancied the tenants must be slaves to them; but where a man had capital he advised him not to deal with such men, for if they went on without a good tenure it was like devouring them by piece-meal. (*Cheers*). He had a feeling of independence that no man should ever subvert—he never cringed to any man; and he was sure if the farmers made a respectable stand, the landlords, if they had any feeling, would make terms

with them. He had followed men that had had tyrannical leases, but he found he was able to obtain liberal leases afterwards. When he lately took a farm he said, "I will give you a good rent, but I must get rid of those nuisances, the small hedge-rows, and hedge-row timber." This was agreed to, and he had been getting rid of it, for he could assure them that 2s. per acre was not equivalent to the additional rent which they indirectly paid by the continuance of these things. It would in the whole make a considerably larger sum, and he was sure if this was fairly made known to the landlord he would give way. They grew timber in the hedge-rows, and what was the use of it? For the elm they could only make 1s. per foot: they could buy Memel timber, if required for repairs, at 6d., and if they did not want it for repairs they could make only 1s. of the elm in the market. In order to break this system up, they must begin with the landlords by making liberal proposals to them, for they could not afford to give the tenants everything; and if they could give the landlord a better rent he would do away with the timber. (*Hear*). He had been adopting deep draining on the farm, and he found it was a little more expensive, while the advantages were most extended and lasting. He believed it would last 100 years, and if any of them were alive to see them eighty years hence, those drains would be as perfect as they were now. Of course he meant if done by a man who knew his business, for it was no use to pick a man out that did not know it; but the man he employed had been in the service of Lord Digby, and was the maker of that nobleman's estate. In one case in his neighbourhood, a gentleman engaged this man to come and look over the work, and employed his own men on it, who kept the drain open, and when the rains came the whole fell in, and it cost him £3 or £4 to get it right again; but this man himself never worked with more than six feet open. He (Mr. H.) was satisfied that draining in this way was the best mode in which money could be laid out; he paid this man £80 the other day; he had a 16 years lease on the farm; the operation drained the strata to the extent of half a mile, and the wells in his neighbourhood had been laid dry. The man charged 4d. the square rod for removing the soil, and he thought he could not do it cheaper. It was worth the while of any person to come and see it, and if they had a piece of boggy land they would find it answer the purpose well.

Mr. LUNGLEY said, for three-score years he had been in the habit of considering the subject of land-draining, and he expected he knew something about it, but he was much enlightened by seeing Mr. Hutley's draining; he was sure it would be a permanent good, and when landlords knew how much their estates were benefited by it, he thought they would come forward and find the tiles. A more practical and more scientific man than Mr. Hutley employed he never saw, and if any of them had land that wanted draining, he advised them to go and look at the work there before they did it.

Mr. BEADEL said, he had an opportunity of seeing the draining, and there was one thing peculiar in it that he thought it desirable to mention; the common practice was to make the drains 32 or 33 inches, without reference to the water; but the principle of this system was to get below the spring, so that all the water ran into this deep drain; be the depth five or six feet this man never considered he did it properly till he got below the spring. He advised them to go and see the principle on which it was done.

Mr. HUTLEY said it was getting below the spring that made its effect so extended.

The PRESIDENT said, he had practised draining on his farm, but if he went twenty feet he should get below the sands or below the water. When he made his deep drains he laid his well dry, and was obliged to sink it lower. It was thirty-five years since he commenced, and he had had occasion to open the ends of the drains where the roots of the trees grew in, and he found they were as sound as when they were put in. He thought tile draining was likely to stand a century or a century and a half.

Mr. W. FISHER HOBBS said, he had seen the draining on Mr. Hutley's farm, and he trusted all of them would take the opportunity of doing so, for it would prove to them the efficiency of the system. Another point of importance, he thought, was having large tiles for draining. There was a habit of supplying small tiles and pipes, but he thought these were not sufficient to carry off the water on all occasions; and he hoped they would take care that tiles were not, for the sake of 1s. or 2s. an acre, used too small. If they were to be a little more careful to have tiles well made, and well burnt, and of a proper size, the drainage would be permanent and more useful. (*Hear.*) Before he sat down he would propose "the health of Mr. Piggott." (*Drunk with cheers.*)

Mr. PIGGOTT returned thanks.

Mr. O. JOHNSON said, as to draining there were two distinct systems, as he could show in the same field, one twenty-two inches deep, to take off the top water; and the other, six feet, to take off the springs. He was told that the tiles he put in for top-draining would, in a short time, become filled with silt, and would be of no use whatever; and as these tiles were now used very extensively, he thought this was a subject that ought to be enquired into.

The PRESIDENT said he had done pipe-draining thirty years ago, and they worked well now. Some which had been done five or six years, now took off the water better than when first put down.

Mr. LUNGLEY said, Mr. Hutley's man put hay to the pipes, and the silt would not get through that.

Mr. W. HUTLEY gave "The health of Mr. Beadel," who, he said, could give them some

information on experiments he was making in sheep feeding. (*Drunk with cheers.*)

Mr. BEADEL, in returning thanks, said, he was one of that class whom Mr. Cobden called "red tape men," and he was glad to hear, from the observations that evening, what a useful body of men they were; and that if the landlords would entrust their interest in their hands, how much better it would be protected than by solicitors. That (said Mr. B.) shows the progress which this club has made in sound knowledge—(*Cheers and laughter*)—and if we perform our duty well, we ought to be middle men, acting fairly and honestly between the landlords on the one hand and the tenants on the other. (*Cheers.*) With respect to the experiment alluded to, he bought eighteen sheep, and got a neighbouring butcher to pick out twelve as near alike as he could, and then to divide them into threes; they were then placed, two months ago, one lot on mangel-wurzel, another on Swede turnips, another on carrots, and another on parsnips; but as they had been in the habit of having a few oats, each had a pint a day the first month, and in the second month a quart. At the end of the month, each showed an average increase of nearly two pounds per week. They would all be slaughtered and weighed next week, and hung up at Mr. Barwell's; what the result would be he did not know. But there was this circumstance in the matter that excited surprise. Two or three years ago, he tried an experiment with Altringham red carrots, against mangel-wurzel or Swedes, and the sheep did not eat the quantity of carrots they did of mangel-wurzel, but this year he fed them on the Belgian white carrot, and they ate as nearly alike as possible; but as respected parsnips, his man said they ate comparatively nothing; yet, as far as handling went, and in live weight, there was a proportionate increase with them as with the others. It therefore appeared that parsnips were fulsome, and they could not eat so much. He thought the Belgian white carrot had not the nutritious qualities in it that the Altringham red had, and thus, if they grew more of the Belgian than of the Altringham, they did not gain anything by it. His object in these experiments was the investigation of truth; but a single experiment could not settle it—they must have many; and when they had a number of facts before them, they might arrive at proper results in agriculture. He wished them to try, and carry out these things by a number of experiments, as in the case of fixing ammonia in dung-hills—to carry it out in fifty or sixty instances, in order that they might be able to arrive at correct conclusions on the subject. (*Cheers.*)

Mr. W. HOBBS asked Mr. Beadel what quantity of parsnips he grew.

Mr. BEADEL said he grew six hundred bushels on one acre, and sold them at one shilling a bushel.

The PRESIDENT gave "The ladies," and the company then separated.

## THE YORKSHIRE AGRICULTURAL SOCIETY.

This important body publishes periodically a No. of its "*Transactions*," from the 6th of which we take the following "*Report of the Judges appointed to inspect the Farms entered for the Prize and Sweepstakes, proposed by the Yorkshire Agricultural Society, 1843.*"

This report is interesting as showing the various modes of culture adopted on the several soils, and the general economy of the several farms submitted to competition. We cannot curtail the document. No extract will give a sufficiently accurate account of its contents; we shall therefore present it to our readers entire, satisfied that when they have the whole before them we shall earn their thanks:—

"My Lords and Gentlemen,—The inspection of the farms, which we were honored by your instructions to commence on Monday the 3rd July, has been completed. It may be proper to state, that, after an extremely wet season, from the 4th May to the 11th June,—during which important period for preparing the land for the reception of green crops, little or nothing could be done,—the weather changed to an almost equally remarkable drought. The cultivation of turnips (and especially the swedes) was in consequence extremely difficult, and the period of sowing was necessarily much delayed. This circumstance exemplified, in a striking manner, the advantage of always cleaning the land to the greatest extent the season will allow, immediately after the harvest. The farms which were submitted to our inspection (all situate within the prescribed limit of a crow-fly line of twenty-five miles from Doncaster,) we took in the following order of route:—

Occupier.	Situate at.	Owner.	Extent in acres.
G. Wentworth.	Woolley.	G. Wentworth	255
T. C. Johnson.	Chivet ..	Sir W. Pilkington,	Bt. 283
R. J. Coulman.	Wadworth	R. J. Coulman	165
W. Newham ..	Edlington	W. B. Wrightson	299
T. Snowdon ..	Marr....	Lord Rendle- sham }	430
B. Crowshaw ..	Byram ..	Sir J. Rams- den, Bt. }	300
H. Skelton....	Winmoor	Henry Skelton	203

"Left to our own judgment as to the interpretation of 'the best cultivated farm,' we could only decide upon awarding the prize to the person who, in our opinion, adopted such a system, and carried out its practice in such a manner as, in the course of years, would tend to produce the largest amount of grain and animal food at the smallest expense per bushel and per pound. We think that *good* cultivation and *profitable* cultivation are synonymous terms, and that this applies alike to the grass and to the arable lands. Our original intention was to have reported only upon the two farms to which we awarded the prizes, but the very superior cultivation of the whole

of the lands which we inspected, is highly deserving of notice. On each farm there is some peculiar feature that might be imitated with great advantage; for each exhibited something in which it was superior to every other, and on none, though most fully and carefully viewed, could we detect an instance of waste or neglect.

"We commence with the farms to which we have awarded the first and second prizes, and shall then allude to the others, *without classification as to merit*, in the order in which we pursued our route of inspection.

"Mr. T. C. Johnson has occupied the Chivet Grange farm eight years. It is land of excellent quality, situate near Wakefield, and well adapted for the four-course system of cropping, which is pursued upon it.

"Turnip Fallow.—The cleaning of this commences as it ought to do, immediately after the harvest. In January or February it is covered, broad-cast, with manure that has been previously led from the farm-yard, (and to a considerable extent decomposed,) at the rate of six tons to the acre. This is immediately ploughed in, and afterwards intimately mixed with the soil. The turnip seed is drilled in rows eighteen inches apart, with twelve bushels of bones mixed with two quarters of ashes, or pulverized earth enriched with liquid manure. Sowing upon the level was evidently advantageous in the present dry season, and the advantage of early working, after the last harvest, was strongly exemplified by the clean and forward state of the land, notwithstanding the wet weather of May and June. Some of the swedes are drawn, for the sheep to eat upon the grass pastures, but the greater part of the turnips are consumed upon the land, where they have been grown, more especially upon the lighter soils.

"Barley is drilled after the turnips at the rate of thirteen pecks to the acre; about two-thirds of the breadth are sown with eighteen pounds of white clover, three pounds of rib grass, and half a peck of Italian rye grass per acre, for sheep pasture. The remaining third is sown with fourteen pounds of red clover, and half a peck of annual rye grass per acre, for mowing. This course prevents the too frequent repetition of red clover, as it thus comes into use only once in twelve years.

"Wheat is the principal crop after the clover or pastured grass, though parts of the latter are occasionally sown with oats or beans to vary the grain. Be the corn crop what it may, it is sown with the drill, and hoed, both for the immediate purpose of encouraging the growth of the plant, and as a preparation for the succeeding turnip fallow.

"Grass-Land.—In addition to the average annual pasture of about forty acres of white clover and grass seeds, this farm possesses about one hundred acres of permanent grass-land, of very good, though not prime quality. A portion of this is dressed every year with manure, sometimes supplied from the farm-yard alone, but more gen-

erally enriched with a mixture of bones. Bones are used extensively on the grass-land. They are purchased from the manufacturers of size, after having been boiled to extract the gelatine, and are obtained at one-third less price than those which have not undergone that process. Mr. Johnson is of opinion that their fertilizing qualities are uninjured by the extraction of the gelatine, but in this opinion we cannot concur. Three quarters of these bones, mixed with three cart loads of earth, are considered the proper dressing for one acre, and the period of application not material. The grazing department was well conducted. The Leicester sheep and short-horned cattle were suitably proportioned to the lands on which they were pasturing; though in one field we observed stall-fattened cattle too heavy for the soil on which they grazed. These we were informed were intended to have been sold from the stall, and had only been detained in hope of an advance in price. The immediate vicinity to a large and excellent cattle-market has induced Mr. Johnson to rely more upon his practice in buying and selling than in breeding; he therefore avails himself of the constant fluctuation in price, and makes a frequent change of stock.

“Though this farm is generally dry, from the nature of the soil and situation, yet there are portions of strong clay on the sides of the hills, both of arable and grass land. These, to the extent of sixty or seventy acres, have been underdrained with tiles, at an average expense of four pounds per acre. The work has been done by Sir W. Pilkington, for which, by agreement, Mr. Johnson pays an interest of six per cent. upon the expenditure. The cutting plough of Mr. Stickney, drawn by eight horses, has been recently tried, but the advantage was not so great as to give it the preference over manual labour. Wherever the lands have been drained, the necessity which previously existed for summer fallow is removed, and excellent turnips are produced.

“Linseed Cake is used largely with great advantage, as a substitute for turnips in the farm-yard; it is given to all the cattle. By this means the manure from the folds is doubled in value; and perhaps much of the superiority in bulk and luxuriance of all the growing crops may arise from this excellent practice. They were full and regular in every part. It has been observed that Mr. Johnson spreads his manure for turnips over the land in January and February. This is a peculiarity in management. He keeps his fold-yard manure nearly twelve months before using it; as from the large size of his yards, he is not obliged to take any manure out of them until the autumn; and to prevent too rapid a decomposition, when carted into the field, it is closely pressed down in very large heaps, and protected from the air by a covering of earth. We might be inclined to doubt the advantage of keeping so large a stock of manure for such a length of time; but we cannot forget the unusual weight and fertility of the crops now upon the land.

“This farm is conducted in a most admirable

manner; and though others may, in some particulars, even surpass it in excellence, yet here we find such a combination of neatness and utility in management, as, in our judgment, fully entitles Mr. Johnson to the prize.

“Godfrey Wentworth, Esq., has occupied his Woolley park farm about fourteen years. The four-course rotation, of green crops, barley, seeds, and wheat, is here adopted; a variation being occasionally effected by the introduction of beans or tares on portions of land that would otherwise have been sown with pasture-grasses or clover after the barley crop. The land is very suitable for this course, being a good working soil upon a sand-stone rock. The surface is undulating; and though, on the whole, dry and considerably elevated, parts of almost every field require underdraining. This has been effected completely over fifty-three acres; and the springs, which were noxious, have been converted into most valuable rivulets for supplying water to the live stock. The average depth of the drains is from eighteen to twenty inches; the distance six yards; the cost £5 11s. 6d. per acre, including the price of tiles, which are made upon the estate. The whole of this drainage has been completed between the 24th March, 1838, and April, 1843; and the farm is now entirely dry. The fences which (as we were informed by Mr. William Heslop, the very intelligent steward) had been old, crooked, and full of gaps, generally on banks, and occupying considerable space, are now fences of peculiar beauty and promise; they are all quickwood, low, close, sufficiently broad at the bottom, and progressively tapering to the top—an admirable specimen: no stock can escape—no land is wasted—no room left for the growth of weeds. Prior to the planting of the quickwood, the ground was fallowed, manured, and trenched: afterwards it was kept carefully clean.

“Turnips and Fallow Crops.—The preparation for these commences as soon as the corn is carried, by ploughing and harrowing the stubbles as much and as often as the weather permits—making the last ploughing deep, to give the greatest exposure of the soil during the winter. The manure is led from the farm-yard in December and February; placed in a convenient and level site on a layer of earth, and protected from the air by a light covering of the same. For these crops, the manure is conveyed by one-horse carts, up the centre of each third drill, as soon as the drills are formed, and care is taken to spread it equally and quickly, that it may be covered in with the least exposure to wind and sun. The drills for potatoes are thirty inches apart; for mangel-wurzel, twenty-seven inches; carrots and Swede turnips twenty-five inches. We found all these crops extremely promising, and remarkably clean. They had been sown about the 8th of May: six pounds of mangel-wurzel, four pounds of white Belgium carrot seed, and three pounds of Swedes were sown per acre; fifteen carts of manure per acre were allowed for these crops. One-half of the Swedes are carted to the farm-yard for the cattle by removing

six rows alternately; but to supply the drain thus made upon the land, a quarter of a pound of linseed-cake, per head, is daily given to the sheep when consuming the remainder. For the white turnips, which are all consumed upon the land, only ten cart-loads of manure are allowed.

“Barley.—Eleven and a-half pecks drilled upon the acre, distance six inches, the chevalier variety chiefly used.

“White Clover.—Eighteen pounds per acre were formerly sown broad-cast, but now fourteen pounds, with half a peck of Italian rye-grass, are put in immediately after sowing the barley, by a drill of twenty coulters, six inches apart, made by Nicholson. This was the first season of using the drill, and it was much approved, especially when seeds are sown upon a wheat crop.

“Wheat.—Eleven and a-half pecks per acre are drilled upon the land when ploughed after seeds. No manure is applied to this crop, the seeds having been manured in the spring.

“Tares.—These are cultivated for soiling. Three bushels of winter tares and two pecks of winter oats are sown per acre for the principal crop; but for early cutting, rye, instead of oats, is mixed with the tare-seed. The draft-horses have only this during the day, and go to grass at night. We are of opinion that it would be economical to soil to a greater extent.

“Grass-land.—The management of this department is admirable. The average stock of Leicester sheep is 550; of short-horned cattle, 40, all of a very superior breed, and in high condition. There being 76 acres of good permanent grass-land upon this farm, the heaviest cattle are pastured upon it, with a smaller proportion of sheep. The younger stock are principally maintained, with the ewes and lambs, upon the seeds. Much pains is taken to make compost on a large scale, which is applied to the grass-land in the autumn, winter, and spring. Thistles and other weeds are carefully kept down.

“Implements.—These are good; amongst them are a double-row turnip-drill, with separate coulters for tillage and seed, by Heponstall, of Doncaster; a large corn-drill by Smith, of Peasenhall, Suffolk; a twenty-coultered clover and grass-seed drill, by Nicholson, of Lincoln; a very efficient hay-making machine, &c.

“The farm-yard is amply supplied with water, by a stream sufficient to work all the requisite machinery; the corn is thrashed, and the straw cut by water-power. Nine farm horses are kept; but the relief they have from the water-wheel is perhaps not greater than their extra work of conveying coals, &c., to the mansion, and to the drain-tile-yard of the proprietor. A large tank has been recently formed, to collect the liquid manure, which has hitherto been carted only over the grass-land. Sensible of the increased value of farm-yard manure, by the consumption of linseed-cake in it, Mr. Wentworth, in addition to that which was previously mentioned as being given to sheep when on turnips, allows to cattle, in the straw-yard, an average of three pounds per

head daily, to the milk-cows five pounds, and to the stall-fattening cattle six pounds.

“We have never witnessed neatness and good order carried to the degree which this farm exhibits; it is a perfect model farm, and as such highly creditable to the proprietor; but there were other lands brought under our notice bearing crops considerably heavier.”

(To be continued.)

## FOREIGN TRADE.

### IMPORTS AND EXPORTS FOR 1841, 1842, AND 1843.

The annual “Accounts relating to Trade and Navigation, Custom Duties, and Tonnage of Vessels,” have just been published; and they show that our Foreign trade has regained the ground which it had lost in the year 1842. We subjoin the table of the “Exports of the principal articles of British and Irish Produce and Manufactures,” in the years 1842 and 1843—to which we have added, from former returns, the amounts for the year 1841:—

#### PRINCIPAL EXPORTS.

ARTICLES.	Declared Value of the Exports in the year ended 5th Jan.		
	1842	1843	1844
	£.	£.	£.
Coals and Culm .....	675,287	734,000	685,331
Cotton Manufactures .....	16,232,510	13,907,384	16,248,759
Yarn .....	7,266,963	7,771,464	7,191,870
Earthenware .....	600,759	555,430	629,585
Glass .....	421,936	310,152	336,910
Hardware and Cutlery .....	1,623,961	1,398,487	1,744,087
Linen Manufactures .....	3,347,555	2,346,749	2,816,111
Yarn .....	972,466	1,025,551	873,164
Metals, viz.—Iron & Steel .....	2,877,378	2,457,717	2,574,494
Copper & Brass .....	1,523,744	1,810,742	1,652,991
Lead .....	242,334	354,590	258,060
Tin, in bars, &c. .....	86,574	200,956	109,943
Tin Plates .....	368,700	347,781	480,407
Salt .....	175,615	201,811	208,207
Silk Manufactures .....	788,894	590,189	604,061
Sugar, Refined .....	548,336	440,175	415,812
Wool, Sheep's or Lambs' .....	552,620	509,822	417,835
Woollen Yarn .....	552,148	637,305	697,354
Woollen Manufactures .....	5,748,673	5,185,945	6,784,432
Total of the foregoing articles	44,609,558	40,785,350	44,720,563

In the year 1840 the exports of the above principal articles amounted to 43,959,614*l.*, and in the year 1839 to 45,307,409*l.*

Thus the exports have about recovered the position they occupied prior to 1842; and the Woollen exports (so called) have reached a higher point than in any year since 1818, except the year 1836, when they reached 7,639,354*l.* The fact is, however, that the exports of Woollen manufactures (made of taxed foreign Wool) have declined, and that it is the great increase of the Worsted manufactures that makes the aggregate appear so favourable. The two combined shew an increased export last year of 1,599,387*l.* over the exports of 1842, and of 1,035,759*l.* over the exports of 1841. The Cotton exports have as nearly as possible recovered the amount of 1841. Those of Linen and Linen Yarn, and also of Silk and of Glass, have by no means regained their former amount. The

exports of Hardwares and Cutlery, and of Earthenware, have more than regained their former position.

It is agreeable to see that the exports from this country, both of foreign and colonial Wool, and of British Wool, for the use of our foreign rivals, have diminished, though they are still far above their amount a few years back, as appears from the following tables :—

EXPORTS OF WOOL.

Years ended Jan. 5th.	Foreign and Colonial Wools. lbs.	British Wool. Declared Value.
1840	695,049	360,849
1841	1,014,625	830,233
1842	2,554,455	557,676
1843	3,697,789	509,822
1844	2,961,282	417,855

The exports of Woollen Yarn continue to advance. In the year 1839 they were 423,320*l.*; in 1840, 452,957*l.*; in 1841, 489,344*l.*; in 1842, 637,305*l.*; and in 1843, 697,354*l.*

The quantity of foreign and colonial Sheep's Wool taken for home consumption during several years back, shows that there has been a decline in the Woollen manufacture, properly so called, which has been by no means recovered this last year. The imports have been as follows :—

FOREIGN AND COLONIAL WOOL TAKEN FOR HOME CONSUMPTION :—

Years ended Jan 5th.	lbs.
1840	53,221,663
1841	50,002,976
1842	53,020,067
1843	44,623,319
1844	48,656,829

The imports of the principal raw materials of manufactures, and the quantities taken for home consumption during the last year and the year preceding, were as follows :—

RAW MATERIALS.

	Quantities Imported.		Quantities entered for Home Consumption.	
	Year ended 5 Jan.	Year ended 5 Jan.	Year ended 5 Jan.	Year ended 5 Jan.
Flax.....cwt.	1,145,759	1,442,467	1,148,741	1,439,574
Hemp undressed „	585,905	732,977	614,074	698,472
Silk, Raw.....lbs.	3,951,773	3,464,873	3,936,714	3,649,467
Waste ..cwt.	12,824	13,812	12,809	13,352
Thrown ..lbs.	397,497	385,805	363,977	385,118
Cotton Wool ..cwt.	4,747,769	6,019,016	4,266,498	5,231,332
Sheep's Wool . lbs.	45,881,639	40,324,924	44,623,819	48,656,829
Hides untanned cwt.	610,428	587,136	585,202	537,467
Skins, Goat, number	455,521	515,115	352,168	413,216
Id., undressed „	81,510	91,595	77,918	100,571
Do, dressed ...	480,343	446,772	477,727	444,591
Lamb, undressed „	822,042	1,292,316	854,899	1,346,127

The importation of living animals and of provisions, which was considered as likely to be great under Sir Robert Peel's Tariff, has fallen off and become a perfectly insignificant amount. The import of animals was as follows :—

	In 1842.	In 1843.
Oxen and Bulls imported—number	3,156	1,114
Cows .....	1,038	367
Sheep .....	634	210
Swine .....	410	359

So that Sir Robert Peel's boast, of having by his Tariff so cheapened provisions as nearly to compensate for an Income Tax of more than 5,000,000*l.*, turns out to be one of the falsest and most ridiculous promises ever made by a Minister.

The following are the quantities of several of the most important articles imported and entered for home consumption during the two years respectively :—

	Quantities Imported.		Quantities entered for Home Consumption.	
	Year end. Jan. 5.	Year end. Jan. 5.	Year end. Jan. 5.	Year end. Jan. 5.
Butter.....cwt.	1843. 175107	1844. 152360	1843. 180480	148928
Cheese.....cwt.	179748	179568	180584	166548
Cocoa.....lbs.	3172351	3613952	2247821	2541691
Coffee.....lbs.	41444414	38905446	28567157	30631606
Wheat.....qrs.	2717454	940666	2668051	869149
Wheatnealor flour.cwt.	1128852	436832	1125799	426794
Barley.....qrs.	73335	179484	49067	228543
Oats.....qrs.	301272	85016	282544	41963
Indigo.....cwt.	68823	68415	27382	24544
Logwood.....tuns	18481	20892	16382	20132
Madder.....cwt.	86382	139143	94295	148791
Madder Root.....cwt.	82879	162216	84783	162194
Eggs.....Number	86548747	70448250	80557501	70442250
Currants.....cwt.	267086	238414	196551	254744
Raisins.....cwt.	212218	216526	186683	237474
Gloves, Leather...pairs	1623713	1882182	1592034	1839429
Copper Ore.....tuns	40856	55598	15709	54271
Iron, in bars.....tuns	18701	12809	14746	12683
Oil, Train.....tuns	17473	23859	16673	23424
Palm.....cwt.	424242	420277	356222	383625
Cocoa Nut.....cwt.	40742	68577	27400	34120
Olive.....tuns	14065	12139	9557	10129
Rice.....cwt.	511414	453379	252436	259201
Rice in the husk....qrs.	41420	19877	39983	19152
Flaxseed & Linseed.qrs.	367700	469642	357963	468150
Pepper.....lbs.	6021290	4032955	2686536	2790069
Spirits, Rum.....gals.	4619804	3729673	2092829	2163891
Brandy.....gals.	1674430	2396340	1063890	1088941
Geneva.....gals.	325744	360220	14580	13899
Sugar.....cwt.	476011	5022348	3876448	4045181
Tallow.....cwt.	1011370	1169864	1034470	1175545
Tea.....lbs.	40742128	45344440	37839576	40362281
Timber, Deals, &c.				
Of British possessions.lds.	110319	341873	170781	346986
Foreign.....lds.	48715	268618	55874	226078
Tobacco, unmanufactured.....lbs.	39526963	43744893	32152694	22891526
Manufactured and				
Snuff.....lbs.	811064	1137531	223369	263813
Wine—all sorts....gals.	7216113	6773795	5074332	6287453

THE CURRENCY QUESTION.

THE NATIONAL DEBT AND FOREIGN LOANS.

The manner in which the National Debt was accumulated puzzled Mr. Cobbett exceedingly, and he endeavoured to puzzle others as much as he was himself puzzled. "The national debt," Mr. Cobbett says, in his Manchester Lectures, "is stated in its most modest amount at eight hundred millions. It would not be right to have an appearance of boldness in addressing persons who are worth eight hundred millions of money, but one might just ask them—WHERE THEY GOT THE MONEY? Where did you get it, gentlemen and ladies? there are a good many of you, to be sure, but you have lent more money here than there now is, or ever was, in the world; more pounds of gold and silver than ever came out of the mines. It amounts to more than the whole of the kingdom, lands, houses, mines, and woods, would sell for, if put up to auction, and if foreigners could bring gold and silver into the country and purchase them. There must be some great mistake then. It is physically impossible that you can have lent this money." Gold and silver never were lent and never could have

been lent, though, certainly something was lent which enabled government to carry on its wars. Mr. Cobbett continues. "It has all been juggled from the beginning to the end. A loan-monger, or the maker of a loan, HAS NEVER LENT ANY MONEY AT ALL. He has written his name upon bits of paper; these he has distributed about in sales to under loan-mongers; these have been turned into other bits of paper; and these bits of paper the government have paid away." Upon the actual value of the debt thus contracted we need not now comment; the question we have now to grapple with is—"How could the nation thus get into debt to itself?" How were the armies the nation sent forth supported? and how were the materials of war furnished to them? The "bits of paper" into which Mr. Cobbett has resolved the national debt were neither rations nor materials of war; these were the things the nation furnished, and the "bits of paper" were the medium which gave to the government the command over these commodities. The "bits of paper" then represented commodities, and it was commodities the government actually borrowed, and not coins of gold and silver. EVERY YEAR THE NATION PRODUCED AS MUCH AS THE NATION CONSUMED, and every year the productive power of the nation increased, and yet there was no complaint of "over production." During the whole of the war, with a proper system of taxation and currency, the whole of the revenue necessary for the purposes of the government might have been collected from year to year. This, we think, must be evident from the fact, that every year the commodities requisite for government use were produced, the variation caused by the seasons alone excepted; and in addition to the national debt, private fortunes of vast amount were accumulated. The industry of the country produced sufficient for its own support, for the support of expensive foreign wars, and notwithstanding all these expenses, its citizens grew rich; houses and palaces were built; docks and merchant shipping, warehouses and store-houses of all kinds were multiplied; roads were improved, and canals were extended; and real wealth of every description was increased. This was not in consequence of the expense of the wars, but in addition to that expense, and amply shows the immense productive powers of the nation; powers which nothing but legislation of the most bungling description could have turned into a national curse—THE CURSE OF PRODUCING SO MUCH THAT THE PRODUCERS ARE LEFT TO STARVE!

The view we have taken of the manner in which the national debt was contracted, destroys the long continued fallacy, that the nation, during these wars, anticipated its resources. The only way in which a nation can anticipate its resources is by becoming indebted to another nation. England has long been a lending nation, and not a borrowing nation; the loan from the Bank of France being the only blot upon the escutcheon; and that was not a national loan, though borrowed for strictly national purposes.

The accumulation of the national debt has enabled a greater number to live on the industry of the country, without being themselves of the class of labourers. Mr. Charles Enderby, in his recently published pamphlet on "The Distress of the Nation, its Causes and Remedies," observes, that—

"During the war no man reduced his expenditure, consequently the loans came out of profits; the nation, in the expenditure of the £500,000,000, took off that accumulation of wealth (profit) which, had it not been so taken, would have formed a mountain of produce called 'over-production,' and which, in the collection, would often have produced the distress from which we are now suffering, and would consequently *not have been profit*. It cannot for a moment be supposed that the £500,000,000 consisted of an accumulation of the precious metals, or that it was anything more than the ordinary accumulation of commodities (profits) over consumption.

"Whilst the war continued, and the national debt kept increasing, profits were realized; but when the war, and with it further increase of the national debt, ceased, then profits ceased to be realized, and, in 1816, distress was experienced, in consequence of production exceeding consumption. From this date, however, a new channel was opened for realizing profit (*viz.*, in the debts contracted by foreign nations to England), and taking my *data* from the period when foreign loans were contracted, and comparing the dates with the periods of prosperity and adversity as exhibited in a tabular form in the published life of the late Mr. M. T. Sadler, it is interesting to observe how they bear out my argument, that when the stocks of wealth were in course of consumption, and the British nation (or foreign ones) were incurring debts, there was prosperity; trade was really *profitable*, because profits were realized; but when checked, distress exhibited itself in the form of over-production.

## TABLE.

## FOREIGN LOANS CONTRACTED IN ENGLAND.

Years.	
1815.—Close of the war.	
1818.—Prussian loan	£5,000,000
1821.—Spanish Loan	3,500,000
1822.—Russian	3,500,000
Prussian	3,500,000
Colombian	2,000,000
Chilian	1,000,000
Peruvian	450,000
1823.—Spanish	1,500,000
Portuguese	1,500,000
Austrian	2,500,000
1824.—Peruvian	750,000
Neapolitan	2,500,000
Mexican	3,200,000
Greek	800,000

\* It should be observed, that although these loans were contracted in the year 1822, they were not in course of payment until the latter end of that year, or the commencement of the next.

Years.		
1824.—	Colombian .....	£4,750,000
	Buenos Ayres.....	1,000,000
	Brazilian .....	3,200,000
1825.—	Ditto .....	2,000,000
	Danish.....	5,500,000
	Greek.....	1,000,000
	Guatemala.....	1,428,571
	Mexican.....	3,200,000
	Peruvian.....	616,000
1829.—	Brazilian.....	300,000
1832.—	Belgian.....	2,000,000
1834.—	Credits to the Uni- ted States of Ame- rica.	15,000,000
1835.—		
1836.—		

M. T. SADLER'S STATEMENT OF PERIODS  
OF PROSPERITY AND ADVERSITY.

Years.	
1815.	The period of the war a time of agricultural and manufacturing prosperity.
1816.	Distress.
1817.	
1818.	Prosperity.
1819.	Distress.
1820.	Great distress till the latter end of 1822. County meetings calling for relief.
1821.	
1822.	
1824.	Great prosperity and speculation.
1825.	Great prosperity and speculation.
1826.	Panic and distress.
1827.	
1828.	
1829.	Great distress. Burnings, and meetings to petition.
1830.	
1801.	
1832.	
1833.	
1834.	Return to prosperity.
1835.	
1836.	
1837.	Panic and distress.
1838.	
1839.	Distress, without amelioration.
1840.	
1841.	

"It may be imagined by some, that the periods of distress referred to by Mr. Sadler were caused by these very loans, but very little reflection will satisfy them that if the Bank of England had not contracted the circulation, and thus checked trade (destroying profits by low prices), the loans to foreign nations would have been continued, possibly even to the extent of £1,000,000,000; for it was out of *profit* that the loans were made; in confirmation of which assertion it is only necessary to observe, that periods of *distress* are periods of *low prices* (low, because produce is then abundant), and although we might not have had the precious metals to lend, yet we had an excess of that which really constitutes wealth, and which has heretofore formed the substance of all British and foreign loans."

It will be perceived by the extract we have here given that Mr. Enderby boldly opposes himself to some of the most cherished doctrines of the Bul-

lionists. It was not the loans that destroyed trade. Loans must ultimately consist of commodities; the labour employed in producing these commodities must give employment to the productive classes, who are thereby benefited. "I would remark," says Mr. Enderby, "that most persons attribute the distress periodically experienced to the large shipments of wealth and loans to foreign nations; but on this point I am at issue with them: for, had the shipments not been made, or the loans contracted, we should have had amountain of 'over-production' (profit) that would never have been realized even to the extent of one-tenth part of that which we shall now receive." The period here glanced over, so far as it is similar to the period of the war, produced similar consequences. During the period from 1821 to the end of 1825, foreign loans were contracted in England to the amount of about £50,000,000. The nation was more or less prosperous during the whole of this time. How is this to be accounted for? Here the Bullionists are utterly at fault; but rather than allow that it is their system which is bad, they cry out that the prosperity is "factitious," and forthwith set to work to destroy it. We should like the Bullionists to define to us in what real prosperity consists; we are apt to imagine that the only prosperity they are willing to acknowledge is prosperity to themselves. Prosperity which enables the working man to put a better coat on his back, and to house, and clothe, and feed his family plentifully, they regard not. What is this to them, if the exchanges are against us? rather than this should be the case, they would desolate the island, and convert what should be happy Old England into a howling wilderness. The disciples of Cobbett would be equally perplexed were they called upon to account for the prosperity here alluded to; for abatement of taxation there was none on any account; and the burthens of the nation were nominally as great as in 1820-22; the national debt was then in all its magnitude, and no "equitable adjustment" had been effected. None of these things had been done, and yet the productive classes were beginning to surround themselves with comforts; a bright era of prosperity dawned upon them; and a hope of future enjoyment gladdened the hearts of all, even that of the Chancellor of the Exchequer, "Prosperity Robinson." Amid all this gladness the desolating cry of the Bullionists was heard—"The exchanges are against us!" Prosperity must be destroyed; the prosperity which feeds the hungry and clothes the naked must no longer be allowed to exist, or our system will perish. The Bullionists triumphed, and bankruptcy and misery, want and crime, were the results; and this will ever be the case so long as the Bullionists rule. Prosperity can only be rendered permanent by a system of currency which will expand with population and production.

The Money Power at the present time is neither loaning its surplus money to foreign nations, nor using it in any way to benefit the industry of the nation, but is accumulating it in great masses in

the hands of London brokers for the purpose of "safe investment." The system must be remedied, or the end will be destruction. Investment in the products of industry is the only investment which can render the nation prosperous, and this investment can only be safely made under an efficient and steady system of currency. The entire destruction of the debt would not relieve the industry of the nation, unless at the same time measures were taken to secure to the productive classes ample means of consuming the produce of their own labour.

GEMINI.

*Birmingham, Feb. 13, 1844.*

### AGRICULTURAL IMPROVEMENTS.

SIR,—As agricultural improvement is the order of the day, allow me to mention an extreme case—the expenditure of 5,200*l.* on a farm of mine, 130 acres (Tiptree Hall, near Kelvedon, Essex), that only cost 3,250*l.* In due course, when the results are accurately ascertained, I shall deem it my duty to submit statistical details and drawings of the buildings to every agricultural society in the kingdom, in the hope it may give confidence to those who, having the means to improve their property, are doubtful as to such improvements paying a remunerating profit to both landlord and tenant. The expenditure above mentioned has been appropriated to—1st. The perfect and permanent drainage of the land with stones and pipes, 4 yards apart, and 32 inches deep; between 80 and 90 miles of drains. 2nd. To the entire removal of all timber trees, which cannot be profitably grown in corn fields. 3rd. To the removing all old, crooked, and unnecessary banks, fences, and ditches. 4th. The cutting new parallel ditches and fences, so as to avoid short lands. 5th. The inclosure of waste, and conversion of useless bog into good soil. 6th. The economising time and distance by new roads, arches, and more direct communications with the extremities of the farm. 7th. The erection of well-arranged farm-buildings built of brick, iron, and slate, in a continuous range, excluding all cold winds and currents of air, but open to sunny warmth. 8th. The building a substantial and genteel residence, with all due requisites for domestic comfort and economy. 9th. The erection of an efficient threshing machine, and needful apparatus for shaking the straw, dressing the corn, cutting chaff, bruising oats, &c., so constructed as not to injure the straw; avoiding, by its perfect action, that immense waste of grain visible in almost every truss of straw we examine. 10th. The avoidance of thatching and risk of weather, by ample barn room, with convenience for in-door horse-labour, at thrashing, &c., when not employable without, so as to have no idle days for man or beast. 11th. The saving of every pound and pint of manure by a tank (90 feet long, 6 feet deep, 8 feet wide, with slated roof facing the north, and with well and pump), into which is received the whole drainage from the farm-yard

and stables. 12th. The conveyance by iron gutters and pipes of every drop of water from the roofs of each building, so as in no manner to dilute the manure in yards. 13th. The perfect drainage of the foundations of the barn, and every building on the farm. 14th. A steam-house to prepare food for cattle. I am thus particular in detail, because it is from each of the above branches of expenditure that some portion of remuneration is expected. But, during the progress of my undertaking, I have been warned, entreated, and dissuaded by my farming friends, who protested that a profitable return for such an enormous expenditure was impossible; my calculations, however, were made, and mere assertions without facts and figures weighed nothing with me. Although the operations were only commenced early in 1843, the results, so far as they go, are gratifying and convincing. As one instance of success, a field of oats, sown on the 16th of May, after drainage, was harvested and stacked, before another (sown two months earlier on better but undrained land) was ready to cut. Hereafter you shall have detailed statistics of every department in which saving is effected and increase produced. In a moral and social point of view, these improvements have acted beneficially. They have excited the energies of the tenant and his labourers, stimulating them to think, compare, and improve. They have awakened the attention and curiosity of the neighbouring farmers, who are watching the result, and already have they caused many undertakings in drainage, which otherwise would not have been thought of. Had I invested my money in the funds, there would have been an end of the matter; but now I have the satisfaction of having fulfilled a public duty (without injury to myself) by calling into action, temporarily and permanently, a considerable amount of labour. I conceive that the highest order of charity, which, by providing employment to the willing labourer, confers a favour unseen, and leaves uncompromised (his most valuable privilege) his self-dependence.

If every one who has the means follows my example, where requisite, there will be little need to complain of the want of employment for our peasantry or our capital. Whilst everything has been done for the farmer's profit and comfort, the cottagers have not been forgotten. A few gutters and pipes to their residences, and some drains in their gardens, have rendered the former dry and healthy, and the latter productive; and this at the trifling cost of a few pounds. I may be asked, "What can you, as a Londoner, know about farming?" I will answer, "I always loved the beauties of nature, the pure air of heaven, the sports of the field, and the hospitality of our honest yeomen. I have seen one farmer making a fortune, and his next neighbour losing one. I have seen one field all corn, and another nearly all weeds."

I asked, "How is this?" I enquired into the causes: I noted the results. I obtained from all the best farmers and all the best agricultural

books within my reach, every information bearing on agricultural pursuits. I practised on my own little garden, on a small scale, a variety of experiments; and after carefully weighing the evidence, I come to the conclusion, that want of drainage, both in land and buildings, waste of manure, shallow ploughing, and short leases, are amongst the greatest curses to this country; and I, as far as my individual means will permit, am resolved on remedying them.

I am, sir, your obedient servant,

4, *Leadenall-street, London,* I. J. MECHI.

*March 15th, 1844.*

PS.—As Tiptree Heath is notorious for poor land, and as the Essex farmers, generally, are extremely sceptical as to these improvements answering, I would recommend their inspecting the crops (there will be no long fallow) about July next; and then, having the facts before them, they will be enabled to draw correct conclusions. I may as well add, it is intended to trench, plough, and disturb the soil to the depth of fourteen or sixteen inches. The implements used on this farm are Crosskill's clod-crusher, roller, and liquid manure cart, Lord Ducie's drag, and Barrett, Exall and Co's subsoil plough. The threshing machine is constructed under my own direction, by Mr. Bewley, of Chelmsford, on the Scotch principle.

## ON MANURES,

### AND THE PROPER APPLICATION THEREOF.

Every species of matter capable of promoting the growth of vegetables, may be considered as manure. Sir H. Davy and other scientific men have written very satisfactorily on the chemical properties of manures, and given theories on the operation of those composed of animal and vegetable substances. Without entering into the *rationale* of the chemical changes which manures undergo, it may be sufficient for practical purposes to examine the several substances most extensively employed—pointing out any change that may have occurred in their management and application; and conclude with merely mentioning the various articles of this kind that are to be procured only in small quantities, or in particular situations, and which are therefore used on a very limited scale. 1st. Farm yard dung. This manure, composed chiefly of the straw of grain, and the excrementitious substances of live stock, is the principal, and in most instances, the only fertilizer of the soil to which farmers have access. Its use is so universal and well known that a very few observations will suffice. As straw is the basis of this compost, every judicious farmer takes care to have his crops cut as low as possible, as it is evident to every one that a few inches of straw towards the root-ends adds much to the weight of the crop. From every ton of dry straw, about three tons of farm-yard dung may be procured, if the after-management be properly

conducted; and, as the weight of straw per acre runs from 1 ton to 1½, about 4 tons of dung on an average of the different crops, may be produced from the straw of every acre under corn.\* The straw is served out to cattle and horses in the houses and fold-yards, either as provender or litter, commonly for both purposes; and turnips in winter, and green clover in summer, on which food the animals pass a great deal of urine, afford the means of converting the straw into a richer manure than if it were eaten alone. All the dung from the houses, as they are cleaned out, ought to be regularly spread over the yards in which young cattle are left loose, where litter is usually allowed in great abundance; or over the dunghill itself, if there be one at hand. This renders the quality of the whole mass more uniform; and the horse-dung, which is of a hot nature, promotes the decomposition of the woody fibres of the straw. At a convenient season, usually during the frosts of winter, this mass of material is carted out to the field in which it is to be employed, and neatly built in dunghills of a square form, three or four feet high, and of such a length and breadth as circumstances may require. What is laid up in this manner early in winter is commonly sufficiently prepared for turnips in June; but if it be not carried from the straw yards till spring, it is necessary to turn it once or oftener, for the purpose of accelerating the decomposition of the strawey part of the mass. When dung is applied to fallows in July or August, preparatory to autumn sown wheat, a much less degree of putrefaction will suffice than for turnips—a clay soil, on which alone fallows should ever be resorted to, not requiring dung so much rotted as a finely pulverized turnip soil; and besides as the wheat does not need all the benefit of the dung for some time, the woody fibre is *gradually* broken down in the course of the winter, and the nourishment of the plants continued till the spring, when its effects are most beneficial. In the application of dung to land under tillage, particular attention should be paid to the cleanliness of the soil; and to use it at the time when, from the pulverization of the ground, it may be most intimately mixed with it. The most common time of manuring with farm yard dung is, therefore, either towards the conclusion of the following operations, or immediately before the sowing of fallow crops. If no dung can be procured, but what is made from the produce of the farm, it will seldom be possible to allow more than from 10 to 12 tons to every acre, when the land is managed under a regular course of white and green crops; and it is thought more advantageous to repeat this dose at short intervals, than to give a larger quantity at once and at a more distant period in proportion.† Farm yard dung it is well known, is greatly reduced in value by being exposed to the atmosphere in small heaps, previous to being spread, and still more after being spread. Its rich juices are exhaled by the

\* Husbandry of Scotland, vol. ii.

† General Report of Scotland, vol. ii. p. 517.

sun, or washed away by the rains, and the residuum is comparatively worthless. This is in an especial manner the case with long fresh dung, the far greater part of which consists of wet straw in an entire state. All careful farmers, accordingly, spread, and cover in their dung, with the plough, as soon as possible after it is brought on the land. Too great a degree of fermentation is very prejudicial to the composite manure in the dunghill. It is better that there should be no fermentation at all before the manure is used, than that it should be carried too far. The excess of fermentation tends to the destruction and dissipation of the most useful part of the manure, and the ultimate results of this process are like those of combustion. It is a common practice among farmers to suffer the farm-yard dung to ferment till the fibrous texture of the vegetable matter is entirely broken down; and till the manure becomes perfectly cold, and so soft as to be easily cut with a spade. Independent of the general theoretical views unfavourable to this practice, founded upon the nature and composition of vegetable substances, there are many arguments and facts which show that it is prejudicial to the interests of the farmer. There are reasons sufficiently strong, Grisenthwaite observes, to discourage the practice of allowing dung heaps to ferment, and rot without interruption. It appears that public opinion has slowly adopted the decision of chemical reasoning; and "dung pies," as they are called, have been formed with a view to save what was before lost, a stratum of mould sustaining the heap, being placed to receive the fluid parts, and a covering of mould being applied to prevent the dissipation of the aerial or gaseous products. These purposes and contrivances, unfortunately, like many of the other operations of husbandry, were not directed by scientific knowledge. To cover is so commonly believed to confine, that there is no wonder that the practical cultivator adopted it in this instance from such a consideration. But, it is in vain; the elasticity of the gasses generated is such as no covering whatever could possibly confine. If it were perfectly compact, it could only preserve as much carbonic acid as is equal to the volume or bulk of air within it; a quantity too inconsiderable to be regarded, could it even be saved; but every particle of it must be disengaged and lost, when the covering is removed.\* Checking fermentation by watering is sometimes recommended; but this practice is inconsistent with just chemical views. It may cool the dung for a short time; but moisture is a principal agent in all processes of decomposition. Dry fibrous matter will never ferment. Water is as necessary as air to the process; and to supply it to fermenting dung, is to supply an agent which will hasten its decay. In all cases when dung is fermenting, there are simple tests by which the rapidity of the process, and consequently the injury done, may be discovered. If a thermometer plunged into the dung, does not rise to above 100

degrees Fahrenheit, there is little danger of much aeriform matter flying off. If the temperature is higher, the dung should be immediately spread abroad. When a piece of paper moistened in muriatic acid, held over the steams arising from a dunghill gives dense fumes, it is a certain test that the decomposition is going too far, for this indicates that volatile alkali is disengaged. From a recent publication, the practice of the best farmers of turnip soils in Scotland appears to be decidedly adverse to the use of fresh dung; and its inutility, or rather injurious effects, from its opening the soil too much, is a matter of experience with every one who cultivates drilled turnips on a large scale. As the whole farm-yard dung, on such land, is applied to the turnip crop, it must necessarily happen that it should be laid on in different stages of putrefaction; and what is made very late in spring, often after a very slight fermentation, or none at all. The experience of the effects of recent dung is accordingly very general, and the result in almost every case, is, that the growth of the young plants is slow,—that they remain long in a feeble and doubtful state, and that they seldom, in ordinary seasons, become a full crop, even though twice the quantity that is given of short *muck* has been allowed. On the other hand, when the manure is considerably decomposed, the effects are immediate; the plants rise vigorously, and soon put forth their rough leaf, after which the beetle or fly does not seize on them; and in a few weeks the leaves become so large that the plants probably draw the greatest part of their nourishment from the atmosphere. Though it were true, therefore, that more nutritive matter were given out by a certain quantity of dung, applied in a recent state, and allowed to decompose gradually in the soil, than if applied after undergoing fermentation and putrefaction; the objection arising from the slowness of its operation, would, in many instances, be an insuperable one with farmers. Many experienced farmers are in favour of applying dung in a recent state. Mr. A. Young adduces a number of excellent authorities in support of the plan, and Mr. Coke has entirely abandoned the use of applying fermented dung. His crops are as good as ever they were, and his dung goes twice as far. A great objection against slightly fermented dung is, that weeds spring up more luxuriantly where it is applied. If there are seeds carried out in the dung, they certainly will germinate; but it is seldom that this can be the case to any extent; and if the land is not cleansed of weeds, any kind of manure, fermented or unfermented, will occasion their rapid growth. If slightly fermented farm-yard dung is used as a top-dressing for pastures, the long straws and unfermented matter remaining on the surface should be removed as soon as the grass begins to rise vigorously, by raking, and carried back to the dunghill; in this case no manure will be lost, and the husbandry will be at once clean and economical. In cases where farm-yard dung cannot immediately be applied to crops, the destructive fermentation of it should be prevented as much as possible;

\* Grisenthwaite on Agriculture, p. 1170.

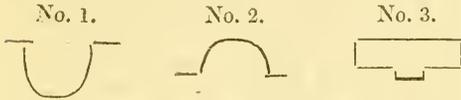
the principles on which this may be effected have been already alluded to. The surface should be defended as much as possible from the oxygen of the atmosphere; a compact marl, or a tenacious clay, offers the best protection against the air; and before the dung is covered over, or, as it were, sealed up, it should be dried as much as possible. If the dung is found at any time to heat strongly, it should be turned over, and cooled by exposure to the air. No rule of universal application can be laid down on this subject. The degree of decomposition to which farm-yard dung should arrive, before it can be deemed a profitable manure, must depend on the texture of the soil, the nature of the plants, and the time of its application. In general, clayey soils, more tenacious of moisture, and more benefited by being rendered incohesive and porous, may receive manure less decomposed than well pulverized turnip soils require. Some plants too, seem to thrive better with fresh dung than others—potatoes in particular; but all the small-seeded plants, such as clover, turnips, carrots, &c., which are extremely tender in the early stage of their growth, require to be pushed forward into luxuriant vegetation with the least possible delay, by means of short dung. The season when manure is applied is also a material circumstance. In spring and summer, whether it be used for corn or green crops, the object is to produce an immediate effect, and it should therefore be more completely decomposed than may be necessary, when it is laid on in autumn for a crop whose condition will be almost stationary for several months. To preserve dung for any time, the situation in which it is kept is of importance. It should, if possible, be defended from the sun. To preserve it under sheds would be of great use; or to make the site of a dunghill on the north side of a wall. The floor on which the dung is heaped, should, if possible, be paved with flat stones; and there should be a little inclination from each side towards the centre, in which there should be drains connected with a small well, furnished with a pump, by which any fluid matter may be collected for the use of the land. It too often happens that a dense mucilaginous and extractive fluid is suffered to drain away from the dunghill, so as to be entirely lost to the farm.—*Preston Pilot.*

### ON DRAINING.

SIR,—I have been a cultivator of strong land with a tenacious subsoil for upwards of thirty years, on the south-east border of Norfolk, in which county and Suffolk the practice of under-draining with straw, bushes, and stones, has been well understood for seventy or eighty years, and probably much longer. The cost of doing it at 21 feet apart would not exceed £3 or £3 10s. per acre, including straw and bushes; and it is a very effectual method of draining, but by no means so economical as at first sight it would appear, as it

depends upon the subsoil, whether it lasts six or ten years; and we, as cultivators of such soils in Suffolk and Norfolk, have been guilty of a great error in not draining our heavy lands more frequently, as it is the very foundation of all good farming, and I have no hesitation in saying that such soils will pay no rent, and are not worth cultivating till they are thoroughly drained; but when that operation has been effected, few soils are more productive. But to the point. Our practice has been to cut the drains from 28 to 30 inches deep, and only from an inch to an inch and a half wide at the bottom, and those which I have found stand the longest and work the best have been filled with bushes down to an inch and a half of the bottom, a small quantity of straw put upon them, and then clay trodden down very firmly; thus leaving the drain only, at most, an inch and a half square at the bottom; and this was considered sufficient to carry the water from 70 to 90 rods of drain,  $5\frac{1}{2}$  yards to the rod. The fields in these counties, on wet lands, are small, seldom exceeding 8 to 10 acres, and numbers much smaller; but in these it has been the practice to run three or four drains into a main, which was always of the size above-mentioned, and it is quite sufficient to carry the water from 80 to 100 rods. Stone draining, upon these soils, has been practised as long as fifty years back; I have found them on my own farm. They appear to have been done from 20 to 24 inches deep, and dug about 4 inches wide at the bottom, and filled up about four inches with small gathered stones. At the time I first discovered them they had (as far as I could learn from an old labourer who worked with my father) been done fifteen or twenty years. They were completely filled with mould, and no water passed along them; and had I not been told of their existence, I should scarcely have remarked the difference between them and some other stony places in the subsoil. About fifteen years ago, some round pipes and circled tiles, similar to what are now used, were introduced, and some few were used, but the price was such as to prevent their being used to any extent; the tiles were used without a sole, and the result has been that both have become completely stopped by being filled up with mould, and the land must now be fresh drained. This has occurred in two instances which have come to my knowledge lately—the soil, a strong loam on a tenacious clay subsoil, with occasional sand pockets or galts, as they are termed, which are universal in our clay lands. I have long turned my attention to this most important branch of husbandry; and have, for the last few years, been using tiles with soles about  $1\frac{1}{2}$  inch wide by 2 inches deep, laying the flat at the bottom; but I have never been satisfied with it; and I am convinced, from long observation, that we have failed, in most cases, from want of a rapid current in the drains. The sand and some particles of soil will insinuate themselves into the drain. Round pipes, admitting the water only at the end joints, do not carry it off quick enough when there is a very heavy

fall, and the soil immediately round them becomes so saturated as to settle very close round them, and in time it becomes quite or nearly as impervious as the common subsoil. The ends of pipes, too, are apt to sink if two meet in a sand pocket, and so stop the drain. I esteem the common arch tile laid on a flat better than pipes; but my objection to them is, that when the water runs an inch in depth, or even less, in the drain, it cannot enter freely except at the end joints; and here we have the same effect as in the pipes, though not in the same degree. To remedy these defects, as well as to guard against the injury done by moles, I am now using tiles with covers, made by a machine invented by my son, F. W. Etheredge. My principal objects are to admit the water into the drain with as little obstruction as possible, and to leave the drain no larger than is actually required to carry the water off freely, so that I may have as rapid a current as the fall of the land will admit of. The form of my tiles and covers are as under:



Our fields in Norfolk and Suffolk are surrounded by hedges and ditches from  $3\frac{1}{2}$  to 4 feet deep, and I much prefer carrying out every drain to the ditch; but this cannot always be done, in which case two of No. 1 will form a drain  $3\frac{1}{2}$  inches by 2, which will carry the water from any length of drain we can require; but, for a 100 or 120 rods, No. 1, covered with No. 2 is sufficient; the bearing where the cover lays upon the tile forming the lateral joint, is full an inch wide, and being laid at the depth of 28 or 30 inches, there is no fear of being pushed off by moles. On flat lands, as the drain approaches the upper end of the field, we are frequently obliged to make the drain shallower, and a smaller is not only sufficient, but, in my opinion, better; being shallower, it is more exposed to moles, which we find it very difficult entirely to get rid of, and I therefore use No. 1 covered by No. 3, which cannot by any means be removed. I have never known the water fill these drains so high as the lateral joint, and therefore there is a constant free admission for it. The soil round the drain will never become sodden, and my impression is that it will become more porous, and that the water will enter the drain more freely after two or three years than it does at first. The rapid current, confined to a small space, will carry out any sand or fine particles of soil which may enter at the joints; and I think I have a better chance of a permanent drain than from any system I have seen practised. As to the admission of air by means of large drains, I think nothing of it. Our best and most productive soils are on a fine white clay full of chalk stones. Where no drain is required, the subsoil is particularly close and hard, and as impervious to the air as any well-drained soil will be after two or three years. The expense of No. 1 of these tiles is from 14s. to 20s.

per thousand, 15 inches long, according to the price of coals and other circumstances; No. 2, from 8s. to 14s.; and No. 3, from 7s. to 12s. The most tenacious clay lands may be thoroughly drained with them at from £3 10s. to £5 per acre.

As I am very anxious to accomplish the best, the most permanent, and the most economical method of draining, I shall be glad of any information upon the subject.

I am, Sir, your most obedient servant,  
CHARLES ETHEREDGE.

### GLOUCESTER FARMERS' CLUB.—QUESTIONS DISCUSSED BY THE CLUB IN 1843.

#### SECOND MONTHLY MEETING, MARCH 11TH.

Subject, "*The cultivation of root crops on heavy land, and the extent to which it may be profitably carried.*"

This subject was introduced by Mr. N— in the following paper:—

Our secretary has put down my name as the introducer of the subject you have chosen for discussion on this evening. I must say that I much regret his having so done; not on account of any unwillingness on my part to lend my aid, and that to the best of my ability, for the service of the Gloucester Farmers' Club, or for the general advancement of agricultural practice; but because I well know how unfitted I am to undertake a subject of great import, and of considerable difficulty in practice; and also that very many of our members, men of far more practical knowledge than I can pretend to boast, could have given you useful and valuable information on the matter, had their diffidence permitted them to have undertaken the subject.

We are now to enquire into the best mode of cultivating our strong and tenacious soils for the growth of root crops, and likewise to what extent the cultivation of them can be carried with profit on such soils. I believe it will be readily conceded that roots can be produced on heavy soils, and large crops of them too, by good tillage and careful cultivation; but then comes the grand and puzzling question, "Can we consume the crop when we have brought it to maturity, without positive loss to our pockets, and ultimate injury to the land?" Some time ago I certainly should not have attempted an answer to the question, or if I had replied to it at all, it would have been by declaring my conviction of the uselessness and folly of the attempt, but now the case is far different: we have discovered a mode of taking up and stacking away the roots when arrived at their full growth with ease, and certainty of their preservation till a late period in the spring: and we have also, by the result of experiments carefully tested, and duly registered, found out that sheep, as well as other stock, when housed and kept warm and

dry, will thrive faster and with less food than when folded in the usual way in the open field. I must remark likewise, that the drainage of moist clay soils, which formerly were, from being saturated with surface water, difficult to cultivate, is now well understood; without which drainage the necessary operations of husbandry cannot be carried on to good purpose; and without which, the cultivation of roots should not be attempted; for, if attempted, it will not be successful. I am sorry, gentlemen, that I am not enabled to state to you, as the result of my own experience, facts on which you might safely proceed; but that I shall be compelled instead to resort rather to hints and suggestions for your adoption or rejection. These I leave to your better judgment, and to the test of future experiment and experience.

I will commence then by telling you what I did for upwards of thirty years since, when I began to attempt to be a farmer and a grower of root crops, and you may take me as an example to avoid: shun my errors. Well then, being aware of the great advantage of a plentiful supply of roots as food for my stock during the winter months, whereby to save my hay ricks, and increase my heap of dung, I divided my arable land into eight parts, taking as a rotation of cropping—turnips, barley, clover, wheat, cabbages and beet, oats, beans or vetches, and lastly wheat: thus a fourth of my arable land was annually producing a root crop. This went on for a bit; I grew roots, good ones, and plenty of them; but how were they to be got off the land, at that time not thoroughly drained? I will tell you how it was; got off they must be, for it was out of the question to think of feeding them off where they were growing; so I pulled them and fetched them away in carts as I wanted them, let the weather be as it might, wet or dry. You will say I got into the mire; I did so most certainly, but this was not all, for as the season advanced, and when the spring crops of oats and barley were to be planted, the land could not be worked properly, notwithstanding much labour and pains were bestowed upon it, the lent grain was consequently oftentimes a failure, or at best an indifferent crop, and so the scheme was, after a time, given up: mine was an experiment farm rather than an example, at least one to be followed. I did not however like to allow myself to be dead beaten; and finding the great advantage of having a few roots in winter for my stock, I changed my course of cropping, and managed the eight pieces of arable land I at that time farmed, as follows, viz., a rotation of six years. First, fallow or vetches manured, wheat, clover, wheat, beans—the land previously manured, and lastly oats; to be succeeded again by winter vetches. On this rotation I have no cause to complain of my crops, which have been, to the full, as good as those of my neighbours.

The two remaining pieces, situated near the homestead, and also being tolerably sound land, they having been pretty effectually drained, I reserved for roots alternately with white straw or corn crops. The roots I have always carted off at

my convenience, choosing as dry a time as I could, and have stowed them away with various successes as to their keeping sound. This plan I have now pursued for several years, and have found the roots so grown to be of considerable advantage to my winter stock of cattle. The quantity of land being small, not exceeding seven or eight acres in a season, I have been enabled to go on without difficulty. These two pieces I consider the most profitable of my whole farm, having always grown me excellent crops of roots and corn alternately, having never lain idle, or having required a naked fallow for upwards of thirty years. I have always kept them clean at a small expense, by forking out the little couch the land produced at a cost not exceeding in any one year, two shillings per acre. The ground is never ploughed more than once in preparation for the root crop, and in alternate years the succeeding corn crops are usually put in, the ground being worked with the scuffler without ploughing. The only difficulty I had to contend with was to get the land into fine tillage for the root crop by once ploughing. This I effected after the following manner. As soon as my winter vetches were in and my wheat sowing finished, (which I always drilled on a stale furrow, and in many instances after the scuffler, without ploughing at all), I looked over the field intended for a root crop very carefully; forking out with a three grained fork every blade of couch that was visible. This, after the land had been once got into condition, was by no means either a troublesome or expensive job; never exceeding, as I before observed, two shillings per acre. The ground being thus prepared, at my earliest convenience, and having previously well opened out the old furrows in dry weather, I carted out on the land the usual dose of dung: and spreading the manure by carefully shaking out every lump so as equally to cover the ground with it, I proceeded immediately to plough it into ridges of six feet in width, taken a deep furrow of at least seven inches. The land thus ploughed, remained to receive the benefit of the winter frost, to mellow and sweeten till the spring, at which time, when thoroughly dried, I passed, if found needful, a heavy roller lengthways and across the ridges; and then put the scuffler to work lengthways, with the broad shares, cutting the whole surface about two inches in depth, and thereby destroying a multitude of annual weeds which had sprung up since the land was ploughed. The dung ploughed in before winter remained undisturbed and well covered. Nothing now remained to be done till the time arrived for planting the cabbages and beet root, or for drilling the Swedes: at which time the scuffler was again put through the ground nearly to the full depth of the furrow, now pretty well mellowed, mixing the manure and further pulverising the soil. By these means I have rarely failed to produce the requisite fine tilth; and have never been compelled to sow the Swedes twice. For should I apprehend danger of losing the plant from an attack of the fly, I have while the dew was on the

young turnip, dusted them with fresh slacked lime; this I have always found a complete safeguard. The roots have been carted off the land and stacked away, and the land immediately prepared and drilled with wheat, generally with the scuffler alone, or it has got one furrow for some white straw crop, to be planted in the spring.

I have now told you all I know and have practised in the growth of root crops on my land, as grounded on my own actual experience, and shall have now to launch out into the region of fancy and untried experiment. No doubt you will say, why not let well alone; for if you do not you will again, in all probability, stick in the mire; perhaps I may; I cannot, however, burn my fingers in this matter, and have sanguine hopes of better success than attended me when I commenced farming many years since. Circumstances are now in my favour, which were then against me. I imagine that I possess more knowledge and experience; the drainage of the heavy clays is now well understood; a greatly improved method of storing the root crop is practised; which, (since we can by no means reckon upon feeding off the turnips as they grow), is a necessary part of the business; and Mr. J. Morton, by means of accurate and well-tested experiments, as shewn us that sheep can be fed in littered yards and under shelter, well and quickly, with less food than they would have consumed in the exposed and open field fold.

Now, gentlemen, matters standing thus, I confess that I am induced again to tempt my fate, and a second time to alter my course of cropping.

Arable land must, by management and by judicious husbandry, be rendered fit, not only to produce good corn, but also by the introduction of roots, where practicable, and by green crops, be made capable of carrying a large stock of cattle and sheep. I consider that system the best and most profitable where the land is made to produce alternately, food for man and beasts; in other words, that two white straw crops should never be permitted to be planted in succession; this is the foundation and the ground-work of all good husbandry, and ought never to be departed from; it is the sole restraining covenant I would ever introduce into an agreement between landlord and tenant as to the cultivation of his arable land; for if this were strictly adhered to, the land and the landlord could never be materially injured by a tenant; and it might also be a means of removing a prejudice, at this time prevailing in the minds of most of the landlords in the vale of Gloucester, against converting worthless pasture into tillage land; which, if it were set about judiciously, would benefit the tenant, the landlord, and the country at large. I can show you two pieces of land which I myself broke up from pasture more than thirty years since; and which at that time produced me little or nothing, but which are now very valuable arable land; and as they have never been over driven, are at present more fitted for being returned to pasture, and are in better heart than when first ploughed up. But, gentlemen, you will say I have been running rather

wide of the subject proposed, and I come back to tell you what I next propose doing, or endeavouring to do.

I must first observe that much of my land has been laid out in wide ridges of eight yards, gathered twice from the flat, and drained where needful, with tiles and stones up every furrow; the remaining part of the farm is in lands of six feet, or two yards wide, and has been drained many years since with shallow stone drains in a direction across the run of the furrows at intervals of eight or nine yards, and with tile heads. This method of draining does not answer upon our close and adhesive clay soils, as it does not carry off the surface water readily. It is my intention to set out these lands afresh, and to put them (as I have done the others) into ridges of eight yards in width, and to intersect the old drains, where necessary, by running others up the new furrows, at intervals of sixteen or thirty-two yards. By this means I hope to give the old drains a quicker vent, and to enable them to discharge the water more readily than they do at present. Other drains may at a future period be laid in those furrows which are at first missed, whenever it may appear necessary. We will now suppose the ground drained, and rendered as sound and dry as such land can be made. We will also suppose the land to be in fair condition and tolerably free from couch and root weeds (for should the field have been run out, as we say, and full of couch, a naked fallow on this kind of soil must of course be resorted to). My mode of proceeding will be thus: I shall in the first place have the ground very carefully looked over, and with three-grained forks dig up every blade of couch and every dock that can be seen; having previously finished, as I said on a former occasion, sowing my winter vetches and drilled my wheat. The land intended for a root crop is then to be ploughed, in a direction, diagonally to the run of the furrows, into single bouts of twenty-seven or twenty-eight inches; or into two bout ridges where cabbages are intended to be grown. The appearance of the field will then be like garden-ground laid up in trenches. I should plough as deep a furrow as practicable, exposing a large surface for the winter frosts to mellow and sweeten. After the land has become sufficiently pulverized and the trenches are in a dry state, with a double mould-board plough I purpose thoroughly to open out and considerably deepen them, directly following with a stout plough, having the turn-furrow taken off, and with a strong team of horses harnessed at length, subsoil or stir the hitherto unmoved soil in the bottom of every furrow trench, as deeply as may be practicable—six or eight inches at the least. This being not trampled on while in a moist and tender state, will lie light and hollow for the air and frost to sweeten and pulverize. Nothing will have to be done now to the land till the dry weather sets in in the early spring, be it in February or the beginning of March; at which time I intend to set the dung-carts to work, and having spread the manure carefully in the bottom of the trenches, with a

pair of horses driven abreast cover it up, by splitting or reversing the bout ridges. These are again to remain untouched till well dried and pulverized, when an opportunity will be afforded of subsoiling or stirring the intervals. Thus then nearly the whole of the ground will have been loosened to the depth of twelve inches at the least, and a sufficient tilth gained, and that too at no very ruinous expense. I prefer to cultivate my turnips and other roots (such as cabbage and beet) on the ridge system after the Scotch manner, because it will give me an opportunity of working the ground deeply and frequently, during the growth of the crop; and because it will allow me, at the time of singling out the turnips, to draw the earth well away from the plants, whereby they appear to swell, and form better bulbs. I am now working a piece of seven acres in this way for roots, and shall be happy to shew what I am about, to any members who may feel disposed, or who may think it worth their while to pay me a visit.

It is somewhat remarkable that in the autumn of last year, I was suggesting the mode which I have now adopted of preparing my land for roots, by trenching and subsoiling, to one of our members, when he observed to me that he had met with the same idea or something similar to it, in a Gloucester Journal of November last. That member has sent me a copy of the paper, which I have now lying before me. I completely agree with the writer in principle, but not exactly in his practice. In the first place, I do not well understand how land can be ploughed into single bout ridges with a wheel plough, and I consider a swing plough with two horses abreast far better calculated for the operation. I would likewise confine the trench ploughing and subsoiling to the fields under preparation for the root crop; as I well know by practical experience, that a surface which has been exposed to the action of the weather through the winter should by no means be ploughed down, but should alone be worked by the scuffler and harrows in putting in the lent grain. Strong heavy clays, such as I am farming, should be carefully and deeply ploughed before winter; this will enable the farmer (provided his land has been properly drained) to get through the necessary work in a way that would surprise any one who has never given the plan a trial. Our calcareous clays by exposure are rendered so friable that in spring they can be worked quite as readily as the lighter soils; but turn up the stiff and clung bottom after winter, and you will never recover that you have lost—namely a fine workable surface; but instead you will be plagued with clods as hard as brickbats, which you may beat and hammer to all eternity without producing the desired effect, and that too at a vast expense. I am happy to find that some of my neighbours are at length beginning to open their eyes and are following the lead I have given them.

Having thus stated to you in the best manner I am able my opinion of the practicability of raising root crops upon heavy soils, with profit and advantage to the grower, it only remains for me

to declare to you to what extent I would propose their culture. I have now before me a paper, sent me by a friend out of the county of Nottingham, wherein Mr. Richard Parkinson, an eminent practical farmer of that county, has stated that on a clay farm, he has for many years past pursued a course of cropping on a rotation of twelve or twice six years. I consider that his authority may be relied upon, and would follow in his track. I myself am holding twelve pieces of arable land which I would crop nearly after Mr. Parkinson's manner:—

1 Cabbages, carrots, mangel wurzel, manured with dung.	7 Swedes, manured with dung and bone dust.
2 Oats or wheat.	8 Wheat or barley.
3 Seeds (white clover and ray grass).	9 Clover or cow grass*
4 Ditto (red and do.)	10 Wheat.
5 Wheat or oats.	11 Beans or peas, dunged.
6 Winter tares.	12 Wheat.

Thus one sixth part of the whole arable land would be under a root crop. I have little doubt of the practicability of this rotation provided the land is furrow-drained as it ought to be, and the ground thoroughly cultivated, and subsoiled on the plan I have proposed. I will now leave the subject in your hands. The cultivation of root crops on such soils as those I am farming, has been little practised and less understood, but is a matter well worthy your serious attention. I would by no means advise you to attempt it till such time as your land has been properly furrow-drained. And observe that your roots and turnips must be planted early, so that they be ripe and ready for stacking away before the bad or wet season sets in in the autumn; for you must not attempt to feed them off where they grow, or you will be, as I was some years since, set fast in the mire; and from which I feel assured you will not get out without serious loss.

In answer to a question as to his method of preserving roots, Mr. N—— stated that they were heaped between hurdles fixed about six feet and a half from each other, and lightly covered with straw or litter, so as to allow a free circulation of air among them, which was essential to their preservation. On heavy soils he considered that the maintenance of a flock of sheep was a very secondary object, as it would answer better to consume the roots in the yards by means of large cattle. It would be found that a farm consisting of arable and pasture land in about equal proportions would be the most profitable.

Mr. C. H—— strongly recommended the cultivation of the Orange Globe mangel wurzel. It was particularly suitable to heavy land, and while it nearly equalled the Red Variety in the quantity of its produce, its feeding properties were as great as those of the Swede, and it was fit for use throughout the winter. It was also fit to remove from the land early in October, and before the

\* Dressed with lime previous to wheat, or a slight dose of compost.

Swedes were ripe. Now that shed-feeding was found to answer, clay land would be able to compete with the lighter soils, provided the roots could be safely removed.

Mr. L— thought that part of the Swede crop on clay land should be shown early so that they might be fed off before winter, the other part should be sown later to be stacked for spring keep, but he very much objected to the growth of Swedes on very heavy land, as they could seldom be grown with profit on such a soil.

Mr. H— stated that some experiments which had been tried by Lord Spencer tended to prove that the feeding properties of mangel wurzel were greater in comparison with those of Swedes, early in the season than later. He had himself observed that the nutritive properties of roots were greater in proportion to their specific gravity. It was known that the upper parts of roots were lighter than the lower parts, and it would be an interesting experiment to ascertain whether their feeding properties corresponded.

#### SIXTH MONTHLY MEETING, JULY 5th.

Subject, "*The practicability of a corn-rent in lieu of a money payment for the occupation of land.*"

Introduced by Mr. W. R. C—, who said that however feasible the system of corn-rents might appear at first sight, and however applicable it might be in the case of an unencumbered property, still the landlord of a mortgaged estate could not fairly be expected to adopt it, because whatever fluctuations might take place in the value of produce, and therefore in the amount of his rent, he would still be obliged to pay without diminution, the same stated annual sum, and thus he would become involved in difficulties.

Where, however, a property was free, the adoption of the system would be attended with great benefit to all parties. The average prices of corn at the nearest market town, for a period of not less than four, or more than seven years, should be taken as the basis of the rent, and it would be an improvement if the value of cheese and butter were also taken into account.

Mr. C— concluded, by saying that he considered it very desirable that all descriptions of corn should be sold by weight instead of measure, and that the interest of all monies invested in mortgages or other landed property, should be paid on the principle of a corn-rent; justice would then be done to all parties.

Mr. W— thought that, to render a fluctuating rent fair, the prices of the produce of pasture land must be taken into account as well as that of arable. All farms, whether in pasture or tillage, should be, to a certain extent, stock farms, and therefore the profits of the farmer would be affected by the price of meat. If Mr. C—'s suggestion with respect to mortgages were adopted, he thought that few people would be willing to invest their money on such a security.

Mr. W— spoke in favour of corn-rents; he thought a more equitable plan for all parties could not be adopted; landlords and tenants would rise

and fall together, and all necessity for throw-backs and reductions of rent would be obviated.

A seven years' average was too long. Three or four would be quite sufficient.

Mr. J. L—, and other members objected very strongly to what Mr. C— had said relative to mortgaged estates. It ought to make no difference, whatever, to a tenant, whether the farm he rented was free or encumbered to any amount.

#### SEVENTH MONTHLY MEETING, AUGUST 5th.

Subject, "*The advantages of a better method of entering upon and leaving farms.*"

After some preliminary observations relative to the importance of the subject, and after stating that the observations he was about to make related entirely to hill farms, with which alone he was acquainted, Mr. P. M. proceeded to shew that the present system of letting farms from year to year, on condition of their being cultivated according to "the custom of the country," was most prejudicial to the interests of all parties concerned, inasmuch as it afforded to the enterprising farmer no certainty of remuneration for the outlay of his capital.

Supposing a man, of sufficient capital and ability, had taken a farm under a landlord whom he has reason to believe is disposed to act fairly towards him, has expended a large sum of money in draining, manuring, and otherwise improving his land, so that at last he has brought it into a high state of cultivation—under these circumstances the property is improved—the rent is regularly paid—an increased number of labourers are employed—a large amount of the necessaries of life are produced for the public good, and the husbandman has a right to expect that he will be permitted to reap the fruits of his labour, which, under the present landlord, no doubt would be the case. But suppose he dies, and is succeeded by a man of a different character, who wishes to ascertain and to receive the outside value of his property. Upon inquiry he finds that his farm is worth more than its present rent, in consequence of its improved condition. He gives his tenant the option of quitting the farm or paying an additional £100 a year; and in answer to his remonstrances tells him that he has nothing to do with the engagements of his predecessors. The tenant of course feels hurt, and takes time to make up his mind. The affair is buzzed about. Many persons are anxious to take the farm, and offer to do so at an advanced rate, knowing that it will answer their purpose for a time, in order to get out of it what the present occupier has been so long in putting in. This naturally determines the landlord not to take less than the rent he has asked. The case of the tenant is hard in the extreme; he must either give up his farm, and leave others to reap the fruits of his labour, or he must retake it at an increased rent, in which case, disgust at the transaction probably makes him alter his management, and thus, in a few years, reduce the land to the condition in which it was when he first took to it. Such cases are too common, and the mischief extends beyond

the parties immediately concerned, as others are deterred from a proper system of cultivation by the fear lest they should be treated in a similar manner. According to the present system of entry, suppose a Gloucestershire hill farm of 550 acres of arable land was cropped as follows:—

- 50 Acres sainfoin, of various ages.
- 100 Acres turnips and vetches, fed off.
- 100 Acres barley or oats.
- 100 Acres artificial seeds, one year's growth,  
mown.
- 100 Acres artificial seeds, two years' growth, fed.
- 100 Acres wheat.

A person leaving such a farm at Michaelmas would only be paid for his sainfoin land, the actual cost of cultivating the turnip land for the crop then growing, the vetch land, if fed off, and the seeds sown in the spring of that year, and this without any reference to the state of cultivation of the remainder of the land. The slover, if he only cultivated the turnip land last year, would receive as much as the man who had left the whole farm in high condition. Such a system is surely contrary to reason and justice, and the following is recommended in opposition to it.

The 50 acres of sainfoin should be paid for according to age and condition.

100 Acres of turnips.—Every act of cultivation should be paid for, and also the manure if purchased.

100 Acres of barley or oats. Allowance should be made if the land was highly cultivated for the previous crop, and especially if manure was purchased.

Some allowance should also be made for the 100 acres of seeds.

If a hill farm has been highly cultivated, the occupier has a fair claim for compensation on every piece of land that has been well manured and properly cultivated for turnips, until he has taken his wheat crop. And if, on the contrary, the land has been left in a bad state of cultivation, it is equally just that the off-going tenant should be required to pay the amount of damage as assessed by arbitrators fairly chosen. The landlord requires as much protection against a bad tenant, as a tenant against a bad landlord.

Such a system, if generally acted upon, would have a great effect in improving the cultivation of the country. It would be a safeguard to the good tenant in various ways; if he continued to occupy his farm, he would reap the advantage of his good management; if he left it he would be repaid by his successor.

It would also prevent unfair applications for farms, as the good condition of the land must be paid for before possession of it could be obtained. At the same time, as the farms would always be in fair order, the landlord would have little difficulty in obtaining a good tenant.

The amount of capital required upon entry may be brought forward as an objection to the system, but if a man has not a sufficient command of money to pay the requisite charges on entering a farm already in condition, and capable of bearing large crops, he will surely be incapable

of bringing into order one which has been worn out by previous mismanagement. He would, therefore, be better off without the farm, and the landlord without such a tenant.

However difficult it may be to bring such a system into general operation, it is far from being impossible; and it is much to be wished that practical men would further it by all the means in their power.

Mr. C. H.— thought that this system would act as a salutary check upon tenants, who were disposed to take larger holdings than they had capital to manage. It could not but be advantageous also to the landlord.

Mr. W.— considered that a tenant should be allowed to claim a proportion of the value of any manure which he had applied to the land, and from which he had only taken one crop.

#### TENTH MONTHLY MEETING, NOVEMBER 4th.

Subject: “*The necessity of a better method of entering upon and leaving farms in the Vale of Gloucester.*”

Mr. J. L.— having expressed his cordial concurrence in the opinions expressed by Mr. P. M.— on a former occasion, in so far as they related to the Cotswold hills, proceeded to say that he considered the present law of landlord and tenant very defective, inasmuch as the farmer renting from year to year, and liable to be deprived of his farm at six months' notice, was deterred from making improvements which were requisite, and which he would be willing to make if he were sure of a fair return for his outlay. He considered that an industrious, improving tenant, who had been farming highly, ought in fairness to receive, on quitting his farm, a compensation for all acts of husbandry performed during the last three years of his tenancy, and of which he had not already reaped the benefit. He was pleased to see that Lord Portman had given notice of a motion in Parliament relative to this subject, and he hoped it would lead to a satisfactory alteration in the law. Should this be the case, farmers with little or no capital would not be so eager to get possession of the land merely with a view of reaping the benefit of the industry and expenditure of their predecessors, as the incoming tenant would very fairly have to pay down a sum of money in proportion to the condition of the land. It would also be a great improvement if leases were granted, securing to the tenant, or at his death, to his family, the repayment of any sums expended in permanent improvements, unless he had already occupied the farm a sufficient time to have been remunerated by its improved condition. Suppose a tenant were to die after being promised a new lease by his landlord, it would be very hard if his family were not repaid the money expended upon the faith of that promise. Such a case ought to be provided against in the agreement. Again, in consequence of the frequent fluctuations in the prices of agricultural produce, it would not be safe for any farmer to take a lease, except at a

rent regulated by the price of corn; and if, as was generally the case in this part of the country, a considerable part of the farm was in grass, the price of cheese ought also to be taken into account. Such an arrangement would remove the possibility of doubt, and must therefore be beneficial to all parties.

Mr. L— proceeded to comment with much severity on the covenants common in the yearly agreements of the Vale of Gloucester, and produced a copy of an agreement upon which a large landowner of the county was in the habit of letting his estates. This document he considered very oppressive, and wondered how a landlord could propose, or a farmer could be found to adopt, such an agreement. The former he was sure was acting under the influence of his steward.

He must also say, that in consequence of the very great reduction in the price of dairy produce, it was most desirable that a large portion of the inferior pasture-land should be converted to tillage. This would be quite as much for the benefit of the landlord as of his tenant. In many parts of the country, also, draining was needed—this ought to be done at the expense of the landlord, and the occupier should pay a reasonable interest on the outlay.

At such a time as this, it became the duty of the landlord to make some sacrifice for the benefit of his tenant. He was happy to see that many of the landowners of this country were putting their shoulders to the wheel, and permitting and assisting in the removal of trees and hedges, draining, and breaking up of old pasture-land; but as all this, however desirable, brought upon the tenant a considerable outlay of his capital, he thought the business would not be complete without a large abatement of rent.

Mr. B— thought that landlords had a perfect right to let their farms upon any agreements that they liked, if tenants were found willing to take them. He was not aware of any law of landlord and tenant, and no farmer was obliged to take a farm if he did not like the conditions. At the same time he agreed with Mr. L— in thinking that a six-months' notice was too little; a longer time ought to be allowed, and a tenant should be paid a reasonable remuneration for his improvements. If the landlord was at the expense of the improvements, it was only fair that he should receive an additional rent by way of percentage on the outlay.

Mr. C. H— could not agree with Mr. L— in blaming so strongly the agreement he had produced. Excepting in one or two particulars, it was fair. He thought it would be very advantageous both for owner and occupier, that an off-going tenant should be repaid for his improvements, but considered there would be great difficulty in the equitable adjustment of a corn-rent. It was very desirable that a few practical farmers, members of the club, should meet and draw up a set of covenants, which would, in their opinion, be suitable for adoption in the Vale of Gloucester. It would be a most useful guide on many occasions.

## STATEMENT

*As to the Mode of Erection and Tenure of Cottages for Labourers and Tradesmen on the Estates of Annandale, belonging to J. J. Hope Johnstone, Esq., M. P.*

BY CHARLES STEWART, ESQ., HILLSIDE.

About thirty years ago, the labourers and country tradesmen generally held their houses under the tenants. Having been mostly old and thatched, they had become uncomfortable, and in many cases, from the situations being adjoining the farm-steadings, were incommodious and had to be taken down.

A new system of erecting them was adopted.

A lease of twenty-one years is given of the house-stead and large garden, at a rent of 5s. yearly. The tenant erects the house at his own expense, excepting the price of timber, which is given from the estate, and hewn freestone for chimney heads, door and window rybotts, jambs, ridge-stone, &c., in all costing the proprietor from £5 to £6.

The proprietor reserves right to resume possession, or giving six months' notice at any Whitsunday, and paying the proportion of the tenant's outlay for the time unexpired of the lease, the value or outlay being fixed at the commencement at £26 5s., £31 10s., or from £35 to £40, according to the size of the house.

The smallest house is generally thirty feet long by nineteen feet wide over walls. They are all covered with Welsh slate, and lofted with Scotch fir boards. The room end is also boarded, and, in most cases, the kitchen is either flagged or boarded.

The cost at the present time is—

	£	s.	d.
Welsh Slates . . . . .	4	10	0
Mason and Slater . . . . .	5	10	0
Joiner and windows, two in front, and one or two small ones in gable . . . . .	7	0	0
Price of lime and other outlays . . . . .	4	0	0
	<hr/>		
	£21	0	0

The other cost is confined to the tenant's own work, in raising and finding stones, which are abundant, assisting masons, and carriages, which, in most cases, they get in kindly exchange for farm work to farmers and neighbours.

The erection of these houses has been gradually going on for the last thirty years, and now reach seventy in number, in different parishes of the estate, but chiefly in the parish of Johnstone, where, the extensive plantations and other

circumstances, there is most employment for labourers.

In two-thirds or three-fourths of the cases, the tenants have, on separate leases, mostly from year to year, fields of two, three, or four acres of land, which they improve for pasture, for summering and wintering a cow, sometimes cultivating a little, and in all cases, by the manure laid either on their own or the neighbouring farmer's ground, securing potatoes for the family, and for one or two pigs for sale. As the ground is generally coarse, and in corners not interfering with the regular enclosures for farms, the rent is low, seldom above 20s. per acre, nor, in all, above £4.

There have been always numerous applicants for every situation proposed, especially in Johnstone, where materials for building are convenient, and employment is certain; but they have been cautiously granted.

None but persons of the best character, well known in the neighbourhood, and generally natives of the estate, are taken. Most of them have been ploughmen, and of good character; have saved a little money, and wish to settle with their wives and families; or elderly men or widows, who have well-doing children as servants, anxious and able to assist them; a few country carpenters, masons, shoemakers, &c. Great care is taken not to place any without a certain prospect of future work; and the state of the population of the parish, in reference to this, is kept strictly in view, with the intention of keeping the numbers under the demand for labour that should profitably and naturally be undertaken.

Many more such houses may still gradually be built, dependent on demand for employment in particular localities, the removal of more of the original thatched cottages, and opportunities for conveniently attaching pieces of land for cows' grass, &c. In some cases, where a deserving and suitable man is unable to undertake all the cost, assistance is given by providing slates or windows, and charging interest.

The object of the power of resumption was to check misconduct; but so little of this has occurred, that scarcely one instance has happened in which a removal has taken place on this account. Many leases have expired, and they are renewed at rents of 20s., or 25s. the tenants making farther improvements in internal comforts, slating byre, &c. They have, with little exception, shown great industry and regularity; and there is scarcely an instance of any of the families needing parish aid. Originally of good character, exertions are made to keep permanent for the family situations where so much more security, independence, and comfort, are to be found, than where under a tenant, or in a village, or a house held from year to year.

The houses are generally on the sides of the turnpike or other public roads, detached from each other, not formed into anything like a village, a circumstance always favourable to good order and morals. Being in public view, the occupants have a strong inducement to keep them neat, whitewashed, with surrounding trees and gardens, and other appendages, in good order; and as a proof of this, for the last three years in Johnstone, and this year, 1843, in Kirkpatrick-Juxta, and Applegarth, the premiums of the Highland Society for the best kept cottages and gardens have been nearly all gained by the occupants under this tenure.

This system can, no doubt, be more easily carried into effect where the plantations of an estate afford home timber in abundance; and also it is more applicable to proprietors of extensive estates, where, in the management, the proper policy is to make an annual outlay in making and keeping fences in order, draining, and other improvements, whereby a portion of the labourer's work is directly paid by himself,

From experience, it can be strongly recommended as most conducive to the comfort, independence, provident habits, and general good conduct of the labouring classes; to the well-being of whom on his estates it is as much the duty, and will be the inclination, of the liberal and considerate landholder to attend, as to the character and prosperity of his larger tenantry.—*From the Quarterly Journal of Agriculture.*

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#### STEW PONEY FARMERS' CLUB.

Mr. Banton's paper on manure, which we gladly introduce in our present number, will be found in itself a sufficient proof of the practical utility and success of the Stew-poney Farmers' Club. Mr. Banton's essay is a good straightforward production, upon a most important subject to farmers generally, and one possessing the rare merit of beginning at the right end, and showing that much might be done by staying at home without seeking manure from abroad. We can prove—and shall take an opportunity of so doing—that in many instances, instead of the natural supply of riches from the farm itself being an accumulating means for the preservation of the soil, and carefully supplied according to nature's bountiful law of liberal compensation for exhaustion, thousands and thousands of tons of agricultural riches are yearly rolling down the Severn, the Wye, and, nearer still, the tributary brook running in the neighbourhood of Bromyard, all supplied by farm yards near to and distant from them. Mr. Foley, and the other portion of the club, have reason to congratulate themselves on the talent displayed at so early a period of its existence, the last being only the third meeting.

In introducing to you the important subject of manures, I would wish you distinctly to under-

stand that I do not presume to dictate to the practical men I see before me the way they should make their farm-yard manure, or use the liquid or artificial manures. I doubt not that many of you, from your longer experience and better practice than mine, can teach me much more than I can tell you, and I would wish you also to understand that I came here this evening as much with an idea to learn as to teach, and I trust my introduction will lead to a discussion on the subject, and will elicit such facts from others as will materially benefit all. My intention is to give you a plain practical statement of the plans I adopt myself with respect to manures, and those I consider the best calculated for certain crops upon such land as I shall hereafter describe.

The soil, when it becomes exhausted of its component parts necessary for the support of vegetable life, must be recruited, either by leaving it a long time to nature's gifts, or by the application of artificial means. In new countries, as in primitive times, the former plan is now adopted; but in a country so circumscribed as this, where land is so valuable and the necessity exists for a quick succession of exhausting crops of grain, owing to the density of the population, and the consequent demand for food, it becomes the duty, as well as it is the true policy of every British farmer, to produce as much human food as he possibly can; and in order to accomplish that, he must make the best use of the means within his reach, namely, the adoption of the best known modes of aration, as well as the most approved and judicious plans of treating and applying manures to the various crops.

I shall divide my subject into three parts—namely, farm-yard manure, liquid, and artificial manures. I will first speak of farm-yard manure, a subject upon which much has been written, and, consequently, I have to go over beaten ground.

Many of the old farm yards are badly situated, and as badly formed; from some it is almost impossible to prevent the liquid manure from escaping. In former times it appears to have been the especial aim of the planners of farm yards to construct them so that the liquid from them could be readily conducted to a neighbouring stream or a public road, of which there are but too many proofs at this time remaining.

I consider the bottom of a farm yard should be a hard surface and impervious to water, having a slight concavity and inclination to one or two points, if a large yard, from which drains should be laid to a tank or tanks in some convenient situation, so that the drainage may pass quickly off and be disposed of, as I shall notice hereafter. Before any manure is deposited in the yard, I think it a good practice to give it a layer of soil all over, say one foot thick; and, it matters not how poor the soil may be, it will come out a rich compost, ready to be carted to the field, and well calculated for a top dressing for seeds or turf. I also decidedly think that all farm-yard buildings should be spouted, the droppings from the eaves

saturate the manure with too much water, which carries away with it the most valuable and soluble parts, and also creates fermentation and consequent loss, often when fermentation is not required. When buildings are spouted, and the yards have a layer of soil at the bottom, there will not be much superfluous liquid running from them, and perhaps the less the better; the virtue will remain in the manure in the yards, to be given out in the best place and when most wanted, immediately under the young plants in the fields. Manures of all kinds in the yard should be well mixed together; and it will repay the labour of a man a few hours every week employed in such work, as most waggons, in particular, imagine they have done with stable manure if they only throw it out at the door. In carting manure from the yard to stack it, it is advisable that loads should be taken from the stables, cowsheds, and piggeries alternately, if the manure has not before been well mixed in the yard. The stacks of manure in the fields should never be carted over unless it is wanted to check or prevent fermentation; compression excludes the air, and has that effect. There should be also a layer of soil one foot thick placed at the bottom of the stack; and the covering of the top and sides of pies of manure prevents a too rapid fermentation, probably retains some fertilizing parts that would otherwise escape, and, I believe, is good practice. Theory and practice are at variance with respect to the state in which farm-yard manure should be applied to the land. The theorist says unfermented—the farmer fermented. It certainly depends much upon what crop, and when applied, whether the manure should be slightly or well fermented. Every practical farmer knows that for a wheat crop the manure, particularly upon strong lands, should not be nearly so much fermented as for the turnip, which requires to be forced through the first stages of its growth as quickly as possible, in order to avoid the attacks of its enemies and disease, to which, in an early and feeble state, it is liable. I think that *all* manure composed partly of vegetable matter should be fermented before it is applied to the land; but the fermentation, if possible, should never be allowed to be violent, but gradual and uniform; and then I cannot believe that much, if any, loss would be sustained by the practice. The heat of manure, I believe, should never be more than 100 degrees, otherwise the excess of fermentation tends to the destruction and dissipation of the most useful and valuable parts of the manure. A mixture of one-third farm-yard manure and two-thirds scutch, with a little salt added, makes an excellent dressing for tankard Swedes or common turnips. I am glad to see that the old practice of burning scutch is now almost exploded; I have never burnt scutch during the last twenty years, and if I were now compelled to burn a waggon load of straw or a waggon load of scutch, I would burn the straw, so well am I convinced of the power of fermented scutch as a manure. Farm-yard manure, if possible, should never be long exposed to the atmosphere when spread, and

both in summer and in winter doubtless is much injured by exposure, and more so if but slightly fermented. When yard manure is reduced by fermentation to a cold unctuous mass, in a state to be cut by a spade, I think great loss is sustained. I prefer having my manure for turnips, which I ferment the most, in that state in which it requires to be turned three weeks or a month before it is wanted, to make it in a proper order for the crop; the turning renews the fermenting process, and in that state it is that I like to apply it to the land. An incipient heat in the manure will continue some time under the soil, if immediately covered in, and will materially assist the germination of the turnip-seed, and accelerate the growth of the infant plant. I would here observe that I get all the straw I can from my wheat crop; I have most of it cut by Welshmen, with broad hooks, or I otherwise mow it, but I prefer the former plan as the best and the cheapest: one inch of straw at the bottom will weigh as much as three inches at the top.

I now come to my second subject—liquid manure. There are many ways of using it, but I will first speak of the tank to contain it. Tanks are best constructed of masonry, and well grouted at the bottom and sides; those with the spouting round the yards, perhaps I may be allowed to say, should be at the landlord's expense, as every convenience should be given to the tenant to enable him to make the best use of his means in every way, and to progress in improvement for the benefit of himself, his landlord, and the community. If he have proper buildings and other necessities required for the good management of his farm, and neglects to make use of them, the fault rests with himself, and the landlord must be exonerated from blame. My tank is at the back of my farm buildings, and the whole of the liquid from the yard is conveyed to it by a culvert. In it I have a cast-iron pump, that cost me some years ago forty-five shillings, but there are now pumps to be had much cheaper, that answer every purpose. I collect, for the purpose of saturating with liquid manure, all the superfluous chaff, old thatch, parings of banks, leaves, road-scrapings, &c., that are to be found upon a farm, and not sufficiently rich to be applied as a manure without some preparation. Layers of this heterogeneous mass are placed in a square near to the pump, from which I have a moveable spout that reaches to the compost heap. Two lads with two buckets, the one to pump and the other to distribute the liquid over the heap, in a short time saturates the mass sufficiently for once: other layers are added, and the process repeated, and occasionally the heap is turned over: sufficient fermentation is produced to break down the fibrous matter, and by this means I make a good deal of rich manure. I find it good for any crop, but I generally apply it as a top-dressing for up-land pasture. Probably, when the yard is not spouted, there may be more liquid than will be required for the purpose I have named; in that case it may be used to saturate heaps of manure

or scutch, soil, or burnt soil, or used as a liquid manure for the land; though I do not much hold with the latter plan, as the season of the year, when there is most liquid to be disposed of (the winter) is the period when vegetation is dormant. It does not then require any artificial aid and it is probable that some of the volatile and most valuable parts of the manure might evaporate and be lost before the herbage is in a state to be benefited by them.

I now come to the third and last part of my subject, namely, artificial manures; the selection and application of which, perhaps it may be said, belong to what is properly called the science of agriculture. It is of the greatest importance, inasmuch as the English farmer cannot but with few exceptions, and those under some favourable and peculiar circumstances, produce sufficient manure upon his farm for the use of it, particularly if he is at all ambitious to improve its condition, which I believe, in this neighbourhood, most are now anxious to do. No district has made more progress of late in agricultural improvement than this by which we are now surrounded. It is to us all a matter of the first importance to know what is the cheapest and best manure we can buy, to suit both our pockets and our particular lands: so various are the soils of this country, and as various, too, are the circumstances of the men who till them, that it would be next to an impossibility to lay down any definite plan for all to act upon—even if that grand desideratum could be achieved—the knowledge of what particular manure is the best to apply to every quality of the variable lands of this country—so much depends upon the farmers' means, locality, &c.; and, though I cannot tell every individual farmer what is the best manure to apply to his land, I will give you the results of my own experiments with several artificial manures:—On the 12th of June last, I applied to several plots of land in a field prepared for Swedes, of a light loamy soil, and the subsoil a gravelly sand, the following artificial manures, which were carefully sown by hand on the respective plots, and then ridged up and drilled with Swedes, namely, the first plot was dressed with nitrate of soda, at the rate of 3 cwt. per acre: a second with guano, at the rate of 3 cwt. per acre: a third with Fisher's Fertilizing Compost, at the rate of twenty-four imp. bushels per acre: a fourth with white lime, at the rate of four tons per acre: a fifth with good farm-yard manure, at the rate of sixteen tons per acre: and the sixth plot was left without manure, as the test plot: the field was not manured for the preceding wheat crop, and had not been limed for six years. The Swedes were sown on the day the manures were applied. The guanoed plot took the lead, and kept it throughout the summer. The plots upon which the nitrate of soda and lime were, showed no more luxuriance than the test plot. Fisher's Fertilizer appeared about the same as the farm-yard manure. I have carefully weighed the Swedes, after being topped and tailed, on the different plots. The results

were these:—From the nitrate of soda, 6 tons 74 lbs. per acre; guano, 13 tons 15 cwt. 75 lbs. per acre; Fisher's Fertilizer, 11 tons 14 cwt. 16 lbs. per acre; lime, 8 tons 4 cwt. 54 lbs. per acre; farm-yard manure, 12 tons 16 cwt. per acre; and the test plot, had 8 tons 7 cwt. 20 lbs. per acre. Upon three other plots in a different part of the field, I put the following quantities of guano and nitrate of soda:—One plot had guano at the rate of  $3\frac{1}{2}$  cwt. per acre; another 6 cwt. per acre; and a third nitrate of soda at the rate of 4 cwt. per acre. I have weighed the Swedes upon equal quantities of land in each plot, topped and tailed, and found the weight per acre as follows:—From the  $3\frac{1}{2}$  cwt. guano, 15 tons per acre; from the 6 cwt., do. 17 tons 3 cwt. 13 lbs. per acre; from the 4 cwt. of nitrate of soda, 7 tons 9 cwt. per acre; guano should never be drilled with turnip seed. It is certain destruction to it if it comes in contact with a body of guano, and many crops have been lost by so doing, and guano condemned because the turnips never came up. I mix mine with about the same bulk of wood and coal ashes, putting both through a riddle, and breaking all the lumps of guano, so that it will all pass through. The ashes are better moist, so as to cause the dust of the guano to adhere to them; by thus mixing it, it will be sown more regularly, and prevent the wind carrying the finer parts of the guano whilst being sown. The person who sows it should be as particular as if he were sowing grain, and it is still better to have it sown both ways of the field. I have not now a remaining doubt as to the effect of guano upon a turnip crop on land similar to that I have described, if it is properly applied. I have now used guano three years; at first cautiously, not knowing its properties. The first and second years I was satisfied with the results; and this last year I have been bolder, and used it extensively for turnips, and as a top dressing for wheat, and I consider very beneficially. I used it in six different fields for turnips, both for Swedes and the common kind, and it marked its own ground in every instance. In one field of a much stronger soil than the field I have before described (a good wheat soil), with a subsoil of clay, I applied  $1\frac{1}{2}$  cwt. of guano, and forty-five yards of burnt soil per acre, and sowed it with Swedes late in the season, on the 23rd and 24th of June. It will be recollected that the rain, prior to that time, retarded the turnip sowing, and the drought afterwards prevented the turnips coming up; consequently the Swedes sown, as I have before stated, on the 23rd and 24th of June, did not make their appearance till the rain came, a fortnight at least after that time. I quite thought I had made a great blunder in sowing Swedes, but I am happy to inform you that such was not the case. I don't mean to say that they were as good as Mr. Evan's that carried off the prize, but they certainly were the best Swedes I grew last year, and I have no reason to complain of my turnip crop throughout.

Mr. Banton then read the following summary of the foregoing experiments:—

## SUMMARY.

Cost of Manure per acre, including Carriage, &c.	Increased weight of Swedes per acre, from the application of Manure.	Decreased weight of Swedes per acre, from the application.	Increased value of crop per acre, at 15s. per ton, of Swedes.	Decreased value of crop per acre, from the application.	Net profit per acre, after deducting expense of manure.	Loss per acre, from the application.
£. s. d.	tons cwt. lbs.	tons cwt. lbs.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
3 cwt. of Nitrate of Soda, at 18s. per cwt.	2 14 0	2 6 58	4 1 4	1 14 10	2 5 4	4 8 10
3 cwt. of Guano per acre, at 12s. per cwt.	1 16 0	5 8 59	2 10 6	2 0 0	2 5 4	4 8 10
3 qrs. of Fisher's Compost, at 10s. per qr.	2 8 0	3 7 46	2 10 6	2 0 0	2 5 4	4 8 10
4 tons of Lime, at 16s. per ton	3 4 0	4 8 92	3 6 7	14 7	2 17 7	4 6 7
16 tons of good farm-yard manure, at 7s. per ton	5 12 0	18 20	4 19 7	2 17 7	2 17 7	4 6 7
4 cwt. of Nitrate of Soda, at 18s. per ton	3 12 0	6 12 92	4 19 7	2 17 7	2 17 7	4 6 7
$3\frac{1}{2}$ cwt. of Guano, at 12s. per cwt.	2 2 0	6 12 92	4 19 7	2 17 7	2 17 7	4 6 7
6 cwt. of Guano per acre, at 12s. per cwt.	3 12 0	8 15 105	6 12 0	3 0 0	3 0 0	4 6 7

It thus appears from the application of lime and nitrate of soda a considerable loss is sustained in a turnip crop upon such land as I have described, which I repeat is a light turnip and

barley soil; and though the farm-yard manure produced an increase of Swedes per acre of 4 tons 9 cwt., it was not equivalent to the cost of the manure. The guano alone has made a good return for the application to the turnip crop, which it will be remarked is a light one, perhaps not averaging over the whole field more than thirteen tons per acre. The crop was much injured immediately after it was sown by a deluge of rain, the effects of which were very visible upon all the turnips sown about that time. As to the permanent effects of guano and other artificial manures, compared with farm-yard, their introduction into use for agricultural purposes in this county, particularly the guano, is so recent, that it would be scarcely advisable to give a decided opinion upon that point; but my conviction is that if guano be used at the rate only of  $1\frac{1}{2}$  cwt. per acre, that quantity would produce a good and beneficial effect the first, but it is probable that its effects would not be visible the second year. If from 4 to 6 cwt. per acre were applied for Swedes, I have no doubt but it would tell well on the barley crop—and when manure can be cheaply applied to land, it is not of so much importance whether it be more or less permanent. I like the system of applying manures often, but not in strong doses. Plants will take sometimes an excess of food when it is very abundant, which is detrimental to a healthy state, and consequently often engenders disease. As the above summary proves, nitrate of soda should never be used for turnips—it is good and beneficial for a top dressing for wheat and barley, and answers well upon grass land, but its effects are not lasting. There is one kind of soil and one only, that I know of, upon which I would caution my brother farmers not to be too bold in using guano, that is, as a top dressing for wheat, *where wheat never ought to be sown*—namely, on a sandy, ashy, dark soil. Upon such a soil guano has but little if any effect for wheat. I say this from my own experience, which has alone guided me in my previous observations upon this subject, and practice and experience are the best guides in farming pursuits as in everything else; but I would by no means be understood to disparage theory, or think lightly of the zealous efforts now being made by the first scientific men of the age to inculcate the science of agriculture, and aid its progress, though it is not always that theory is confirmed by practice. Sir James Murray, an eminent chemist, in a recent pamphlet published on a new manure, says, “I have made hundreds of minute trials on single plants, with single chemicals, many of which results promised wonders, and no doubt would accomplish wonders, could we pay equal attention to all the individual vegetables of a whole crop. In the small scale I thought chemistry would “soften rocks and bend the knotted oak,” but when I came to work on the great scale, my enthusiasm became less. I found that digging, draining, pulverizing, and manual labour were essential preparations, without which the land would not benefit by chemicals in the degree expected or required.” Thus writes Sir

James Murray, and therefore, gentlemen, I think we had better confine ourselves to practical experiments. For us the best laboratory is the field, the truest test is nature's, and farmers have fields always at hand, and nature ever in attendance.

At the conclusion of the paper a conversation ensued respecting the facts it developed, and several enquiries on different points were addressed to Mr. Banton, to which he replied. J. H. H. Foley, Esq., then moved that the thanks of the meeting should be given to Mr. Banton, for his able and interesting essay, which was unanimously agreed to. Mr. Banton expressed himself happy in being able to assist in carrying out the views of the club, and stated that he had some other experiments in progress, the results of which he should be most happy to report.

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#### ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A weekly Council was held at the Society's House, on Wednesday, the 28th of February—present, William Miles, Esq., M.P., in the chair; Thomas Alcock, Esq.; T. Raymond Barker, Esq.; Rev. T. C. Browne; F. Burke, Esq.; Colonel Challoner; F. Clifford Cherry, Esq.; Henry Colman, Esq.; A. E. Fuller, Esq., M.P.; Humphrey Gibbs, Esq.; Brandreth Gibbs, Esq.; W. H. Hurst, Esq.; Philip Pusey, Esq., M.P.; Professor Sewell; and J. Villiers Shelley, Esq.

*Cottage Tracts.*—The Secretary reported to the Council the distribution of 15,000 copies, during the past two years, of the articles on Cottage Gardening, by Mr. Main, and on Cottage Economy and Cookery, by Mr. Burke, re-printed from the Journal in the form of distinct tracts, and sold to Members at the prime cost of one penny each. The Council ordered that the question of a further re-print of 6,000 impressions of these tracts should be referred to the Monthly Meeting, on the 6th of March.

*Drainage.*—Mr. John Clarke, of Long Sutton, Lincolnshire, informed the Council that little or nothing having yet been done to improve the drainage of the lowland district, near Wisbeach, in which he resided, it had been his wish to draw public attention to the subject; and he had accordingly drawn up a work, of which he then presented a copy to the Council, on Thorough Draining, in principle and practice, with its advantages and simplicity as applied to a dead level; and addressed to the owners and occupiers of the soil in the parts of Holland, in the county of Lincoln, and the great level of the Fens: for which the Council ordered their best thanks to be given to Mr. Clarke.

Colonel Challoner gave notice that he should, on a future occasion, propose that the Society should offer a prize for a practical Essay on the best mode of Draining Sandy Land.

*Southampton Meeting.*—Mr. Shelley, as one of the Stewards appointed for the Southampton Meeting, informed the Council, that, agreeably with the directions of the General Southampton Committee, he had, in company with the Messrs. Gibbs, visited Southampton on the previous day, for the special purpose of making the requisite arrangements for the ensuing Show of the Society in that district, and now presented to the Council the joint Report of himself and

those gentlemen on the results of their personal visit and inspection of the localities proposed for the adoption of the Society, and the conditions under which they were offered. Mr. Shelley having read the Report, and detailed to the Council the various propositions made to them by the authorities of Southampton, and the great difficulties which presented themselves at every stage of the proceedings, concluded by giving notice that he should move at the next Monthly Council, to be held on the 6th of March—"That, owing to the difficulties alluded to in the Report of the Stewards, the propriety of holding the annual Meeting of 1844 at Southampton be re-considered." Mr. Gibbs also gave notice that he should at the same time move the following resolutions:—"1st. That the Bye-Law regulating the selection of the place of holding the Annual Country Meeting, be suspended." "2nd. That in future the place of holding the Annual Country Meeting, shall not be decided upon, until Three Members of the Society, who have acted as Director or Stewards of the Yard, shall have visited and inspected the several Towns and their localities, and have reported upon their respective fitness for the purposes of the Society." The Southampton Committee immediately held a Meeting for the purpose of enabling them, by reference to all the documents in possession of the Society, which had been received from the Mayor or other authorities in reference to the Meeting of 1844 at Southampton, to lay before the Council the specific declarations which had induced them to prefer the site of Southampton to that of other places which had been offered to the Society for the purpose of holding that Meeting.

Sir John William Lubbock, Bart., communicated suggestions on the subject of Farm Buildings and Cottages, which were received with thanks, and referred to the Journal Committee; Mr. Cottam applied for leave to exhibit at his Lecture on the Mechanics of Agriculture, at the Royal Institution, on the 8th of March, the Society's Model of Lord Ducie's Uley Cultivator, and leave was granted accordingly.

Mr. Rickards presented to the Society a copy of his System of Agricultural Accounts; Colonel Greenwood a copy of his Tree-Lifter; and Professor Royle, on the part of the East India Company, a collection of Pine Seeds, received from the Company's Botanic Garden in the North-West of India; for which the best thanks of the Council were ordered.

The Council then adjourned to Wednesday, the 6th of March.

A monthly Council was held at the Society's house, in Hanover-square, on Wednesday, the 6th of March, present—The Right Hon. Earl Spencer, President, in the chair; Lord Worsley; Lord Portman; Colonel Austen; Thomas Raymond Barker, Esq.; Samuel Bennett, Esq.; G. J. Bosanquet, Esq.; Thomas William Bramston, Esq., M.P.; W. R. Browne, Esq.; F. Burke, Esq.; Colonel Challoner; F. C. Cherry, Esq.; Henry Colman, Esq.; H. C. Compton, Esq., M.P.; P. Davies Cooke, Esq.; Ralph Etwall, Esq., M.P.; A. E. Fuller, Esq., M.P.; Humphrey Gibbs, Esq.; Brandreth Gibbs, Esq.; Stephen Grantham, Esq.; W. Goodenough Hayter, Esq., M.P.; W. Fisher Hobbs, Esq.; John Hudson, Esq.; W. H. Hyett, Esq.; Sir John V. B. Johnstone, Bart., M.P.; Rev. Charles Edmund Keene; George Kimberley, Esq.; John Kinder, Esq.; Fielder King, Esq.; Sir Charles Lemon, Bart., M.P.; William Miles, Esq., M.P.; Philip Pusey, Esq., M.P.; Francis Pym, Esq.; Professor Sewell; William Shaw, Esq.; John Villiers Shelley, Esq.; Ed-

ward Solly, jun., Esq.; Professor Spooner; W. R. Crompton Stansfield, Esq., M.P.; Charles Hampden Turner, Esq.; and George Wilbraham, Esq., M.P.

*Finances.*—Mr. Raymond Barker, Chairman of the Finance Committee, presented the Report of the receipts and expenditure of the Society during the previous month; and of the several cases of defaulters whose subscriptions were in arrear. The Council having confirmed the preceding part of this Report, proceeded to take the concluding portion into mature deliberation, and at length agreed unanimously to the following resolution:—"That a professional person shall be appointed to write letters, demanding arrears of subscription, to all such parties as shall be designated from time to time by the Finance Committee; and, in the case of such applications not being successful, to take further legal steps for enforcing the payments due."

*Southampton Meeting.*—Mr. Miles having reported to the Council his communications with Colonel Henderson, Mayor of Southampton, in reference to the notice of motion given by Mr. Shelley at the previous Council, of which he, Mr. Miles, had been the Chairman, Mr. Shelley proceeded to state the grounds on which he had given such notice of his intention to submit to that meeting a motion for the reconsideration of the place at which the Country Meeting of the present year should be held. He detailed at considerable length the whole succession of proceedings which had taken place in reference to the arrangements which had been attempted to be made in the definitive settlement of the various points connected with the business of the meeting, a practical difficulty having been started on almost every question regarded by the Society as finally concluded; and he had consequently felt it to be his duty, as one of the Stewards appointed by the Council, to lay before them at their present meeting the whole state of the case in reference to the points on which such difficulties had been raised. Having done that, he was happy to find that a Deputation of the Authorities of Southampton was then in attendance, and prepared in their interview with the Council to submit such terms for their acceptance as would render the further proceedings in the arrangements for the Southampton Meeting both satisfactory and secure. Communications from his Grace the Duke of Richmond; Mr. Mayes, the Chairman, and Mr. Trew, the Treasurer, of the Committee of the town and neighbourhood of Southampton; Mr. Bulpett, late Mayor of Winchester; and Mr. Burn, High Constable of Brighton, having been laid before the Council, the following deputation from Southampton were received, namely:—

Colonel Henderson, Mayor of Southampton  
Edward Mayes, Esq., late Mayor, and Chairman of  
the Local Committee

Geo. W. Johnson, Esq. Honorary Sec.,  
Thomas Trew Esq., Treasurer,  
W. C. Spooner, Esq., and  
John J. Ekless, Esq., Members } of the Local  
Committee.

The deputation having been received with every mark of respect by the President and Members present, proceeded to express the regret they felt, in common with the inhabitants of Southampton and its neighbourhood, that any difficulty should have arisen in the practical details connected with the arrangements for the ensuing meeting in that locality. The Mayor could assure the Council that the occasion of that meeting was the subject of the most lively interest to every person within that district, and the mere apprehension of a removal of the meeting to another

place would occasion not only severe disappointment but considerable loss both to individuals and the railway and other companies, all of whom, in anticipation of the occasion, had gone to considerable outlay in providing accommodation of every kind for the numerous visitors expected to be present. The deputation, in conclusion, submitted to the Council the choice of various propositions which they were authorized to offer for their acceptance. The deputation having retired, the Council proceeded to discuss in detail the subject of the propositions then brought before them; and, on the return of the deputation to the Council-Room, the following stipulations were unanimously agreed to by all the parties present, namely:—

1. The Council accepts the 1,000*l.* paid into the hands of Messrs. Drummond by the Southampton Committee, for the use of the Royal Agricultural Society of England.
2. The Southampton Committee are to provide and prepare, in a satisfactory manner, from the three sites offered, such sites as shall be determined upon by the Council for the Show-Yard and Pavilion, free of all expense.
3. The Southampton Committee shall guarantee the use of the Victoria rooms and grounds; the Guildhall, Audit-house, and other rooms; the registration of lodgings; the lands already selected for the trial of implements and experiments—free of all expense.
4. The Stewards and Directors shall proceed to-morrow to Southampton to select the different sites, and report the same to a Special Council on Thursday, the 14th of March, for confirmation. The Mayor expressed to the Council the satisfaction he felt in this final decision respecting the place of the meeting, and the stipulations then agreed to; the communication of which on his return to Southampton would, he knew, occasion the most lively gratification throughout every class of the inhabitants, who were fully prepared in every way to greet the Society at its ensuing meeting in the most cordial manner. The deputation having withdrawn, the Council proceeded to receive from Colonel Challoner, the Vice-Chairman of the General Southampton Committee (in London), the Report of their proceedings during the preceding month. The following Programme, prepared by the Committee, was approved and adopted by the Council:—

*Programme.*

*Thursday, July 18.*—Last day of receiving Implements, Wheat, Barley, Seeds, &c., to be exhibited in the Implement Yard, and arranged by the Stewards for the Judges' Inspection.

*Tuesday, July 23.*—The Implement Yard open to the public from eight in the morning till six in the evening, at 2*s.* 6*d.* each person. The public exhibition of the working of the Implements to take place at Mr. C. Gater's, Swathling Farm, at twelve o'clock. Cattle received in the Show Yard from eight in the morning till four in the afternoon.

*Wednesday, July 24.*—The Judges inspect the Stock and award the Prizes. The Implement Yard open to the public from eight in the morning till six in the evening—admission, 2*s.* 6*d.* Council Dinner in the Victoria Archery Rooms, at five o'clock, when the Judges' award of prizes (with the exception of those for Horses) will be read. Doors open at four.

*Thursday, July 25.*—The Cattle and Implement Yards open to the public from six in the morning till one o'clock in the afternoon—admission 2*s.* 6*d.*; and from one till six in the evening at 1*s.* Dinner of the Society in the Great Pavilion at four o'clock. Doors open at three.

*Friday, July 26.*—Cattle Yard open at seven. Sale to begin at nine for ten o'clock precisely.

*Stewards of Departments.*

Cattle .....	Hon. Capt. Spencer;
	Mr. Druce; Mr. H. Gibbs.
Implements .....	Mr. Miles; Mr. Shelley
Finance .....	Col. Ansten.
Sale of Tickets .....	Mr. Wilson.
Receipts and Admission to	} Mr. Barker.
Show Yards .....	
Pavilion and Council Dinners.	Col. Challoner.
Ladies' Gallery .....	Mr. Etwall.
General Arrangement of Show.	Mr. B. Gibbs.
	By Order of the Council,
	JAMES HUDSON,
	Secretary.

*London, March, 1844.*

By the 15th Regulation of the Society, all persons admitted into the Show Yard, shall be subject to the rules, orders, and regulations of the Council.

N.B.—Sale of Tickets for the Pavilion Dinner, to Members of the Society at the Pavilion, from Nine until Four o'clock on Wednesday the 24th of July, and from Eight until Three o'clock on Thursday the 25th of July.—Price 10*s.* each.

*Implement Regulations.*—Mr. Shelley, as chairman of the committee for taking into consideration the best mode of arranging and adapting for immediate publication the Regulations for Implements at the Southampton Meeting, proposed by Mr. Miles and Mr. Gibbs, reported to the Council the resulting schedule of regulations unanimously agreed to by the Committee. The Council adopted this report and ordered a copy of the Regulations to be sent by post to each exhibitor of implements at the Bristol and Derby meetings.

*Annual Country Meetings.*—The Council resolved, on the motion of Mr. Miles, that in future all replies to queries on the subject of the capabilities afforded by any particular locality for holding the Annual Country Meeting of the Society, and required by the order of Council in December, 1841, prior to the selection of any town for such place of meeting, and all applications made to the Council in favour of particular towns within the district of any particular year, shall be laid before the Council by the first Wednesday in April of the year preceding that in which the meeting is to be held; in order that the Council may be enabled to ascertain by personal reports the actual facilities and capabilities of each proposed locality before their final selection, agreeably with the Bye-laws, on the first Wednesday in the May ensuing. Mr. Miles also gave notice that he should move at the next monthly Council—"That in future the place of holding the Annual Country Meeting shall not be decided upon until a committee (of whom at least three shall have acted as Directors or Stewards of the yard) shall have visited and inspected the several towns and their localities, and have reported upon their respective fitness for the purposes of the Society."

*Price Essays.*—The Sixty-five Essays reported by the Secretary as received by the 1st of March, in competition for the Prizes offered for the present year, were referred by the Council to the Journal Committee.

*Farm-Yard Manure.*—Mr. Pusey, as Chairman of the Journal Committee, has reported the adjudication of the Society's Prize of 15 Sovereigns, for the best Essay on the mode of management and application of Farm-Yard Manure, to Mr. John Clarke, of Long Sutton, Lincolnshire.

Communications were received with thanks from Mr. Colman, Mr. Isaac Clapp, Mr. Denison, M.P., Mr. Purchas, and Mr. Falconer. The Council then adjourned.

A weekly Council was held, at the Society's House in Hanover-square, on Wednesday, the 13th of March. Present: Thomas Raymond Barker, Esq., in the Chair; Thomas Aleock, Esq.; R. Westbrook Baker, Esq.; David Barclay, Esq., M.P.; John Barton, Esq.; William Beckford, Esq.; W. R. Browne, Esq.; French Burke, Esq.; Henry Colman, Esq.; A. E. Fuller, Esq., M.P.; Humphrey Gibbs, Esq.; Brandreth Gibbs, Esq.; W. H. Hyett, Esq.; John Kinder, Esq.; Theodore Rathbone, Esq.; Professor Sewell; William Shaw, Esq.; Professor Solly; Samuel Staffurth, Esq., and William Staffurth, Esq.

His Excellency Count Reventlow, the Danish Minister in London, addressed a letter to the Council in favour of M. Tesdorpf, a gentleman of large landed property in Denmark, who had come over to England for the purpose of making himself personally acquainted with the agricultural improvements of this country; and for whom, on account of his high character, and the active usefulness of his pursuits at home, his Excellency ventured to claim for him, as a distinguished foreigner, the favourable reception of the Society. The Council immediately admitted M. Tesdorpf to their sitting, and unanimously invited him to attend their weekly meetings whenever it might suit his convenience to do so, during his residence in England.

*Agriculture of Essex.*—Mr. Pusey, M.P., Chairman of the Journal Committee, announced to the Council the adjudication of the Society's Prize of 50*l.*, for the best Report of the present state of the Agriculture of the County of Essex (stating the ordinary course of cropping adopted in the different soils of the county; the breeds of cattle, sheep, and pigs, most generally bred or fed within it; the state of its drainage; the implements used; the number of horses or other cattle employed in the different operations of husbandry; the tenure on which the farms are generally held; the wages of labour; the average amount of the Poor's Rate; and whether any and what alterations and improvements have been made in the system of agriculture pursued within it since the Report made to the Board of Agriculture, by Arthur Young, Secretary to the Board, and published in the years 1807 and 1813), to Mr. Robert Baker, of Writtle, near Chelmsford.

*Weights and Measures.*—The Marquis of Downshire communicated to the Council the great desire felt by the Royal Agricultural Improvement Society of Ireland to promote the establishment of an uniform system of weights and measures throughout the United Kingdom, for the sale of all agricultural produce; in order to facilitate and increase as much as possible the free intercourse in commercial and agricultural arrangements between its three great integral portions—England, Scotland, and Ireland, reciprocally. The noble marquis enclosed in his communication the particulars of the plan proposed by Mr. Blacker, of Armagh, to effect this desirable object; but as it appeared to be the ultimate result of Mr. Blacker's recommendations to establish the proposed uniformity by means of an Act of Parliament, the Council doubted whether by the distinct legislative neutrality enjoined upon their discussions and proceedings by the strict exclusive condition of the Royal Charter, they were at liberty to entertain the proposition; but agreed to receive the communications with thanks, and refer them to the decision of the Monthly Council.

*Flemish Plough.*—The Old Flemish Plough, procured as a present for the Society, by the late Rev. W. L. Rham, and imported by his executor, David Jardine, Esq., having been released from bond in the Custom House, was this day submitted to the inspection of the Members. The high value set by Mr. Rham on the properties of this plough for use in light lands, and the difficulty he experienced, when preparing for the Society's Journal (Vol. II, page 58) his paper on the Agriculture of the Netherlands, in endeavouring to convey by an engraved illustration the peculiar curve of the sheet-iron turn-furrow, in which its excellence consisted, were the reasons which induced him to procure from the continent an actual Flemish plough, for the museum of the society. This simple plough, says Mr. Rham, has been adopted or imitated in most countries, and for light soils without stones none can surpass it. The old Rotherham plough, which was improved by Small, was only a copy of it. In France and Switzerland it has almost superseded the old ploughs of the country, wherever improvements have been introduced; and, with a few modifications to adapt it to different soils, it has re-appeared in England as an improved plough.

*Rotation of Soil.*—Mr. Colman, the agricultural commissioner of Massachusetts, and at present engaged in an agricultural tour through Europe, having presented, at the previous council, the model of a new implement, transmitted from Boston, in the United States, to this country, by Mr. Isaac Clapp, for which the council voted their best thanks and ordered all shipping charges to be paid, has laid before the Society Mr. Clapp's own account of his invention. This implement consists essentially of two rollers confined loosely on a fixed axle, and followed closely by an attached scarifier, formed by a single row of strong tines. Mr. Clapp states: "I have used this implement on newly ploughed sward land to great advantage. The greatest value which I consider it as possessing consists in the dispatch with which it works, and the perfect control it gives over the soil, producing a rotation of soil, which, in my opinion, is as advantageous as a rotation of crops. The working of the soil in rotation can be best effected by the use of the pulverizer, the second year, in place of the plough; leaving the sod to decompose; and then sowing grass seed, or a second crop, on the surface given by the first ploughing. If seeded to grass, the second year, and after the ground has acquired a sward equal to that first turned under, it may be then re-ploughed, bringing to the surface a vegetable mould that will ensure an abundant crop without the aid of manure. By cultivating the soil in this manner, we have always one vegetable mould at work, and one at rest."

*Trial of Manures.*—Mr. Moseley, of Glemham House, Saxmundham, Suffolk, communicated to the Council the following result of his comparative experiments with manures:—As the cost of manure is of essential importance to farmers, an equality of price, or nearly so, has regulated their application, which took place on the same day, early in last March, and was followed by frequent rain. The cost of each sort, excepting that of the nitrate of soda (which was put on the land by mistake, at the rate of 28*s.* per acre), was about 16*s.* per acre, exclusive of carriage and sowing. The whole produce of grass was weighed in my presence, on the day after it was mown and strown; therefore the weight must be deemed to be that of grass, not of hay.

	Tons.	Cwt.
Nitrate of soda : 131lbs. ; cost 28s. per acre ; and produced .. ..	4	12
Sulphate of ammonia : 53½lbs. ; cost 15s. 6d. ; and produced .. ..	4	10
Guano : 131lbs. ; cost 16s. 7½d. ; and produced .. ..	4	12
Carbonate of ammonia : 21½lbs. ; cost 18s. ; and produced .. ..	3	18
Saltpetre : 42lbs. ; cost 16s. 6d. ; and produced .. ..	3	3

*Sulphuric Acid and Bones.*—Mr. Evelyn Denison, M.P., communicated to the Council a statement he had received from Mr. Brackenbury, agent to the Earl of Scarborough, containing the result of his own trials of sulphuric acid and bones on sand land in Nottinghamshire, sown with wheat and on forest land newly broken up; as well as of trials made by his Lordship's tenants both with sulphuric acid and bones, and bones alone: these results were in favour of land on which the chemical preparation had not been used, and particularly so in reference to that on which bones only had been applied. Mr. Denison, wishing to make the experiment on strong clay grass land, less favourable commonly for the operation of bones than sand land, thought it probable that the manipulation of the mixture of the sulphuric acid and bones might make a considerable difference in the result, and he was therefore not deterred from the contemplated trial by the ill success which had attended Mr. Brackenbury's applications: still, however, he conceived it very desirable that more distinct particulars should be desired in reference, 1. To the proportions of the sulphuric acid and bones; 2. The quantity of water; 3. The mode of mixing; 4. The mode of application to grass land; and 5. The strength of the sulphuric acid itself, which is often sold in a diluted state for medicinal as well as chemical purposes.

Mr. Lloyd Walrond transmitted a copy of the 4th Report of the Gloucester Farmers' Club; Mr. Renton, a copy of the Report of the Newcastle-on-Tyne Agricultural Society; and Mr. MacNab, copies of his "North British Cultivator:" for all which and other communications, thanks were ordered.

The Council then adjourned to Wednesday, the 20th of March.

A SPECIAL COUNCIL was held on Thursday, the 14th of March, present, the Right Hon. Earl Spencer, President, in the Chair, Hon. George Henry Cavendish, M.P., Sir Thomas Dyke Acland, Bart., M.P., Colonel Austen, Henry Blanshard, Esq., Thos. W. Bramston, Esq., M.P., French Burke, Esq., Colonel Challoner, H. C. Compton, Esq., M.P., Humphrey Gibbs, Esq., B. Gibbs, Esq., W. H. Hyett, Esq., Sir John V. B. Johnstone, Bart., M.P., John Kinder, Esq., George Kimberley, Esq., Sir Robert Price, Bart., Professor Sewell, John V. Shelley, Esq., and George Wilbraham, Esq., M.P.

*Southampton Meeting.*—The Report of Messrs. Shelley and Gibbs (the Stewards and Director who had proceeded, agreeably with the stipulations made with the authorities of Southampton at the last monthly Council, to that town, for the purpose of selecting from the localities placed at the disposal of the Society, a suitable site for the Show-Yards on the occasion of the ensuing country meeting of the Society in July), having been read, the Stewards and Director present pointed out to the Council on Lewis's large map of Southampton the situation of a 15 acre field they had strongly and unanimously agreed

to recommend for their adoption, as a piece of sound old park pasture land, near Portswood Lodge; nearly even in its surface, with a gentle slope to the south, and situate midway between the town and the ground selected for the trial of implements, and only a few hundred yards from the old terminus of the line of the Railway, which would be re-opened for the occasion; and a tram road being laid down from that point in the direction towards Portswood, all arrivals of Stock and Implements would at once be wheeled almost into the very Show-Yard itself, with the least possible inconvenience to all parties concerned.

The Council unanimously adopted this Report; and the President ordered a Meeting of the General Southampton Committee to be held on Thursday next, for the purpose of deciding on the Plans to be recommended for the Pavilion and Show-Yard, and for drawing out the proper specifications of contract for the works required.

A weekly Council was held at the Society's House in Hanover-square, on Wednesday, the 20th of March, present, Thomas Raymond Barker, Esq., in the chair, W. R. Browne, Esq., F. Burke, Esq., F. C. Cherry, Esq., E. D. Davenport, Esq., James Dean, Esq., C. G. Dupre, Esq., M.P., A. E. Fuller, Esq., M.P., H. Gibbs, Esq., B. Gibbs, Esq., Rev. C. E. Keene, William Miles, Esq., M.P., H. Price, Esq., Professor Sewell, and R. Trench, Esq.

*Burnt Clay.*—His Grace the Duke of Richmond having transmitted to the Council the results of Mr. Page's experience in the application of burnt clay, the communication was read to the meeting. The report stated the length of time during which the burnt clay had been used on the farm, the mode in which it had been prepared, the quantity applied to the land, the time of year, and to what crops, concluding with the following statement of its effects:—"I have known," says Mr. Page's servant, "that in a wet, cold season it beats all other manure for turnips: of course it keeps our stiff lands from congealing together, giving the seed power to vegetate stronger. I never earthed any without seeing an improvement made. All I can say about it is, that it certainly answers on wet, cold lands: it will increase the barley crop two coombs per acre. I do not think it answers so well for wheat as for barley. It has been used on the farm for 20 years upon a small scale, but for the last six years very plentifully; last year, had the season allowed me, I should have burned 600 loads."

*Model Experiments.*—Mr. Miles, M.P., informed the Council, that Mr. Pusey, in his capacity of Chairman of the Journal Committee, being desirous that as much practical matter as possible should be communicated to the Society, and under such a uniform statement of the plan adopted as would lead to direct inferences on a comparison of the results obtained, had suggested to the Journal Committee that a prize should be given to promote that object; a proposition that had been unanimously adopted by the Committee, and of which the details would in a short time be laid before the Council, and the conditions of the prize made public.

Mr. Miles was anxious to see the model experiment on the growth of turnips, which on a former occasion had been recommended by the Council to those members of the Society who had the means and opportunity for engaging in such inquiries, repeated on an extended scale, embracing in its plan not only a trial of the different manures on a root crop, such as that of

turnips, but also on a grain crop—as, for instance, that of barley—made on not less than an acre of ground, and weighing the produce of not less than half an acre; the trial being tested not only by the resulting weight of turnips, but also by that of the barley. He thought that such an experiment would be important and interesting in many points of view; and as it would be desirable that in this, as in the former model experiment, the seed should be obtained from a given and genuine source, he then gave notice, that the attention of the Council having been called to the circumstance of there being at present no duly appointed seedsmen to the Society, he should move at the next monthly Council, that Messrs. Thomas Gibbs and Co., of Half-Moon-street, Piccadilly, the parties who had always been engaged by the Society to furnish seed for the model experiment, and to test by cultivation the various samples of seeds and plants, from time to time, referred to them by the Council, should be officially appointed the seedsmen to the Society.

The Council then adjourned to Wednesday, the 27th instant.

*Southampton Meeting.*—A meeting of the General Southampton Committee was held on Thursday, March 21, Colonel Challoner, Vice-Chairman, in the chair; at which the recommendations of the Committee, respecting the plans of the Pavilion and Show-yards, at the ensuing country meeting in July, were finally determined upon, and ordered to be reported for confirmation to the monthly meeting of the Council on the 3rd of April next.

### NEW MEMBERS.

The following gentlemen were elected Members of the Society:—

Benson, Alan, Papcastle, Cockermouth, Cumberland  
 Bewick, Right Hon. and Rev. Lord, Cleveland-row,  
 St. James's  
 Cantrell, Charles Seward, jun., Old Windsor, Berks  
 Coape, William, Waddington, Stamford, Lincolnshire  
 Croft, Rev. Richard, Rector of North Ockendon,  
 Romford, Essex  
 Dowden, Thomas, Mitcheldever, near Winchester  
 Eve, William, North Ockendon, Romford, Essex  
 Foakes, Charles L., Ramsden-Bell-House, Billericay,  
 Essex  
 Fothergill, Matthew, Cefnrachder, Bedwelty, New-  
 port, Monmouthshire  
 Garland, Joseph, Worgret, Wareham, Dorset  
 Gillespie, Robert, 33, York Place, Portman-square  
 Havers, William, Bacons-Farm, Mountnessing, In-  
 gatestone, Essex  
 Hawkins, Henry Montonnier, Tredunnoch, Usk,  
 Monmouthshire  
 Hodge, Henry, Bosistow Vale, Penzance, Cornwall  
 Homer, John, Martinstown, Dorchester, Dorset  
 Hopper, John Mason, Newham Grange, Stockton-on-  
 Tees, Durham  
 King, Frederick, Nursling, Southampton  
 Loader, Caleb, Gomeldon, Salisbury  
 Long, Francis Stephen, Bulford, Amesbury, Wilts  
 Marjoribanks, Stewart, M.P., Bushy Grove, Watford,  
 Herts  
 Marsh, John, Lydgate Hall, near Sheffield  
 Nockolds, I. A., Stanstead, Essex  
 Paris, Thomas, Greenwood, Barnet, Herts  
 Parke, Charles, jun., Lower Henbury, Wimborne,  
 Dorset  
 Parmiter, Edward, Beaulieu, Southampton  
 Pearse, Thomas, Launceston, Cornwall  
 Pearse, Henry, 9, Manchester-square, London

Percy, E. T. (Land-Surveyor), Sherborne, Dorset  
 Rees, William Trcharne, Holly House, Newport,  
 Monmouthshire  
 Rous, T. B., Court-y-Rala, Cardiff, Glamorganshire  
 Samson, Thomas, Kingston-Russell, Dorchester,  
 Dorset  
 Spooner, William C., V.S., Southampton  
 Suckling, Rev. R., Duntsbourn Abbots, Cirencester,  
 Gloucestershire  
 Stratton, William, Laverstock, Overton, Hants  
 Stretton, William R., Dany Park, Crickhowell, Breck-  
 nockshire  
 Symonds, John, Broad Windsor, Beaminstor, Dorset  
 Thompson, George, jun., Prestwood, Stourbridge,  
 Worcestershire  
 Townshend, Lee Porcher, Wineham, Northwich,  
 Cheshire  
 Turner, Thomas (President of the Royal College of  
 Veterinary Surgeons), Croydon  
 Twitche, Andrew, North-Oakley, Kingsclere, Hants  
 Vaizey, Joseph, Whitcombe, Dorchester, Dorset  
 Wade, Rev. Albany, Elton Rectory, Stockton-on-  
 Tees, Durham  
 Walmsley, Thomas, Ribblesdale-place, Preston, Lanc.  
 Wharton, John Thomas, Skelton Castle, Guisborough,  
 Yorkshire  
 Whitby, Mrs., Newlands, Lymington, Hampshire.

### AGRICULTURAL PROTECTION SOCIETY.

A meeting of the general committee of this society was held on Friday at the house of the Duke of Richmond, in Portland-place, and which was attended by the following noblemen and gentlemen:—

Duke of Richmond (chairman); Duke of Bucking-  
 ham; Lord Beaumont; F. P. Allix, M.P.; E. N. New-  
 digate, Esq., M.P.; A. S. O'Brien, Esq., M.P.; Mr.  
 Geo. Brown, Wiltshire; Mr. Allnatt, Wallingford,  
 Berks; Mr. William Bennett, Lewsey Farm, Dunsta-  
 ble; Mr. Bethel, Enford, near Pewsey, Wilts; L.  
 W. Buck, M.P.; Mr. W. H. Barroro, Southwell;  
 Mr. James Clarke, Rutland; Mr. John Cramp, East  
 Kent; Mr. Thomas Ellman, Beddingham, Lewes,  
 Sussex; Mr. Ellis, Barminge, Maidstone, Kent; Mr.  
 John Ellman, Sussex; Mr. R. Gordon, 9, Berkeley-  
 square; Mr. Fisher Hobbs, Mark's Hall, Coggeshall,  
 Essex; Mr. Hartshorn, Staffordshire; Mr. S. Jonas,  
 Ickleton, Saffron Walden; Mr. George Lucas, North  
 Bucks; Mr. Edward Lewis, Hertford; Mr. P. Mat-  
 thews, Coombiend, Cirencester; Mr. S. Miles, War-  
 minster, Wilts; William Miles, M.P.; Mr. D. Maid-  
 well, Highlands Farm, Leatherhead; Mr. John  
 Mosely, East Suffolk; Mr. Onslow, Worcestershire;  
 Mr. Pope, Simmondsbury, Dorchester; J. Plumtree,  
 M.P.; Mr. Pimsey, M.P.; Colonel Rushbrooke, M.P.;  
 Mr. Rolphe; Mr. E. Ruck, Cirencester; Mr. J. M.  
 Rodwell, West Suffolk; Mr. J. Shackell, Mapleden-  
 ham, Reading; Mr. J. W. Sutherland, East Surrey;  
 Mr. Trower, Castle Thorp, Stoney Stratford; Mr. R.  
 Tumber, Wyke Farm, near Hounslow; C. H. Turner,  
 East Surrey; Mr. Thomas Umbers, Wappingbury,  
 Leamington; Mr. Warsop, Alembury, Huntingdon;  
 Mr. T. Weale, Carshalton, Surrey.

The following arrangements were made:—Rooms were taken at 19, Old Bond-street, and a secretary appointed, to whom all communications are to be addressed, at the society's rooms. The office hours were fixed to be from ten to four daily, during which time the secretary will attend. Reports were received, and

unanimously adopted, from the Finance, Correspondence, and Publication Committees. Numerous letters were read from the country, expressing the most anxious desire to co-operate with the society, and several large sums were added to the funds. We are also enabled to state that in addition to the favourable opinion already given by Mr. Platt, a case has been submitted to Mr. F. Kelly and Mr. Talbot, and their joint opinion has been given decidedly that the society is perfectly legal in itself, and its rules in conformity with the Act of Parliament.

### ROYAL AGRICULTURAL IMPROVEMENT SOCIETY OF IRELAND.

A meeting of the Council was held on March 7th, the Marquess of Downshire in the chair. Present—The Earl of Erne, V. P.; Gustavus Lambert, William B. Wade, William Stewart Trench, Charles Hamilton, James Redmond Barry, George Moore, Q.C., Charles Roper, Acheson Lyle, Charles William Hamilton, Thomas R. Hardy, George Macartney, J. Kincaid, Robert Fowler, Peter Purcell, David H. Sherrard, Patrick Corbally, Francis A. Trench, and Wm. Owen, Esqrs.

Upon the suggestion of Lord ERNE, it was proposed that for the future copper-plate certificates, handsomely engraved, should be substituted for the society's medals, to the local farming societies, it appearing by the secretary's returns that the sum for medals awarded last year, amounted nearly to 200*l.*, that thereby a great saving would be made of the funds of the society, which might be more beneficially applied, and the same effect produced; a sub-committee therefore was appointed, consisting of the Earl of Erne, Chas. Wm. Hamilton, Thomas Hutton, and Acheson Lyle, Esqrs., to procure a proper design for the certificate, and have it ready for the next general meeting of the society.

Lord ERNE, the chairman of the sub-committee, upon "Essays upon the best and most approved plan for cottages, for the working and labouring classes in Ireland," brought up the report, also signed by the Hon. C. J. Trench, and James L. W. Naper, Esq., which reported that they had examined the only essay on the subject, which had been sent in to the secretary. That the plans accompanying it were neatly executed, and their respective advantages, with the mode of building, explained in a clear and succinct manner. That the essay itself displayed a knowledge on the part of the author of the habits of the peasantry and small farmers in the north of Ireland. The sub-committee were, however, reluctantly obliged to state that they did not think that the essay possessed sufficient merit to entitle it to the society's medal. Ordered that the report be received.

The secretary was directed to communicate again with Mr. Smith, of Deaston, who, it was understood, was at present in this country, and to ascertain from him whether it would be in his power to undertake the task of personally inspecting the thorough-draining, executed by the four competitors for the society's gold medal, who were selected at the last meeting of the Council for the purpose, on the principle of being the four who had executed the greatest quantity of thorough draining amongst the different competitors.

Several communications were laid upon the table, which had been lately received by the secretary, and amongst the rest the last report of the society on the improvement of flax in the North of Ireland; and a

short "Essay on manures—organic and inorganic—their uses and qualities;" by a member of the Drumbo and Drumbeg Farming Society; and published by Francis D. Finlay, Esq., Belfast, and which was considered peculiarly adapted for circulation among the farming classes in this country.—*Cork Southern Reporter.*

### AGRICULTURAL QUERIES.

TANKS.—SIR,—I should feel much obliged if any of your numerous correspondents who may be acquainted with the subject would favour me by stating, through the medium of your valuable columns—firstly, whether a tank constructed for holding liquid manure should be placed in the *middle* of the farm-yard; and, if *not*, where? Secondly, whether the drainage from the cattle-stalls to such tank should be conveyed by means of *covered* drains, or suffered to make its own way over the *surface* to the *centre*? And, thirdly, if the latter, what grating or opened covering to such tanks should be adopted, so that the liquid might flow into the tank without impeding from choking? Any general remark hereon will receive thanks from, yours,  
H.

March, 1844.

TO THE EDITOR OF THE MARK-LANE EXPRESS.

SIR,—Having read the report of the Duke of Richmond and Dr. Mason, in your paper of the 26th of February, proving the *profitable* use of diluted sulphuric acid and bones for turnips, I beg some of your scientific farming readers will inform me, through your paper, whether the above solution, mixed with saw-dust, or ashes, or dry earth, might not be profitably applied to cloverseeds and meadow-grass. If the bones are merely broken and immersed, two parts water and one part sulphuric acid, will they not dissolve without passing through the mill and merchants' hands, or would part of the most valuable gas pass off in the vapour? Would mountain lime be a proper vehicle to convey the above solution to the land? I have derived benefit by applying pulverized gypsum in its natural state: would the benefit be increased if the gypsum was calcined?

### ANSWER TO AGRICULTURAL QUERY.

DIBBLING.—There is a great saving of seed by using Saunder and Newberry's machine, four or five pecks of wheat being quite sufficient for an acre of ground. Labour is also saved, as the ground is only required to be ploughed; the machine makes the ground perfectly firm, and the seed takes such root, that the winter has no effect in throwing it up. Then the plants are at equal distances, thus allowing a circulation of air, and permitting the ground to be cleared with the hoe, in consequence of which the plants tiller out and produce a much greater number of full-grown ears than otherwise. A light pair of harrows after the machine is sufficient to cover the holes.

### SOWING TURNIPS WITH BARLEY IN LIEU OF CLOVER SEED.

By the kind permission of the editor of the *Reading Mercury*, comprised in his intelligent and widely circulated paper, I shall briefly elucidate a few remarks on the cultivation of turnips with barley, in lieu of clover, which at present is but little known or even thought of by agriculturists in general, or, indeed, thought practicable by any person I have yet conversed with upon the subject. But having proved the advantages and success of the plan, I am not altogether writing theory but experience, and shall endeavour at once to set this fallacy at rest, as I think what is useful and beneficial ought to be made public.

I have understood for a considerable time past, that this system of husbandry has been adopted in the lower parts of Hampshire, particularly in the local districts and neighbourhood of Kingwood; also knowing how desirable and beneficial a good crop of turnips is to the farmer, with the least possible trouble and expense, I was induced last year to give it a fair trial, the result of which has fully answered my expectations, by having as good a plant of green round turnips as any farmer could ever wish for (and under a heavy crop of barley, too), and which has since been fed off with sheep, and the ground now again in as good and efficient state of dressing to receive a second white crop, of oats and clover, or any other grain I may choose to adopt, while otherwise than by this process, I could not depend on having two white crops together; thus much I say without fear of contradiction, having had ocular demonstration by those who have seen them. I was given to understand from the gentleman of whom I derived my information, that it was possible I might not see much growth in the turnips until the barley was cut, but after giving the ground two times each way with the drags, I might shortly expect a good crop of turnips; but not so last year, for, I suppose, on account of the unprecedented wet weather in the May month (a very unusual occurrence), the turnips from the first took precedence of the barley, and continued their growth until the cutting of the same. Now, this being the case, I was fearful it might have proved against their after growth on account of their being so forward; however, at harvest, when the crop came indiscriminately under the operation of the scythe, although many of the turnip-tops were cut off, not being cut too close so as to share off their crowns, I could perceive very little difference in their appearance from the small ones not touched by the scythe, excepting the leaf appeared to shoot out much stronger after its maltreatment, but I believe the smaller turnips proved the largest heads.

Therefore, if a farmer can only but ascertain he has a good plant of turnips, it is sufficient; the less he may see of them the better, as regards size, until harvest; but should he use the drag as above stated, never fear how deep the tines may

go, for I doubt not, if there is a good plant, there will be a plenty left for a crop when half of them are scratched up; or, if better approved, use the seven-share plough or scarifier, and stir up the earth well between those left on each side of the shares, when I think they will come to a good size without taking any farther trouble with them. But of this I am certain, that the deeper the tines or shares may go in to stir and loosen the ground, the better will be the crop, for it was in this respect that I restricted the growth of my own turnips last year on some parts of the field. Then the pith of the question in my argument is this: will turnips live under barley? I say that they will live, and grow with the same ease and facility as clover, and when the barley is off and the ground well stirred, they will begin to enjoy themselves, and head very fast; and any farmer that has his ground in good condition, and particularly where the barley comes off early, may expect as good a crop of turnips (barring the seasons) as though he had given the ground a regular summer fallow. Not that I am writing to supersede the clover crop, far from it, but merely to show that barley is applicable in both cases; and if a farmer thought proper to appropriate a field or two to this purpose, or if he does not choose to have clover with his barley, which is often the case, what better plan could he adopt than to sow turnips as above stated?

For, by this procedure, look at the advantages in its train. First, there will be already a plant of turnips to his hand without re-ploughing; secondly, it saves a year by having a second white crop without the dung cart; thirdly, taking the average of the seasons, this mode of culture will always beat stubble turnips four-fold, being nearly or quite two months advance in their growth; and fourthly, although last not the least, the turnips being sown so early, by adopting this process, will, I think, five times out of six, generally escape the ravages of the fly.

Then, if such be the case, and once tried by any practical farmers, I have no doubt it would be by them generally adopted, and brought into their improved systems of agriculture. Having now only to apologize for the space taken up in the *Mercury*,

I am respectfully, your friend,

JOHN PADBURY.

Wokingham, 18th of 3rd Month, 1844.

### FARMERS' CLUB-HOUSE.

The Monthly Meeting of the Committee was held here on Monday, March 4, at three o'clock. Present; W. R. Browne, in the chair, H. Gibbs, Thos. Knight, R. B. Smith, Wm. Cheffins.

The following gentlemen were elected Members:—

John Dunn, Alresford.

Samuel Dudley, Wenslow.

Henry Marriott, Hampton Wick.

## CALENDAR OF HORTICULTURE.—APRIL.

*Retrospect.*—The cold and fluctuating weather had permitted no advance in vegetation to the middle of March. Nearly the whole of February having been frosty, at least during the nights, the damage sustained, particularly by the cabbage tribe of vegetables, could not be repaired; and wherever the stiff ground was swamped by the profuse rains and sleet, after heavy falls of snow, it became a hopeless affair to attempt planting or sowing of any kind. Our thermometers indicated the *mean* averages of all the days and nights of February, at maximum 40°, minimum 29°.4.

It is curious to trace the exceeding variations of meteorological phenomena. In Berkshire snow fell to the depth of twelve level inches; in Norfolk there was hardly enough to whiten the ground; in the west a medium fall was observed; but all accounts concur in evidencing the check given by frost to vegetation. We fear much damage was sustained by the young shoots of evergreens, many of which were actually growing at the end of the last year. Bay-trees have suffered, which sustained the intense rigour of 1838 and 1841; and we have ourselves cut back six inches, or more, of dead wood that was lively and in beautiful foliage prior to the 3rd of January. The *China roses* have in many instances lost half their wood; and we hear that among a lot of 24 fine blooming *caurustines*, only two retain signs of life. Let it not be inferred that frost has destroyed this shrub generally, for the plants had recently been purchased and moved. Our object is to caution amateurs against late autumnal planting of evergreens; these tribes are jealous of any act that tends to torpefy their massive roots; and it is quite certain that no advance can be made after the middle of October. Evergreens affect and prosper most under an April removal; for at that period growth is on the verge of activity, and if once the fibres grasp the soil, which they will do if it be suitable in quality, and the weather at all moist, they are sure to prosper, and retain a healthy appearance.

## NATURAL AGENTS.

*Manures.*—These have now become so numerous that it is impossible to distinguish, with minute accuracy, between them. The great benefit that cultivators have derived from the writings of Liebig may be traced to his mode of arrangement. Some pretend to detract from his merits by asserting that he has discovered nothing *new*; but we ask, whether the classification of all manures under two heads—the *organic*, and the *inorganic*—whether the perspicuity with which he has pointed out, and made perfectly available to analysis the essential characters and offices of each, be not of more importance than any mere novelty. We only follow in *his* path in the present attempt at a general outline.

*Organic manures*, strictly so called, develop when submitted to chemical analysis the four great ultimate elements—oxygen, carbon, hydro-

gen, and nitrogen; these constitute the basis of all pure vegetable and animal organic structure, and their products. Of organic manures, the chief, as being what may be considered a natural manure, is the substance fantastically called *humus*; its elements appear to be oxygen, hydrogen, and carbon, the last being the base; and as it is the product of vegetable remains, decaying in the heart of almost all soils capable of supporting vegetable life, it may with some accuracy be styled the natural manure. Every root, every fibre or leaf, is finally resolved by the chemical processes of decay into natural humus.

The word itself is Latin, and if simply translated, is the earth or ground; thus Columella, the Roman agricultural author, defines the fertility of the earth by the words *Laetitia humi*. In process of time grass-turf, by itself or incorporated with earth, becomes humus of the first quality; the same may be said of tree leaves, and of fermenting masses of stable manure. Yet it must not be overlooked, that all these substances comprise some portions of inorganic matters, which are separated from the more simple elements during that process of decay which converts them to pure humus; the nearest representative of which is the black, reduced mass of exceedingly old heaps of dung, decayed wood, and leaves. *Alkalies* act upon, and combine with certain parts of such humus, producing a brown-coloured fluid: hence the term *humic acid*.

Of all the organic manures, good stable manure is unquestionably the best; but we reject admixtures, particularly of the dung of swine and poultry, referring them to the farm-yard only; because pure horse-dung, with straw, the heap moistened with the urine of the same animal, contains all the vegetable substances and animal salts which garden vegetables can require. If employed pretty fresh, before the ammonia is developed, it ought to be buried deep within the soil, whence it could be raised at future diggings and trenchings, so as to be incorporated with the earth. If it be previously suffered to ferment in the heap till reduced to black-spit manure, the ammonia should be fixed by watering the whole surface with a little extremely diluted sulphuric acid at the first formation of the heap, and after every fresh addition of recent manure. The exhalation of ammoniacal fumes would thus be prevented, and sulphate of ammonia formed in the heap. More must be said in our next calendar.

*Inorganic manures* are those salts, earths or oxides, which though they are traceable in plants, have their origin in the ground. These are flint, or silex, which appears to enter the plant in combination with potassa; it abounds in straw, bamboo, &c. Lime, which is also combined with some acid solvents, and traceable in the ashes of

wood and vegetables in the condition of carbonate of lime, oxides of iron, traces of which are almost invariably found in vegetable ashes, potassa, and soda—that is, the two fixed alkalies, and these are present in pure loams. Whenever analysis by fire detects earths or salts among organic elements of any vegetable, it may be considered certain that manures which contain similar inorganic manures, are indispensable to the perfect development of that individual in whose ashes they are found to exist.

Since it is pretty evident that the inorganic substances above named are rarely traceable in the growing plant in a pure state, we must infer that they have already combined with some organic, or decomposal acid, which, being detached or destroyed by the action of fire, leaves the alkaline, or other inorganic base, in the condition of a residual ash.

#### WEEKLY OPERATIONS IN THE KITCHEN GARDEN.

1st and 2nd week. Sow *Beans*, long-pod, *Token*, *Windsor*, the white or green seed: and *Peas*, in drills—imperial blue, Prussian, scimitar, also the tall marrow. Let no drills be nearer than four feet, and thence to six, for the high growers; and to prevent mice, some finely chopped furze should be laid over the seed. On such sowings, a light sprinkling of any of the new powdery manures, most of which are preparations of dry night-soil, might be tried with great advantage.

*Cabbage*—the hearting varieties of which none surpasses the true London York. Savoys, red, for pickling; Brussels's sprouts; *Boricole*.

*Beetroot*—long or horny carrot, parsnips—these very early—for the main crop; and if the ground be clayey, make holes with a crow-bar at proper distances—six to nine inches; fill them with sifted sandy loam, and about one inch below the level sow six or seven seeds to a hole, covering with a little fine earth. This method secures an easy downward descent; its only defect is the liability of the young plants to be destroyed by slug or beetle.

*Lettuce* of any approved sorts in shallow drills of the richest earth, or broadcast according to the practice of some, after *Onions* sown in drills for the main supply of large bulbs.

*Silcer onions* for pickling should however be sown thickly in very poor light soil, for size depends much upon these conditions.

*Leeks* and *Cardoons* in drills, to be transplanted.

*Celery* and *Celeriac* are sown in beds—the latter in rows to grow and bulb—therefore the ground should be rich; but celery does best when raised over heat, as before directed, for when planted out late it never becomes fine. Still, however, it is advisable to prepare for a row or two of the hardy, dwarfish red, because it stands severe weather, which would destroy the tall bleached white.

3rd week. Sow brocoli and cauliflower, also

some cape, for early autumn. Some radish, lettuce, mustard, cress, and the sweet pot-herbs.

4th week. The first crop of kidney and runner beans, in a dry sunny exposure. Salsafy and Serzonera.

Plant potatoes for autumn and winter. Cut the sets now, and insert them a few inches apart in the rows—the rows themselves being two or three feet asunder.

Slips of balm, sage, thyme, savory, margeram, lavender, rue and rosemary, will succeed in a shady border.

Asparagus-plants are safely removed now, to form beds, and rooted suckers of artichokes: showery weather is to be preferred.

Transplant lettuces to thin the seedlings, and also other plants that stand too close and can bear removal.

Sow or plant sea-kale; and dress the beds that have been cut over.

Dig the artichoke-beds after removing decayed leaves.

Earth up every crop in rows, stick peas, and keep the plots neat.

#### FRUIT DEPARTMENT.

Sow and transplant melons, keeping a lively heat in the beds, and also in those devoted to cucumbers—see directions of March.

Little ought to be required among fruit-trees and shrubs now; though grafting may yet be practised early in the month.

#### PLEASURE GROUNDS.

Plant evergreens, not only the common sorts, but those which are called American shrubs.

It is a mistake to suppose that azalias and romedas, Ralmias, hardy heaths, Rhododendrons, &c. require bog or heath-mould only. If plenty of decayed leaves and sand be digged into soil composed of chopped turf of a light sandy loam intermixed with road-grit, a small portion only of heath or bog, like that about Bagshot or Wimbledon, will suffice, if put into the holes with the plants. In the autumn after planting, a top-dressing of decayed leaves and sand will further meliorate the soil, and render the shrubs rich in verdure when they push again.

Sow annual seeds in the fresh digged borders, and begin to plant out seedlings raised under glass, also the choice herbaceous tribes.

Protect auriculars from rain: plants in flower should stand on a stage facing the east.

Roses in pots are grown to great perfection in a loamy soil of chopped turf roasted over a grating on a slow fire, till the grass roots be killed. The carbonaceous smoke is manure, the heat kills insects, and when a little clean manure is added, the compost is most fertile.

Roses, however, are admirably grown without pots, planted in soil contained in brick pits.

Every part of the flower garden plots,—lawns, walks, and edgings—should be brought into, and maintained in a state of the greatest neatness; and a little timely attention will effect the object with comparatively small labour.

## AGRICULTURAL REPORT.

## GENERAL AGRICULTURAL REPORT FOR MARCH.

The present is, unquestionably, a most important period of the year for agriculture, more particularly as relates to ploughing the land for the reception of Lent corn. As this operation is chiefly influenced by the state of the atmosphere, a few remarks respecting that experienced this month may not be out of place. Its early part, although so closely following the "fill-dyke" season, was seasonably fine; but, from the 5th until the 20th, heavy showers fell almost daily in every part of England, we might say of the kingdom. These rains so completely saturated in soil, especially in the lowlands—many of which were partially inundated during several days—as to put a stop, for a time, to the progress of the plough. Notwithstanding, however, their visitations, the agriculturists were not idle; the various other matters connected with farm labours having engrossed much of their attention. From the latter period above referred to, until the month's conclusion, the temperature was dry, and consequently seasonable; hence very great progress was made in the fields. With the exception, therefore, of the drawback above alluded to, there is every reason to congratulate our readers upon the time just elapsed. As to the position in which farm labours now are, we have to intimate that it is quite as satisfactory as could be desired; in fact, both ploughing and sowing—which are fully expected to be concluded within the time usually allotted to them—are sufficiently forward. From time immemorial, the presence of March dust has been considered an omen of a good future harvest; of that commodity there has been a fair share. Let us hope that the prognostications of ancient, may hold good in modern years. A large portion of the wheat, barley, and oats, including beans and peas, has now been sown, with the land in, for the most part, good working condition.

It affords us very great pleasure in being able to state that the contents of the letters received from our numerous correspondents residing in the great agricultural districts, are such as enable us to convey to our readers a most flattering statement of the appearance of the winter wheats. This is a subject worthy of the most attentive consideration at this moment, for we need scarcely say that, upon the present condition of the growing crops depends, in some measure, the future prospects of the agricultural body, increasing or lessening as it does the demand for the stocks of grain on hand, and thus having a tendency to influence prices. Some few of our statements complain of the ravages committed by the slug; but, considering that the past winter has been one of comparative mildness, the losses thus experienced form but a small, very small, item for consideration. It is to be observed that we have had occasion to make remarks to the same effect as these

during the last three or four years. May not this effect have been produced by the progress agricultural chemistry is making throughout the length and breadth of the land? We are but little admirers of theory, but it occurs to us that, in years yet to come, that science will be the general basis on which agriculture will be conducted. To use a technical expression, so regular have the wheats appeared that the land upon which they are growing has almost the appearance of a bowling-green; while premature exuberance has been seldom complained of.

The farmers' political horizon has continued one of more than ordinary excitement. Patient and forbearing as the agriculturists have been, during a long period of time, in which their property has been assailed by a faction, they have, at length, deemed it necessary to act in self-defence, and thus vindicate their own cause in a manful struggle with the enemies of native industry. Yes, the sturdy yeomen of England have determined to uproot the evil prejudices raised against them—for that they have been ruined, to serve certain persons, no one can deny—and prove to the world that their actual position is one of a different character that has been represented. The society formed in London for this laudable purpose has been sneered at by the Anti-Corn-Law League and its supporters, as having been formed for an illusionary purpose—as being, in fact, a mere "plaything" in the hands of the so-called *champions* of free trade. To treat, however, an opponent with contempt is not the most ready way of getting out of a difficulty. Let the League understand they have good and sturn stuff to deal with, and that those against whom they have raised themselves in hostility will not be put down so easily as they imagine. But why this agitation at all? Simply on the part of the League, that it is a money-getting principle—that dupes have been found in the great manufacturing districts to subscribe largely to its funds, by which are supported numerous persons, actually holding political principles directly at variance with their professions! This, be it observed, is no idle assertion, because we are in a condition to prove that many who have gone through the country lecturing in favour of a total abolition of the duties on foreign grain, have expressed themselves favourable to the sliding scale! Prospectively speaking, this question is one of the greatest moment. Sir Robert Peel has declared his intention not to make any alteration in the existing duties on grain during the present session of Parliament, but whether any change will take place at some distant period time alone will determine. In the opposition now raised against the League, we are sure a firmness of purpose, and a steady adherence to principle will be the ruling guide.

The corn trade of the month has not exhibited that buoyancy of character which many persons were led to anticipate. It is true that in its early part the value of most grain was supported, with

a steady demand for the best descriptions; but as it proceeded, the demand became extremely heavy, at a decline of from 1s. to 3s. per quarter in the rates of wheat, while barley has retrograded to the same extent. In all other corn no material variation has been noticed, though the trade has ruled inactive. As might be expected, this state of demand has somewhat perplexed the speculators in foreign corn, and prevented orders to any extent being transmitted to the various grain shipping ports up the Baltic and elsewhere. That there is very little prospect of any immediate improvement taking place in the value of wheat is obvious; but when we consider that the produce of last year's crops was barely an average, and that the stocks of that of home growth are far from large for the season, we are led to conclude—more especially as the supply of foreign, both free and in bond, is limited—that higher rates will be obtained during the months of July and August.

In our grazing districts the stock has fared remarkably well, though, of course, great demands have been made upon dry food.

From Scotland we learn that great progress has been made in out-door farm labours, the whole of which are represented as being sufficiently forward. The wheats are looking remarkably strong and healthy; but the supply of wheat and barley in the hands of the farmers is acknowledged to be small.

The shipments of corn to England from the various Irish ports have been small, while the different markets have been scantily supplied; prices, however, have undergone no change worthy of notice. Most of the winter crops have been already sown, under favourable auspices.

The following is our usual monthly statement of the supplies and prices of fat stock exhibited and sold in Smithfield cattle market during the month. The former have been composed of 10,212 beasts; 103,412 sheep and lambs; 1,349 calves; and 2,364 pigs; while the latter have ruled thus: beef, from 2s. 4d. to 3s. 10d.; mutton 2s. 8d. to 4s. 6d.; lamb, 5s. to 6s.; veal,

3s. 8d. to 4s. 8d.; and pork, 2s. 8d. to 4s. 4d. per 8lbs. to sink the offals.

With the exception of the primest mutton having commanded a steady demand, at mostly full prices, the general trade has ruled extremely inactive, owing chiefly to the large arrivals of country killed meat up to Newgate and Leadenhall markets, and prices have had a downward tendency.

The Norfolk supplies have come to hand in, for the most part, good condition; but from other quarters the receipts have been inferior.

During the month the imports of live stock from abroad into the United Kingdom have been very trifling—viz., about 40 beasts, chiefly from Spain and Holland. These importations have turned out profitless speculations. In Smithfield only 10 from the latter country have been on show.

A STATEMENT AND COMPARISON of the SUPPLIES and PRICES of FAT STOCK, exhibited and sold in SMITHFIELD CATTLE MARKET, on Monday, March 27, 1843.

	March 27, 1843.		March 25, 1844.	
	s. d.	s. d.	s. d.	s. d.
Coarse and inferior Beasts.....	2 8	to 2 10	..	2 4 to 2 8
Second quality do.....	3 0	3 4	..	2 10 3 2
Prime large Oxen.....	3 6	3 8	..	3 4 3 6
Prime Scots, &c.....	3 10	4 0	..	3 8 3 10
Coarse and inferior Sheep.....	2 10	3 0	..	2 8 3 0
Second quality do.....	3 2	3 4	..	3 2 3 6
Prime coarse woolled do.....	3 6	3 8	..	3 8 3 10
Prime Southdown do.....	3 10	4 0	..	4 0 4 4
Lambs.....	5 0	6 0	..	5 0 6 0
Large coarse Calves.....	4 0	4 4	..	3 10 4 6
Prime small do.....	4 6	4 8	..	4 8 4 10
Large Hogs.....	3 4	3 10	..	3 0 3 8
Neat small Porkers.....	4 0	4 6	..	3 10 4 4

## SUPPLIES.

	March 27, 1843.	March 25, 1844.
Beasts.....	2,610	2,900
Sheep & Lambs.....	23,350	25,240
Calves.....	60	75
Pigs.....	439	336

In Newgate and Leadenhall markets great heaviness in the demand has again prevailed, and with it very low and unremunerative figures, which have ruled as follows: beef, from 2s. 2d. to 3s. 6d.; mutton, 2s. 6d. to 3s. 8d.; lamb, 4s. 10d. to 5s. 10d.; veal, 3s. 8d. to 4s. 6d.; and pork, 2s. 4d. to 3s. 10d. per 8lbs. by the carcass.

## AGRICULTURAL INTELLIGENCE, FAIRS, &c.

ABERAYRON FAIR was well attended by the principal dealers. Horses and pigs were sold at advanced prices, and the inhabitants afforded the dealers and others every accommodation during their stay.

CASTLE DONINGTON FAIR.—This fair was much better supplied with cattle than on any former occasion. Barren beast fetched good prices, and were in great request; in-calvers also were much inquired after. In fact, there was scarcely anything brought in which was not quickly sold.

STAMFORD FAIR.—This stock fair was held on Monday last, and was the largest (for the time of year) ever known since the Deeping fairs were established. The show of beasts was very good and large; some excellent animals were offered, but all kinds sold rather indifferently, prices ranging not higher than about 5s. or 5s. 6d. per stone. A great number of sheep were

penned, but in consequence of this being the first spring fair, and wool low, buyers held off, and sales were very tardily effected.

ANDOVER FAIR was fully attended. The quantity of cheese pitched was considerable, and the greater part disposed of at the following prices:—Best Cheddar, 70s. to 78s.; Somerset, 66s. to 70s.; North Wilts, 48s. to 58s.; half coward, 40s. to 44s.; skim, 24s. to 28s. per cwt.

LEOMINSTER FAIR.—There was an excellent supply of cattle and other stock, but prices were rather flat, not quite so good as those at fairs recently held in the neighbourhood. The horse fair was well attended at an early hour, and useful animals met with a brisk sale.

TRURO MIDLENT FAIR.—There was a tolerably good supply for the time of year; but the demand

was not very brisk. Fat cattle ranged in price from 48s. to 50s. Store cattle about 35s. Cows and calves, of which there were a considerable number, brought from 45s. to 48s. Of sheep there were not many; their price was about 5d.

WORCESTER FAIR was pretty well attended by dealers, and yet prices were not so high as were expected. Of beef the supply was tolerably good, and on an average fetched 5½d. Cows and calves were heavy sale, unless they were of first-rate quality. Barrens were much sought after, and still keep up in price. Of sheep the supply was good, and they met a sale at 5d. to 5½d. per lb.

CROYDON NEW CATTLE MARKET—which has been erected on a commodious and handsome scale, is intended to be opened at the commencement of the ensuing month, when every facility will be given to those salesmen and farmers who may support it. We hear that extensive patronage has been promised, and there is no doubt but that, in time, it will be eminently successful.

KELSO SECOND HORSE MARKET.—The principal Horse Market for the season was held here on Friday, 15th, and the show of animals has seldom been equalled either for number or variety. Owing to the attendance of dealers from a distance being unusually great, business commenced at an early hour in the forenoon, and continued with much briskness till the close of the market. Good draught horses were

in demand, and brought high prices. Riding horses were scarce, and few fit for the hunting field were to be met with. Such of these descriptions as were offered for sale readily found purchasers. Upon the whole, a great number of animals changed owners; and we believe that at least the sellers had no reason to complain.

KELSO SECOND MARCH MARKET.—There was a great show of horses, principally for the draught, and a good number of dealers from a distance were in attendance. Good draught horses were in request, at a considerable advance in price. There were few or no good horses for the field or the road in the market; but had there been, there is little doubt that they would have met with a ready sale at good prices, as the dealers were anxious to pick up horses of this description.

BROMYARD AGRICULTURAL SOCIETY bids fair to become a most efficient institution. Upwards of a hundred members have already enrolled their names, and the committee, who have been appointed to regulate its proceedings, met on Monday and fixed the amount of premiums to be awarded for stock, &c., at the annual meeting, which is to take place about October next. There will be ploughing matches, prizes awarded to labourers, and all the other etceteras likely to make an agricultural show interesting and attractive.

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## REVIEW OF THE CORN TRADE DURING THE MONTH OF MARCH.

Steady progress has been made during the month in maturing the different societies for the protection of agriculture, and we may now congratulate the farmers of Great Britain on their having achieved, more by their own exertions than they could possibly have gained by placing implicit dependence on any class of politicians. With the tenant farmers the idea of forming associations to counteract the machinations of the League originated, and to them a large proportion of the credit is due; we are happy, therefore, to see that the committee of the central society is composed partly of the owners and partly of the occupiers of the soil. The parties connected with the League are well aware that they will now have a far more difficult game to play than heretofore: they can no longer expect their misrepresentations to go forth to the world uncontradicted; and the salutary dread of a vigorous opposition has already taught them to become more guarded in their expressions.

The tone and manner in which Mr. Cobden brought forward his motion for a committee to examine into the effects of protective duties on the interest of tenant farmers and labourers, was characterised by a greater degree of moderation and seeming fairness than that gentleman's speeches usually exhibit: the speech contained, nevertheless, abundance of gross mis-statements, some of which were promptly exposed by Lord Worsley. As regards the cost of growing wheat on the continent of Europe, and the expenses attending its

transit to this country, the statements made by Mr. Cobden are so glaringly incorrect as to subject him to the imputation of total ignorance, or the desire wilfully to mislead. That gentleman stated, in the House of Commons, that wheat had, during the last ten years, averaged 40s. per qr. at Danzig; which is not true. But, supposing even that such had actually been the case, is it fair to select one port, and that port the highest in the Baltic, as a means of showing the price at which our continental neighbours could afford to ship wheat? Mr. Cobden entirely overlooks the immense resources of those countries, from whence supplies come down to Odessa, and the very great improvement which has of late years been made in the agriculture of that portion of the world. But a few years ago, the wheat received from the Black Sea was of most miserable quality; whilst the Polish Odessa, more recently imported, weighs 60 up to 62 lbs. per bushel, and possesses such good mealing properties as to have rapidly risen in the estimation of our millers.

The most recent advices from Odessa inform us that the demand which had been experienced there, from France and many of the ports in the Mediterranean, in addition to purchases on British account, had caused prices of wheat to rise unusually high; but, notwithstanding the enhancement thus occasioned, we find that good serviceable qualities of 60 lbs. weight were selling at equal to 25s. and the very best under 30s. per qr. This being the case with the partially defective harvest

of last year in many countries of Europe, it is fair to infer that, under ordinary circumstances, wheat might be bought at the port named at about 20s. per quarter.

Respecting the charges attending transit, the statements put forward by the free-traders are given with equal unfairness. The last accounts from Danzig inform us that first-class British vessels might then be chartered for London at 3s. 6d.; to this we have to add insurance, 6d.; and the dues for passing the Sound, 6d.; making in all, 4s. 6d.

We have instanced Danzig, as that is the port to which the Leaguers generally confine their remarks; from Odessa, the freight and insurance is about 2s. to 3s. higher; whilst, from the Lower Baltic, Hamburg, and other near ports, the expenses are, in many instances, no greater than shipping from the northern parts of the kingdom to the south. What becomes, therefore, of the natural protection of 10s. per quarter Messrs. Cobden and Bright assert the British farmer must always enjoy? The cause must indeed be weak which can alone be supported by misrepresentations so gross as those constantly put forward by the paid lecturers of the League; but the defence of the farmers is now, we trust, in good hands; without, therefore, going further into this subject, we shall direct our attention to the consideration of matters for which this article is more particularly intended.

The rapid rise which took place in prices of wheat during the months of January and February has (as is not unusually the case when a commodity advances suddenly) been followed by a material reaction, and within the last week or two business has again become very dull. We warned farmers in our last number not to place too much reliance on the then value of wheat being long maintained, though, we must confess, we were not prepared to expect so speedy a reduction. As yet no portion of the supply from abroad has arrived in this country; nor, in fact, does there exist the slightest reason to calculate on large receipts from the Baltic until about the middle of May, the navigation of the principal rivers and harbours being, according to the latest accounts from thence, still blocked up by ice. So great an influence, however, has already been produced by the anticipation of these comparatively remote arrivals, that holders of wheat, farmers as well as merchants, have displayed a considerable degree of anxiety to realize; whilst, on the other hand, millers have felt the effect with equal force, and have shown a determination to keep their stocks low, so as to be in a situation to take advantage of any depreciation which may occur.

In taking a retrospective view of the corn-trade during the month, attention is naturally first directed to wheat: this grain has been brought forward pretty freely by growers in most parts of the country, and buyers having been influenced by the considerations already noticed have acted with the utmost caution. Until about the

middle of the month sellers continued to display considerable firmness, but since then prices had gradually given way in all parts of the kingdom.

In our last we noticed the fluctuations which had, up to the period to which our review extended, taken place in Boston; it may, therefore, not be out of place again to refer to that important agricultural market.

At the termination of February, good red wheat, made up 63lbs. per bushel when put on board, was worth there 56s. to 57s. per qr. free on board; for some time after it remained nearly stationary, and quotations have since ranged as follows:—On the 6th March the same quality was obtainable at 55s. to 56s.; on the 13th at 54s. to 55s.; and on the 21st at 54s. to 55s.

We consider this a very good criterion of the variations which have occurred in the farmers' markets, where, of course, free foreign has not been brought in such active competition as at the maritime ports; at several of the latter the fall has been somewhat greater, and, taking the kingdom collectively, the decline has not been unimportant.

So much for the past: we shall now make a few remarks in reference to the future. The weather, on which so much must always depend, will probably this season have even greater influence on the trade than in ordinary years; it may, consequently, be as well to notice some of the many changes which it has lately undergone. More rain has, on the whole, fallen than is usual in March, which must be considered as rather an unfavourable circumstance. February closed with boisterous wet weather, and, up to the 4th inst., we had scarcely a day without showers; the subsequent week was tolerably dry, but on the 11th we had a return of heavy rain, which continued at intervals until, in many parts of the country, the lowlands were completely flooded, and all out-door operations were consequently brought to a stand. On the 17th inst. a favourable change occurred, the wind having veered to the north-east, causing a dry atmosphere, and in a few days much of the superfluous moisture was absorbed. We have since had occasional showers, and, on the whole, less progress has been made with spring sowing than might have been desired.

The young wheat-plant does not, up to the present period, appear to have suffered from an excess of moisture, and we have hitherto heard of very few complaints; on the contrary, the accounts generally describe its aspect as healthy and vigorous in the extreme. On that point, the most material of all, there is as yet no reason for alarm; and unless circumstances should occur to create uneasiness, the speculations which have during the winter been entered into on the continent are likely to turn out the reverse of remunerating. A large proportion of the wheat bought abroad has been purchased by millers, who are not likely to warehouse in bond if, by clearing in for consumption, and converting it at once into flour,

they can realize a moderate profit. The prospects of our own crop will be their guide: should the appearance of the plant continue promising in May and June (by which time the first shipments from the Baltic may be expected in this country), we are disposed to believe that many importers would pay duty from on board ship; and should this step be adopted by a few, others would undoubtedly follow. The same circumstances are likely to influence our own farmers; and, whilst the growing crop progresses favourably, sufficient supplies will, in all probability, be forthcoming to meet the demand. Should, on the other hand, inauspicious weather threaten injury, home-grown as well as foreign wheat would be withheld; in which case a low duty, later in the year, would be almost certain.

From the present position of the averages, and the turn which business has lately taken, the lowest duty which can be expected, unless a fresh impetus be given to the trade, is 16s. per qr.; and it has even become doubtful whether that can now be attained. High as this rate of duty is, we doubt not that it will be paid on small quantities, from time to time; unless, indeed, as before remarked, merchants should be induced, by rumours of injury real or imaginary, to hold back, in the hopes of higher prices and a lower duty in autumn.

Owing to the generally-reported deficiency of the last crop of barley, a good deal of speculation has been carried on for many months past in the article: the purchases made abroad are variously estimated; on a moderate computation, we think the quantity may be taken at 250,000 to 300,000 qrs., and a large proportion of the same having been bought when prices were much higher than at present, the operations are likely to prove even more disastrous than those entered into with regard to wheat. That the yield of barley was really defective, is strongly indicated by the smallness of the deliveries ever since harvest; to show how great the falling off has been, it will only be necessary to give the sales of the last six months at the towns from the returns of which the averages for the kingdom are computed, with the corresponding sales within the same period of 1842 and 1843. This statement will, we think, prove of interest to our readers; we, consequently, give it entire at foot of this article, merely noticing in this place the result. Large as the quantity supposed to have been bought on the continent is, the decrease shown by the document referred to amounts to nearly as much as the entire quantity expected to be imported.

It may therefore be questioned whether prices have not been depressed somewhat below the point warranted by circumstances, and we are certainly disposed to look with some degree of confidence for a moderate reaction. Really fine qualities of barley have not varied much since our last, but all other descriptions have been further depreciated 1s. to 2s. per qr. in value, at the principal markets in the barley-growing counties; within the last week or two holders have, how-

ever, shown a determination to resist any further abatement, and a firmer feeling has characterized the trade. The duty has remained stationary at 5s. per qr. throughout the month; nor is there a prospect of any immediate alteration. Some parties are still sanguine of seeing it lower later in the season, but we are disposed to think this expectation will prove ill founded; for it must be borne in mind that the demand for the finer qualities will shortly be materially lessened. For some weeks superior parcels may still be taken at high prices for seed, but, as spring advances, the inquiry for that purpose must cease, whilst even the maltsters will shortly begin to purchase more sparingly, as the time approaches at which they usually leave off working. It follows, therefore, that within the space of a month or six weeks, distilling and grinding sorts will alone be required; and we are inclined to believe, therefore, that, so far from any fall occurring in the duty, the first change experienced will be an advance.

The trade in malt has been influenced by the dull state of the barley markets: the inquiry for this article has, throughout the month, been exceedingly slow. Still, no material variation has occurred in its value. The movement, in progress some time back, to obtain a repeal or relaxation of the duty, appears to have slackened. From the official account just published by order from the House of Commons, it appears that the total number of quarters made between October 10th, 1842, and October 10th, 1843, amounted to 4,459,673; viz., 3,850,567 qrs. in England, 446,220 qrs. in Scotland, and 162,886 qrs. in Ireland; of which were used in England, 3,336,140 qrs.; in Scotland, 103,902 qrs.; and in Ireland, 126,256 qrs.

Very little alteration has occurred in the value of oats in any part of the kingdom, since our last report. This country depends, now, so greatly on the sister isle for supplies of this grain, that the price in the English markets is almost wholly ruled by the extent of the arrivals from Ireland. These having, during the past month, been on rather a moderate scale at the principal ports, and the slight depreciation which took place at some of the leading markets early in March has since been partially recovered, the future range of prices will, in a great measure, be influenced by the extent of the Irish shipments; and, if dependence can be placed on the advices from thence, a large quantity need not be expected. The letters lately received from the chief shipping ports, state that stocks had been reduced into a narrow compass; and unless greater inducement, by a material rise in the value of the article, should be held out, merchants would not be in haste to part with the comparatively small quantity remaining in their hands. As for the farmers, they have, we are told, scarcely any oats beyond what they will require for their own consumption. We give these statements as they reach us, without, in any way, vouching for their accuracy, experience having taught us to look upon the

intelligence received from Ireland, in regard to this subject, with some degree of doubt.

A reference to the averages of the last six weeks will show how little alteration has really taken place in prices of oats, the general weekly return for the kingdom having only varied a few pence per quarter, one week from the other. The duty remains at 7s. per quarter, with no chance of its falling below that point. This is much too high a rate to allow of importations of foreign with any prospect of advantage, quotations continuing relatively high at all the continental ports from which this grain is usually shipped.

Beans, which had for a long time previous been almost totally neglected, excited some attention early in the month, and a rise of 1s. to 2s. per qr. from the lowest point of depression took place; this advance appears however to have already lessened the disposition to purchase, and within the last week the article has again become difficult of disposal. The period of the year in which beans are most extensively used has now been passed, and beyond the enhancement which takes place in the value of this article in consequence of the improvement in condition imparted by a few months' keeping, we see no cause to expect higher prices than those now current. As the soft qualities disappear from the markets the averages will gradually advance, and it is probable that the duty may fall sufficiently low during the summer to induce a moderate foreign importation.

Peas have slightly risen in price, the demand for sowing having imparted rather more activity to business; the transactions have nevertheless been far from extensive, and so unimportant has been the improvement that the averages have scarcely been affected thereby, nor is there any probability, at least for some time to come, of a lower duty than the present, viz., 10s. 6d. per qr.

As the position of the corn trade at the foreign ports, and the extent of the probable supplies, must have a direct influence on the home trade, we cannot, perhaps, do better than to occupy the remainder of our space by giving a short account of the state of this branch of commerce at some of the leading continental ports. From all we have hitherto been able to collect, the wheat harvest of last year was not only deficient in quantity but likewise defective in quality over a very great breadth of continental Europe.

In France the deficiency has proved so material that extensive importations have for some months been making into that country principally from the Black Sea; orders from thence have also been sent to the Baltic, and the competition thus created at Danzig and other places between buyers on British and French account, has tended to keep up prices at the high point they have maintained throughout the winter.

France, however, has not been the only importing country; letters from Naples, of the 12th March, inform us that the scarcity of Wheat in that kingdom had become so great, as to induce

the government to issue a decree, allowing the importation free of all duty until the end of April. This measure naturally led to some excitement at the neighbouring ports in the Mediterranean, and by the most recent advices from Leghorn, Genoa, &c., active preparations were in progress to consign to Naples, the demand for which had materially enhanced prices.

These circumstances are likely, in some measure, to lessen the quantity which would otherwise have found its way to England from that quarter, and may even be expected to decrease the imports from the Black Sea ports; still, as there were very large stocks of old wheat at Odessa at the close of the year, and rather considerable contracts have been entered into at different periods on British account, the quantity to be expected from thence is not altogether unimportant.

We shall now turn our attention to the Baltic, and, as the place of the greatest importance, first refer to Danzig. The comparatively small shipments made from thence in 1843 left rather a heavy stock on hand, which having been constantly added to by arrivals from Poland until the inland navigation was closed by ice, there is probably at present nearly half a million of quarters at that port. The quality of last year's produce is much inferior to that of the preceding year all over the north of Europe. At Danzig, the difference in price between samples of fine mixed, of 1842 and 1843, is at least 2s. to 2s. per qr.

At most of the other principal ports in the Baltic the smallness of the exports last year must also have left a surplus on hand; and, notwithstanding the acknowledged deficiency of the wheat harvest of 1843, we feel perfectly satisfied that, should this country require it, and prices rise sufficiently high to cause the duty here to recede a few steps below the point at present reckoned on, the imports into Great Britain would exceed a million quarters. This is without any reference to the United States and our North American colonies, from whence rather considerable arrivals may also be calculated on.

The effects of the new Canadian corn bill were scarcely tested last year; there can be no doubt that it is working disadvantageously on the interest of the British farmer, it being, in fact, a boon given to the colonial at the expense of the home agriculturist.

The reports from Montreal all agree in stating that the shipments of Flour from thence will be on an extensive scale. A large amount of business appears to have been done both at the port named and at many of the markets during the winter, with the ultimate view of shipping to England. At Montreal prices had fluctuated from 26s. to 27s. 6d. per brl., and at the date of our last advices there were few sellers below the latter figure. Wheat was then quoted 5s. to 5s. 6d. per 60lbs.

Comparative Statement of the quantities of Barley sold at the towns, from whence the averages are compiled during the six months terminating 23rd of March, 1844 and 1843, respectively.

1843.					
Weeks ending		qrs.		s.	d.
October	7	12,655	....	30	4
"	14	27,019	....	30	2
"	21	40,041	....	30	1
"	28	47,931	....	30	4
November	4	57,596	....	30	9
"	11	66,762	....	31	7
"	18	77,975	....	32	5
"	25	74,795	....	32	4
December	2	107,220	....	32	1
"	9	108,139	....	31	8
"	16	124,983	....	31	8
"	23	134,096	....	32	0
"	30	132,516	....	32	3

1844.					
January	6	120,644	....	32	3
"	13	111,253	....	32	7
"	20	121,612	....	33	0
"	27	116,902	....	33	7
February	3	119,921	....	33	8
"	10	106,808	....	33	2
"	17	111,002	....	33	1
"	24	100,578	....	33	4
March	2	99,037	....	33	7
"	9	86,127	....	33	9
"	16	81,338	....	33	4
"	23	00,000	....	00	0

1842.					
October	7	22,240	....	28	5
"	14	37,293	....	28	8
"	21	50,220	....	28	10
"	28	55,830	....	28	11
November	4	62,634	....	28	4
"	11	76,481	....	28	2
"	18	106,481	....	27	11
"	25	113,308	....	28	1
December	2	127,608	....	28	1
"	9	137,879	....	27	6
"	16	132,788	....	27	1
"	23	131,521	....	26	5
"	30	138,015	....	26	5

1843.					
January	6	130,268	....	26	3
"	13	122,299	....	26	5
"	20	126,526	....	26	5
"	27	129,496	....	27	2
February	3	123,524	....	27	8
"	10	116,712	....	27	5
"	17	102,365	....	27	1
"	24	101,596	....	27	1
March	3	101,837	....	27	2
"	10	96,419	....	27	4
"	17	93,733	....	27	7
"	24	78,911	....	27	11

CURRENCY PER IMPERIAL MEASURE.

MARCH 25.

WHEAT, Essex and Kent, new, red	56	60	White	58	60	66
Irish	50	54	Do.	55	58	63
Old, red	59	64	Do.	55	63	68
RYE, old	30	36	New	36	—	—
BARLEY, Grinding, 28 30 Malting	32	34	Chevalier	34	36	36
Irish	28	32	Bere	26	28	28
MALT, Suffolk and Norfolk	60	62	Brown	56	58	58
Kingston and Ware	60	63	Chevalier	60	63	63
OATS, Yorksh. & Lincolnshire, feed	22	23	Potato	22	25	25
Youghall and Cork, black	18	19	Cork, white	19	20	21
Dublin	18	19	Westport	20	21	21
Waterford, white	18	19	Black	18	19	19
Newry	21	22				
Galway	17	18				
Scotch, feed	20	22	Potato	23	25	25
Clonmel	20	21	Limerick	20	21	23
Londonderry	20	21	Sligo	18	19	19
BEANS, Tick, new	28	34	Old, small	34	38	38
PEAS, Grey	32	33	Maple	31	33	33
White	23	26	Boilers	34	38	38
SEED, Rape	27l.	28l.	Irish	22l.	26l.	per last.
Linseed, Baltic	30	38	Odessa	41	—	—
Mustard, white	7	10	brown	8	11	per bush.
Tares, old	—	—	new	—	—	per qr.
FLOUR, Town-made	50	Suffolk	42	per sk.	of 280lbs.	
Stockton and Norfolk	42	Irish	44			

FOREIGN.

Free. In Bond.

WHEAT, Danzig and Konigsberg, finest						
high mixed	59	64	—	—	—	—
Do, mixed	55	59	—	—	—	—
Saale Marks, Anhalt	53	59	—	—	—	—
Silesian and Stettin	52	57	—	—	—	—
Mecklenburg and Pomeranian	56	61	—	—	—	—
Polish Odessa	49	52	—	—	—	—
RYE	—	—	—	—	—	—
BARLEY, Hamburg, Konigsberg, Dantzig, and Russian malting	none	—	—	—	—	—
Do, distilling and grinding	29	32	—	—	—	—
OATS, Dutch and Friesland, Brew or Poland	21	24	17	20	16	16
Danish or Swedish	17	19	15	16	15	16
Russian and Mecklenburg	17	20	15	16	15	16
BEANS, Small or Pigeon	28	30	none.	—	—	—
Egyptian	26	28	16	17	17	17
PEAS, white boiling	32	34	22	25	25	25
Grey or hog	none	—	—	—	—	—
FLOUR, Danzig, per brl. of 196lbs.	—	—	—	—	—	—
American	33	34	23	25	25	25
Canadian	31	23	—	—	—	—

COMPARATIVE PRICES OF GRAIN.

WEEKLY AVERAGES by the Imp. Quarter, from the Gazette, of Friday last, March 22nd, 1844.	AVERAGES from the corresponding Gazette in the last year, Friday, March 24th, 1843.
WHEAT..... s. d. 56 3	WHEAT..... s. d. 47 3
BARLEY..... s. d. 33 3	BARLEY..... s. d. 28 4
OATS..... s. d. 20 1	OATS..... s. d. 17 7
RYE..... s. d. 33 8	RYE..... s. d. 29 3
BEANS..... s. d. 31 3	BEANS..... s. d. 26 3
PEAS..... s. d. 31 4	PEAS..... s. d. 28 11

IMPERIAL AVERAGES.

Week ending.	Wheat.	Barley.	Oats.	Rye.	Beans.	Peas.
Feb. 10th	52 7	33 1	19 1	32 9	29 10	30 6
17th	53 6	33 4	19 6	33 5	30 6	31 1
24th	55 1	33 7	19 7	32 10	30 4	31 2
March 2nd	56 2	33 9	20 0	35 3	30 5	31 0
9th	56 0	33 6	19 11	33 9	31 0	31 6
16th	56 3	33 3	20 1	33 8	31 3	31 4
Aggregate average of the six weeks which regulates the duty.	54 11	33 5	19 8	33 7	30 7	31 1
Duties payable in London till Wednesday next inclusive, and at the Out-ports till the arrival of the mail of that day from London.	18 0	5 0	7 0	9 0	10 6	10 0
Do. on grain from British possessions out of Europe.	6 0	0 6	2 0	2 6	2 0	1 0

PRICES OF SEEDS.

MARCH 25.

The Seed-trade continues very languid, in consequence of the wet weather, and sales of red Cloverseed can only be made by submitting to lower prices; though, as but little white is offering, the quotations are fully maintained. Canaryseed was plentiful, but at the late decline there were a good many purchasers. In other articles there was very little passing, and quotations remained nominally unaltered.

Linseed, English, sowing	50	60		
Baltic	—	—	crushing	38 41 per qr.
Mediter. & Odessa	38	41		
Caraway	—	—	new	.. 57 62 per cwt.
Clover, English, red	60	76	white	.. 100 130
Flemish	54	73	do...	.. 70 115 extra 130
New Hamburg	60	66	do...	.. 70 122 ,, 130
Old do.	42	52	do...	.. 70 115 ,, 125
French	50	65	do...	.. none.
Coriander	15	20		per cwt.
Mustard, brown, new	12	18	white	.. 10 12 p. bush.
Trefoil	—	—	old	.. 14 23 new 25 34
Rapeseed, English, new	25/.	26/.		per last.
Linseed Cakes, English	9/.	10s. to 10/.		per 1000
Do. Foreign	5/.	to 6/.		10s. per ton.
Large, foreign	—	—		
Rapeseed Cakes	5/.	5s. to 5/.		10s.
Hempseed	35	23	per qr.	
Rye Grass, English	—	—	Scotch	— nominal.
Tares, Spring	4s. Od.	to 5s. Od.		very large 5s. to 6s.
Canary, new	54	55	fine	52 — per qr.

PRICES OF HOPS.

BOROUGH, MONDAY, March 25.

The market is steady, but there is very little doing; fine qualities continue scarce.

POTATO MARKET.

SOUTHWARK, WATERSIDE, March 25.

The heavy gales of wind the early part of the week prevented the arrivals anticipated, and the cold north-east winds checked vegetation, which caused an extra demand for Potatoes, and a further advance on some samples was maintained. The farmers having been fully employed with their field-operations, they have not had time to ship, and our market still feels the hindrance to the shipping caused by the late snow-storm in the North; and since the roads have been opened, many cargoes have been shipped to Yorkshire for plants. Several cargoes arrived from the northern districts the end of the week; yet the supply is moderate, especially for this season of the year. The weather became more genial the last two days, and the dealers only purchasing for present use, sales were languid at the annexed quotations.

York Reds	80s.	to 90s.	Do. Kidneys	80s.	85s.
Perth do.	80s.	85s.	Wisbeach do.	80s.	85s.
Early Devons	—s.	—s.	Do. Blues	75s.	—s.
Late Devons	90s.	—s.	Do. Whites	65s.	70s.
Cornwall	85s.	—s.	Guernsey Blues	80s.	—s.
Jersey Blues	80s.	—s.	Prince Regents and		
Kent & Essex Wh.	60s.	70s.	Shaws	65s.	80s.

RAW HIDES,		SHEEP & CALF SKINS.	
at per stone of 14lbs.		Per skin.	
s. d.	s. d.	s. d.	s. d.
Best steers & heifers	5 6 10	Market Calf	6 6 8 6
Middling hides	4 10 5 4	Long woolled sheep	4 6 6 0
Inferior ditto	4 4 4 8	Short ditto	3 0 4 6
Shearlings, 4d. to 8d. each; and		Lamb Skins, 15d. to 18d. each.	

BUTTER, BACON, CHEESE, AND HAMS.

Irish Butter, new, per cwt.	s.	s.	Cheese, per cwt.	s.	s.
Carlow, new	84	92	Double Gloucester	48	58
Sligo	60	61	Single ditto	42	52
Banbridge	60	—	Cheshire	52	74
Cork, 1st	76	78	Derby	50	58
Waterford	66	70	Foreign ditto	40	48
English Butter,			Bacon, new	40	46
Dorset, per firkin	54	—	Hams, Irish	38	40
Foreign Butter, cwt.			Middle	56	64
Prime Friesland	106	—	Westmoreland	61	70
Do. Kiel	106	—	York	50	74
			Fresh Butter, 13s.6d. per doz.		

HAY MARKETS.

SATURDAY, MARCH 23.

SMITHFIELD.—Supply good, and trade very dull.  
CUMBERLAND.—A limited supply, and a steady demand.  
WHITECHAPEL.—Trade throughout dull, at barely late rates.

	At per load of 36 trusses.			
	Smithfield.	Cumberland.	Whitechapel.	
Coarse Meadow Hay	50s to 60s	60s to 70s	58s to 65s	
New ditto	—s	—s	—s	
Useful ditto	65s	70s	72s	75s 66s 70s
Fine Upland ditto	72s	76s	76s	80s 72s 77s
Clover Hay	65s	100s	63s	95s 65s 105s
Old ditto	—s	—s	—s	—s —s —s
Oat Straw	26s	28s	27s	30s 26s 28s
Wheat Straw	28s	30s	30s	32s 28s 30s
Rye Straw	—s	—s	—s	—s —s —s

TIMBER,

	£	s.	d.	£	s.	d.
Baltic Timber, per load of 50 cubic feet	4	0	0	to 4	7	6
Yo. Deals, per 120 red'd	16	0	0	.. 32	0	0
Deck Deals, for 3 in. 40 feet	0	18	0	.. 1	5	0
Crown Pipe Staves, per mille	150	0	0	.. 160	0	0
Lathwood, per fm. of 4 feet	0	0	0	.. 8	0	0
Petersburg, Riga, and Archangel						
Yo. Deals, per 120 red'd	16	0	0	.. 18	0	0
White	14	0	0	.. 16	0	0
Yo. Battens	16	0	0	.. 28	0	0
Riga Logs, for 18 feet contents	4	10	0	.. 5	0	0
Stettin Pipe Staves, per mille	150	0	0	.. 160	0	0
Gothenb. Yo. Deals, per 120 3in. 12f. 9in.	26	16	0	.. 27	0	0
White ditto	27	0	0	.. 0	0	0
Xania Yo. Deals, 3in. 12 ft.	29	0	0	.. 32	0	0
White	27	0	0	.. 0	0	0
Quebec and St. John's Spruce Deals						
per 120, 3 in. 12 ft. 9 in.	17	0	0	.. 18	0	0
Yo. Pine, per 120 red'd	9	10	0	.. 18	0	0
Red Pine	12	0	0	.. 15	0	0
Red Pine Timber, per load of 50 cubic ft.	3	10	0	.. 3	15	9
Yo. ditto	2	10	0	.. 3	10	0
Birch ditto	2	10	0	.. 3	0	0
Ash ditto	3	5	0	.. 3	10	0

WOOL MARKETS.

LIVERPOOL, MARCH 23.

SCOTCH.—The market for all kinds of Scotch has been quieter this week; still, as the stocks are exceedingly light, prices are maintained. In laid Highland there has been a few small sales. White Highland is scarce, and enquired for. Good Cross Wool is in request, and would command full rates, if any were to be got. Good quality of Cheviots are also in demand, and command full rates.

	s.	d.	s.	d.
Laid Highland Wool, per 24lbs	9	3	to 9	9
White do.	12	6	13	0
Laid Crossed do..unwashed	10	0	11	0
Do. do..washed	11	0	12	6
Do. Cheviot do..unwashed	10	6	13	0
Do. do..washed	14	0	17	6
White do.	23	0	24	0

FOREIGN.—We continue to have a good demand by private contract for all kinds. Our late imports have all been bought and taken from the quay, as landed, at very full rates.

FOREIGN.

CITY, MARCH 25.—The imports of wool into London last week were 2,402 bales; viz., 1,341 from Sydney, 410 from Germany, 87 from Spain, 182 from Buenos Ayres, 278 from Hobart Town, and 104 from Turkey.

The wool market has been firm as regards Colonial and Foreign samples, and tolerably active.

The most recent accounts from Sydney read more favourable, and we make the following extract:—"In the export markets, we are happy to say that every prospect of bustle and activity is discernible. The manifests of every vessel, outward bound, contain entries of heavy consignments of salted beef, hides, tallow, and horns; whilst by each successive advice from the principal sheep countries in the interior we gather the most favourable accounts of the coming clip. As we are upon the subject of wool, and as this is the eve of the sheep shearing season, we will once again press upon the attention of the growers the importance of adopting the suggestions so repeatedly urged upon them by the London brokers, as to the essential points of washing, sorting, and packing the fleeces. The importance of well washing the fleeces, in order that the wools may be brought to market with as bright a colour as possible, is so evident, that it might almost be deemed a matter of supererogation to advert to it; and yet we have, only within the last few days, received convincing proof of the blameable neglect of some of our growers to this all-important point. A gentleman, who has recently arrived from London, has shown us two samples of Australian wool which were sold last year, of very different classes as regard the fineness and the softness of the fibre, but in which the inferior class had been washed and packed in the most approved manner, whilst the superior class had been sent home in the most slovenly manner, filled with grass seeds, bush twigs, and other extraneous substances, which render every process of manufacture both laborious and expensive, and, as a natural result, procure for the wool an unprofitable sale. In the case we are alluding to, the inferior wool, in consequence of the careful manner in which it had been got up, sold for two shillings, whilst the finer class, from its dirty and slovenly appearance, realized but sevenpence. This is a fact which ought to speak volumes to the growers, and one to which we, at this particular season, beg their earnest attention. Having given the subject of washing much consideration, and compared the various modes in use, we are induced to recommend the plan so strongly urged by the principal London brokers, namely, to wash the fleece before shearing, according to the German fashion. The German flocks, after being washed, are driven into a shed strewn with clean litter, or penned up in hurdles on clean grass, where the greatest care is taken to prevent their exposure to dirt, or anything which might sully their whiteness. They are not shorn after washing until a sufficient degree of moisture is deposited in the fleece by perspiration, to impart a soft handle to the wool. We may here repeat that so conscious are the Spaniards of the superiority of the German mode of washing and assorting, that they make every effort to introduce it. In the import markets dulness and inactivity are the still prevailing features.

From Breslaw we have intelligence to March 2nd,

when the sales of woollen goods were going on favourably, the finest descriptions being in most request, as being in smallest supply. There had not, on the whole, been so extensive a business doing for some time before as during the month of February, all qualities having found buyers. One great Berlin house had been purchasing on English account, chiefly the better sorts. Polish and Silesian were 60 to 70 rix-dollars. Some very fine lambs' realized 100 rix-dollars. The good accounts from England and the visits of the foreign buyers had sustained the market, and the prices at the next fair were expected to be equally satisfactory, though no great advance was anticipated. The stock had been 8,000 cwt., but would be larger before the fair.

Advices from Frankfort on the Oder state that up to the 6th inst. there had been a good business doing in woollens; the stock was 77,000 cwt. The raw staple was higher, and had sold briskly.

WOOL, on which the Home Consumption Duties have been paid at London, Liverpool, Bristol, and Hull, during the last week:—

WOOL.	This Year previous to last week.	Same time in the last Year.
London:—		
Spanish, .....lbs.	350,217	14,671
Australian, do. ....	712,610	1,270,462
Other sorts, do. ....	2,533,253	2,129,836
Liverpool .....	1,980,818	540,726
Bristol.....	38,374	—
Hull.....	1,347,236	971,342

IMPORTS OF WOOL.—Quantity of Wool entered at Hull for home consumption during the week ending March 14:—

From Hamburgh.....584,003 lbs.

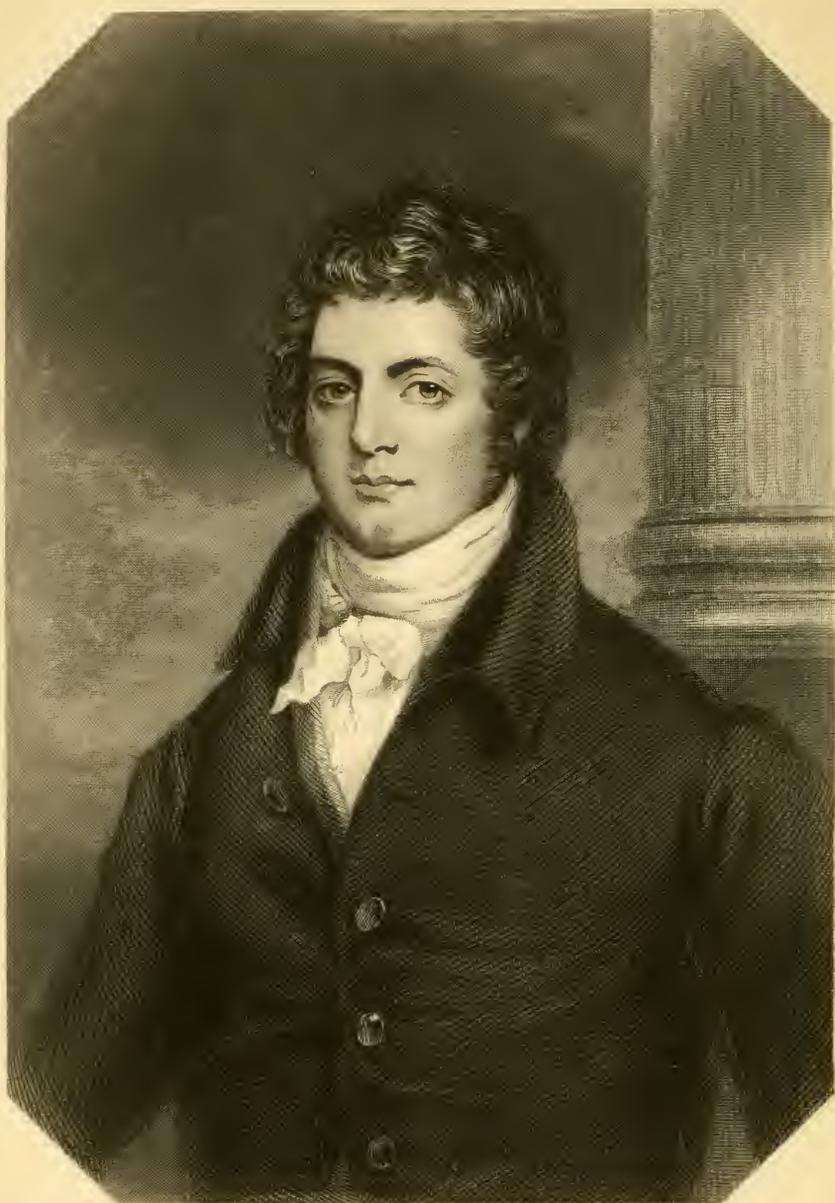
PRICES OF MANURES.

Subjoined are the present prices of several sorts of Manure:—

Hunt's Bone-dust, 16s. per qr.	Chile-fou, 21s. per cwt.
Hunt's Half-inch Bone, 15s. per qr.	Wolverhampton Compost (Alexander's), 12s. per qr., subject to carriage to London, or forwarded from Wolverhampton
Hunt's Artificial Guano, 8l. per ton	Guano, 10l. 10s. per ton; 12s. per cwt.
Hunt's Stuff Graves, 5l. per ton	Potter's Artificial Guano, 12s. per cwt.
Rape Dust, 6l. to 6l. 10s. per ton	Muriate of Ammonia, 24s. per cwt.
Rape Cake, 6l. per ton	Muriate of Lime, 12s. per cwt.
Rags, 4l. to 4l. 10s. per ton	Clarke's Compost, 3l. 12s. 6d. per hhd., sufficient for three acres
Graves, 6l. 10s. per ton	Alkalies, 28s. and 42s. per cwt.
Gypsum, at the waterside, 32s. 6d. per ton; landed and housed, 38s. to 42s. per ton, according to quantity	Soda Ash, 14s. to 16s.
Agricultural Salt, 34s. per ton	Chloride Lime, 28s. per cwt.
Carbon, 12s. per qr.	Sulphuric Acid, 2½d. per lb.
Hunus, 14s. per qr.	Sulphur for Destroying Worm on Turnips, 16s. per cwt.
Soap Ashes, 10s. per ton	Sulphate Soda, 7s. 6d. per cwt.
Patent Disinfected Manure, 13s. 6d. per qr.	The Liverpool Abattoir Company's Animalized Manuring Powder, 2l. 10s. per ton
Highly Concentrated Manure, 30s. per qr.	Manure Powder, 16s. per qr.
Nitrate of Soda, 14s. 6d. to 15s. per cwt.	Boast and Co.'s (Bow) Inorganic Manures, from 6s. to 11s. per cwt., according to crop
Nitrate Potash (saltpetre), 26s. per cwt.	Boast's Guano, 9l. 9s. per ton
Petre Salt, 4s. per cwt.	Fothergill's Gypsum, 35s. per ton.
Willey Dust, 4l. 4s. per ton	Fothergill's Phosphate of Lime, 14s. per cwt.
The Urate of the London Manure Company, 5l. per ton	
New Bristol Manure, 8s. per qr.	
Hunt's new Fertilizer, 13s. 4d. per qr.	
Preparation for Turnip Fly, 10s. 6d. per pakt., sufficient for three acres	

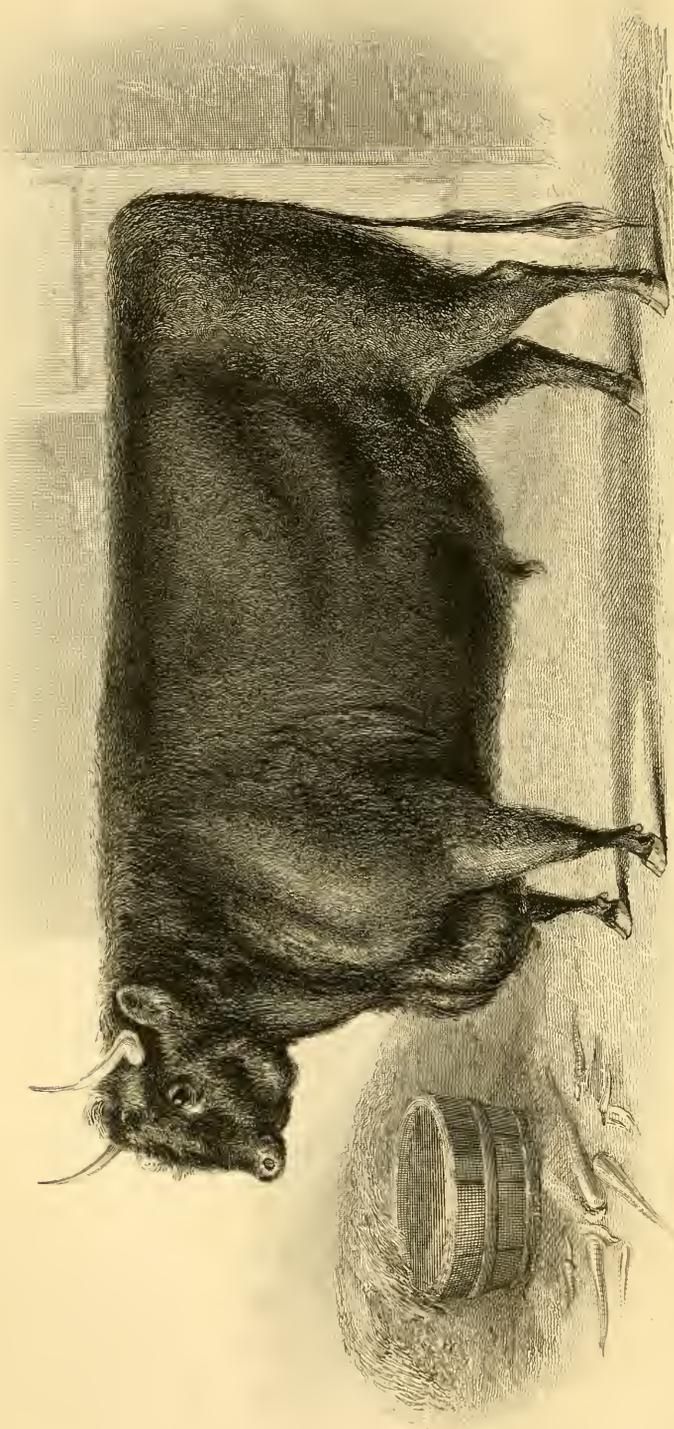






Portrait of a young man, possibly a member of the French Revolution, wearing a dark coat and a white cravat.

MASSACHUSETTS  
AGRICULTURE  
COTTON



*The Cow, English Breed*  
*See Chapter on the Cow, p. 100*

# THE FARMER'S MAGAZINE.

MAY, 1844.

No. 5.—VOL. IX.]

[SECOND SERIES.

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## PLATE I.

PORTRAIT OF FRANCIS, DUKE OF BEDFORD.

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## PLATE II.

A WEST HIGHLAND OX,

THE PROPERTY OF MR. ELLIOTT, EAST HAM, ESSEX.

The West Highlanders, or Kylos, as they are called (supposed to be a corruption of a Gaelic word, pronounced *Kael*, signifying Highlands), are bred in great abundance in, and exported from, the Hebrides. The true Bull of this breed is described by Mr. McNeil, of Islay, as black, the head not large, the ears thin, the muzzle fine and rather turned up, broad in the face, eyes prominent, countenance calm and placid; the horns should taper to a point, neither drooping too much, nor rising too high, of a waxy colour, widely set at the root; the neck fine, particularly where it joins the head, and rising with a gentle curve from the shoulder; the breast wide and projecting well before the legs: the shoulders broad at the top, and the chine so full as to leave but little hollow behind them; the girth behind the shoulder deep; the back straight, wide, and flat; the hips broad, the space between them and the ribs small; the belly not sinking low in the middle, yet, in the whole, not forming the round and barrel-like carcass which some have described; the thigh tapering to the hock-joint; the bones larger in proportion to the size than in the breeds of the southern districts; the tail set on a level with the back; the legs short and straight; the whole carcass covered with a long, thick coat of hair, and plenty of hair also about the face and horns, and that hair not curly. They are hardy, easily fed; the proportion of their offal is not greater than in the most approved larger breeds; they lay their fat and flesh equally on the best parts, and when fat the beef is fine in the grain, and so well mixed or marbled that it commands a superior price in every market. About 30,000 of these are annually sent from the Hebrides to the main land.

In the Hebrides, the dairy is only attended to so far as to serve the family with milk, butter, and cheese. The milk of the Western Highland cow is small in quantity, but excellent in quality; she does not yield, however, more than one-third of that of the Ayrshire. The oxen of the Hebrides are never worked.—*Youatt on Cattle*.

The ox, of which a plate is given, may be considered as an almost perfect animal of its kind, and displays symmetry which may vie with breeds of much higher reputation.

OLD SERIES.]

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[No. 5.—VOL. XX.

MEMOIR OF FRANCIS, DUKE OF  
BEDFORD.

BY CUTBERT W. JOHNSON, ESQ., F.R.S.

It would, perhaps, be difficult to name any other family, who have so long and so ably served the cause of English agriculture, as the noble house of Russell. To ensure the assent to this assertion, of the English farmer, I need only recall to his memory "The great Bedford level," brought into existence more than two centuries since by the noble exertions of the ancestors of the subject of this memoir. Time, it is true, has so familiarized us with this great and fertile extent of valuable marsh land, that we hardly feel sufficiently the obligations we are under to those who first made the successful attempt to drain this once great and worthless swamp of its stagnant waters. The Bedford Level contains, according to Mr. Wells's (*History of the Bedford Level*, vol. i. p. 1.) upwards of 300,000 acres of fen-land, and extends over a surface of more than twenty miles in extent. It would far exceed my limits if I was to sketch even a mere outline of the many great difficulties which former members of the Bedford family had to encounter in their gigantic efforts to accomplish the drainage of this rich and extensive district. It was on the 13th of January, 1630, that a former Francis Russell, the second Earl of Bedford, entered into a contract to drain the tract now denominated the Bedford Level. This illustrious nobleman was, by this memorable agreement, to have 95,000 acres of the reclaimed land, of which 40,000 acres were to be appropriated for continuing and preserving the work; and 12,000 were allotted to the Crown. The Earl was speedily joined in his noble attempt by several other persons, and, in 1637, the association he thus formed was incorporated by a charter from Charles the First. All kinds of opposition, however, speedily arose to impede the efforts of the association, and, at the death of this great nobleman, on the 9th of May, 1641, although much had been done towards the drainage of these great fens, yet much more still remained to be accomplished before these lands could be profitably used, even as "summer lands." "The deep and everlasting debt of gratitude and affection," says Mr. Wells, "which will ever be due from fen men to the memory of Francis, Earl of Bedford, has hitherto been cheerfully acknowledged, and proved by the constant election of his successors to the important and highly honourable office of Governor of the Bedford Level Corporation, of which he was undoubtedly the founder." (Vol i. p. 133.) Francis, Earl of Bedford, was succeeded in the earldom by his eldest son William. In 1641, it appeared, by a paper laid before the House of Commons, that "all the generall sommes of moneye layd owte by the Earle of Bedford, and in ye business of drayning the greate Levelle of the Fennes, from the 10th of July, 1631, until 10th of August, 1638," amounted to about £93,000, a large sum

for those days. William, Earl of Bedford, during a long life (for he lived until the 7th of September, 1700, and to the 87th year of his age), in a variety of ways, nobly supported the cause of the fen drainage adventurers. King William the Third, who well knew his merits, elevated him, in 1604, to the Marquisate of Tavistock, and to the Dukedom of Bedford: "thus terminated" very justly remarks his biographer, when speaking of his death, "the mortal career of William, Earl of Bedford, one of the most exalted, amiable, and benevolent characters, that have adorned this or any other age or country."

To William, succeeded Wriothesley, the second Duke of Bedford, who died in 1711; and he, was succeeded by his son Wriothesley, the third Duke of Bedford, who, dying in 1732, his brother John became the fourth Duke of Bedford, who married, in 1737, Gertrude, daughter of Earl Gower, and by her had issue, Francis, Marquis of Tavistock, born in 1739, who, to the public regret, lost his life by a fall from his horse while hunting, March 22, 1767.\* The marquis having married, in 1764, Elizabeth Keppel, daughter of the Earl of Albemarle, had by her Francis Russell, the noble subject of this memoir, who was born July 22, 1765, and, upon the death of his grandfather, in 1771, became, in the sixth year of his age, the fifth Duke of Bedford.

It would not be an easy task to select, from the peerage of England, any agriculturist who more nobly served the cultivators of his country than that great farmer whose agricultural efforts I propose to briefly sketch in this paper.

His, indeed, was a mind of no ordinary character—heir to the highest rank in the peerage—to the possession of princely estates, whose revenues had rapidly accumulated during a long minority; he considered, in very early life, that there were yet objects of ambition to be attained worthy of the position he held in the land of his birth: deprived, by a complaint which arose, when at Westminster School, from a blow from a cricket ball, of the power of indulging to any extent in the more active sports of the field, he devoted himself to the pursuits of agriculture with a zeal, an energy, and with talents, which soon placed him, young as he was, at the head of the agriculturists of his time.

As is too often the case with those orphans who are similarly situated, his education appears to have been rather neglected. He was first placed at Loughborough House School, near London, and was thence removed to Westminster, where, from the blow to which I have before alluded, he became afflicted with that inveterate hernia which finally brought him to a premature grave: he always, indeed, considered his education to have been neglected, a misfortune which

\* He unfortunately lost his life, by his horse falling under him, in leaping a low hedge, as he was returning from a fox-chase—the horse trampled on his head in struggling to rise.—*Gentleman's Mag.*, vol. 37, p. 144.

the vigour of his mind and his ardent application to study in his maturer years, amply compensated. In early manhood he attached himself to horse-racing, but he soon abandoned the turf for the pursuits of agriculture, and in his after years was merely a breeder of race-horses, amongst the other stock kept on his estate. Coming of age in 1787, and into the possession of his vast property, the duke became indeed a zealous farmer and breeder of live stock, entering upon his inquiries with a zeal and industry which soon placed him at the head of his profession. He followed, indeed, the true path which leads to the attainment of eminence: he sought for instruction from, he honoured, he visited, he associated freely with, the great Bakewell, and most of the eminent farmers of his day. His efforts to improve the breed of live stock were, from the first, most energetic. In June, 1797, he commenced the great Woburn sheep-shearings, which were annually repeated, but with greatly increasing effect and *eclat*, as long as he lived. He offered, at these meetings, considerable prizes for a variety of agricultural improvements, and entertained, at these gatherings, at Woburn Abbey, most of the leading farmers from all parts of the empire. Thus for the meeting held June 17th, 1799, he offered nineteen prizes, varying in value from two to fifty guineas. (*Annals of Agri.*, vol. xxxii., p. 189.) "It was," says Arthur Young, "the greatest meeting of the kind ever seen in England." (*Ibid.*, vol. xxxiii., p. 306.) "Hospitality," he adds, "could not be more nobly or more usefully exerted than on this occasion, by his grace the Duke of Bedford; from whose magnificent mansion and highly-cultivated farm every one went away, equally pleased and instructed."

To this meeting was adjourned one of the early meetings of the then newly-formed Smithfield Club—a society which, formed in the preceding year by Mr. Wilkes, had the Duke of Bedford for one of its earliest members. Long previous to this, Lord Somerville had in London instituted his spring shows of *lean* stock. The Smithfield Club extended their rewards chiefly to the improvement of *fat* stock, and have held their highly-useful meetings in December. Of all the numerous original subscribers to this club in 1798 (*Annals of Agri.*, vol. xxxii., p. 208, vol. xxxiii., 324), Mr. Thomas Gibbs, the eminent seedsman, at the corner of Half Moon-street, alone remains.

At the fourth annual Woburn sheep-shearing, of June 15, 1800, the same prizes were again offered and awarded by the Duke (*Ibid.*, vol. xxxiii., p. 499), and the attendance of the leading farmers of England was greater than ever. It seems that in the four days 847 dined with his Grace at the abbey. (*Ibid.*, vol. xxxiii., p. 227.) "It was," says Arthur Young, "an animating circumstance, to see the lovers of agriculture assembled together from countries so remote, from all parts of England and Scotland, the most distant provinces of Ireland, from Germany, and from Switzerland." "The duke," he adds (for Arthur Young's heart

was generally in the right place), "announced premiums for 1801. May the new century open auspiciously for the plough! may the spirit of this sheep-shearing improve the flocks of Britain! may her fields smile with ample harvests, her farmers rich, her poor well fed and happy! and may we all, by reverence of that Being 'from whom all blessings flow,' endeavour to deserve them."

On June 15, 1801, for the last time, the duke was again the life and soul of the great Woburn meeting. (*Annals*, vol. xxxvii., p. 193.) On that day 255 persons dined with him at Woburn Abbey; the second day, 259; the third day, 232; the last day, 132: total, in the four days, 878. This was the last time that he presided at the Woburn sheep-shearing; he here, in fact, bid adieu to those brilliant meetings, for in the spring of 1802 he died, much too soon for his country; for, although he had accomplished many things for the improvement of its agriculture, he was contemplating far greater efforts. Arthur Young spoke of his death (*Annals*, vol. xxxviii., p. 369) in a way which showed the sincerity of his grief. "The agricultural world," he said, "never perhaps sustained a greater individual loss than the husbandry of this empire has suffered by the death of the Duke of Bedford." And, after noticing the improvements he had made in the cultivation of his farm, in breeding, and in irrigation, he continues—"But the ample mind of this great man meditated much more important objects; he had fixed the plan of an establishment for agricultural education, arranged the plan and determined the execution of a botanical garden and a laboratory—that, much as the Duke of Bedford has been admired for what he effected, it may be safely asserted that he saw but the morning of that fame which would have attended the maturity of his exertions. The personal qualities of the man would have shed a happy influence on the whole progress of these undertakings: affable and engaging in his manners—mild, serene, and beneficent in his temper—none ever approached him but with pleasure, or quitted him but with regret."

He was named in the charter of the Board of Agriculture as one of its first members: he attended its meetings with considerable regularity, and on every occasion endeavoured, by his personal example and by his purse (for it has been estimated that his agricultural efforts cost him more than £20,000 per annum), to promote the cause of agriculture.

The last illness of the Duke of Bedford was but of short duration. He had been slightly indisposed with a cold for a few days: but by an unfortunate over-exertion at a game of tennis, and by a fit of coughing in the afternoon of Feb. 26, his complaint was dangerously increased; great pain ensued; every other means being ineffectually tried, a painful operation was performed; mortification ensued, and on the 2nd of March, 1802, he died, in the full possession of his unclouded faculties, and lamented by every real friend of the country he once adorned. His brief will, written with his own hand on half a sheet

of paper resembling the cover of a letter, when he felt his end drawing near, marked the simplicity of his character. It was as follows:—"I, Francis Duke of Bedford, do give all my personal estate to my brother, Lord John Russell. Witness my hand this 27th of February, 1802. BEDFORD."

He was buried in the family-vault at the Cheney's, in Buckinghamshire, on the 10th of the following March, amid the tears and regrets of a numerous, an opulent, and a grateful tenantry. (*Gent. Mag.*, vol. lxxii. p. 283.) A public subscription was soon after entered into for a monument to his memory, and this soon amounted to between three and four thousand pounds. (*Annals of Agr.*, vol. xxxix. p. 11.)

The person of Francis Duke of Bedford was tall and well proportioned; his handsome countenance, it seems, corresponded with the frankness and liberality of his disposition; his deportment was easy and unaffected; and in his dress, if he was inclined to any extreme, it was that of plainness. In his manners he was agreeable to all ranks of society. (*Month. Mag.*, vol. xiii. p. 455.) The celebrated Charles James Fox, who well and intimately knew the loss England sustained by his death, when moving for a new writ for the borough of Tavistock (March 16, 1802), in the room of his brother, Lord John Russell, who succeeded to the dukedom, in an eloquent address to the House of Commons, expatiated upon his value (*Hansard's Parl. Hist.*, vol. xxxvi. p. 364); very truly describing his death as a "great public calamity."

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## SAWDUST AS MANURE.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

At the monthly meeting of the Highland and Agricultural Society, held in the Edinburgh Museum, on Wednesday last, the following paper "On the fertilizing influence of sawdust, both in its natural and charred states," by Mr. Robert M'Turk, of Hastings Hall, Dumfriesshire, was read by Mr. Scott of Craigmuir. After adverting to the general admission that nothing could be more advantageous to the agriculturist than the careful preservation of every species of manure, and, notwithstanding this, its rare fulfilment in practice in most farm-yards, Mr. M'Turk proceeded to direct attention to a substance produced in great abundance in almost every district, and which has hitherto been too generally considered as inapplicable to any useful purpose in agriculture, namely, sawdust. He then noticed a practice which had been many years ago adopted by Sir Charles Monteith, of Closeburn, and still continued, of using sawdust as a litter in the byres, cattle-sheds, pig-sties, &c., of his home-farm, which had not only a cleanly effect, but also possessed the advantage of absorbing much valuable liquid matter, that might otherwise have been lost. Others had adopted the practice, and afterwards discontinued it, from a mistaken no-

tion that the sawdust thus heated was to be taken as an equivalent to, and substitute for, common farm-yard manure; whereas, in its then undecomposed condition, it could not have been expected to afford an immediate and abundant supply of nutritious matter to the particular crop with which it was used. It is only by its gradual decomposition that it will afford certain principles which will prove a useful adjunct to other manures; independently, however, of its mechanical action in absorbing and conveying to the fields the liquid substances already mentioned, Mr. M'Turk then goes on to show, by quotations from the works of Liebig and Johnston, the necessity of a continued supply of carbon and carbonic acid to growing plants; and points out the facility with which sawdust, undergoing decay, affords these elements. Another mode in which sawdust may be rendered valuable in agriculture, consists in reducing it to charcoal. This operation arrests indeed, for a time, the progress of decomposition, but it imparts a tendency to imbibe gaseous bodies, to which we are to look, in the first place, for the fertilising influence which it exerts on the soil. Excepting in the instance of some particular kinds of plants, charcoal is not to be expected to act successfully as an immediate manure; its fertilising properties will be found to consist in absorbing and retaining till needed those gaseous exhalations which are evolved during the changes which are continually taking place in the animal and vegetable substances under the surface of the soil, and which would otherwise be lost. Thus, one cubic inch of charcoal can absorb 90 of ammoniacal gas and 35 of carbonic acid, and hence its usefulness when employed along with those manures which are rich in these matters, and which may occasionally be evolved in greater quantities than can be appropriated by the crops or retained by the ordinary soil. Mr. M'Turk then proceeds to show, that sawdust, after its passage through the various offices of the farm, and saturated with the liquid substances absorbed, would speedily tend to a more thorough decomposition, if left to ferment in the dung pits; while in its fresh and in its charred state it is capable of being advantageously used along with guano and bone dust, facilitating, by its mechanical mixture, the equal sowing of these substances. He then makes some judicious remarks on the propriety and usefulness of employing charcoal as an absorbent of the many noxious exhalations from dirty and offensive lanes of cities, in the sick chamber, &c., &c.; and concludes by earnestly recommending the owners of saw mills no longer to throw to waste the sawdust produced, which, if not used by themselves, may, ere long, be sought for by their neighbours, and suggesting to proprietors of plantations to collect and convert into charcoal the prunings of their timber—thus affording a valuable article to themselves and employment to the poor.

The paper was accompanied by a specimen of sawdust from larch timber, about 40 years old, which yielded, in charring, about 25 per cent, of

shining, granular charcoal, apparently very pure; also a specimen of charcoal obtained from a black heavy peat, yielding about 32 per cent. This charcoal from peat was without lustre, but not otherwise, apparently, inferior to that from wood. Specimens of both these substances were exhibited to the meeting.

The following observations were added by Mr. Scot:—"Mr. M'Turk has not brought forward this paper on the uses of sawdust as containing any novelty, but rather to recall, from time to time, the attention of agriculturists and the owners of mills, to a useful and economical method of disposing of a substance hitherto a burden to its possessor and a nuisance to his neighbours, whenever, from its accumulation, it is cast into the nearest stream. There seems no doubt that, even in its fresh state, sawdust, carted direct to the field and ploughed in, would, by its gradual decomposition, repay the cost; while, as an absorbent of liquids in cattle sheds, byres, stables, pig-sties, and dunghills, these places would not only be kept in a more cleanly and comfortable state, but the litter, when added to the general mass of manure, would be much more valuable. This subject has been frequently brought before the public. Mr. Sim, of Drummond, at p. 529, of "The Transactions of the Highland and Agricultural Society for 1841," states that, after an unsuccessful trial by burning, when the residue was so small as to be worthless, he used it as a litter for his swine, and found it to be a most successful addition to common manure for turnips. Mr. Home Drummond, at p. 274, Transactions for 1842, states that he mixed it up as a compost with road scrapings and a little lime, and, after lying for three years, it proved to be exceedingly useful. There is, likewise, a notice of sawdust by Professor Brande, who says that, if mixed with lime and water, it is reduced to a dark brown carbonised mass, highly useful for agricultural purposes. In the second number of the Transactions, new series, page 66, Mr. Bishop, land steward, Methven Castle, adverts, likewise, to the economical uses of sawdust, and states that he had successfully reduced it to charcoal, of which specimens were furnished to the society.

"There is another method of carbonising sawdust, which has not hitherto been noticed in any publication to which I have had access, but was lately communicated to the society in a letter, which, most unluckily has, for the time, been mislaid, so that I can neither give the name of the writer, nor detail very correctly the results of the process. His method, however, was this:—He first spreads a layer of sawdust, no matter whether wet or dry, then a layer of fresh lime shells, then another layer of sawdust, and so on; when, the required moisture being applied, the heat evolved in the slaking of the lime was proved to be sufficient to reduce the sawdust to a state of charcoal. This certainly would seem to be a very simple and economical method of reducing sawdust, and is well worth the attention of those who have the opportunity of trying it—as lime is not compatible with guano, from its proneness to

decompose the ammoniacal salts, this mode of carbonising sawdust would not be applicable to its use with that substance; but if it shall be established that the use of charcoal is advisable along with guano, whether mechanically or chemically, there is probably no cheaper or better method of obtaining the charcoal than from sawdust or peat, in localities where these substances abound."

On the same subject, Mr. Maclauchlan, of Maclauchlan, mentioned he had used sawdust in his stables, placing it in the channels to receive the urine, and found it useful in giving bulk to the manure heap, but cannot say how it decomposes in it.

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### GREAT ANNUAL SHOW OF THE UNION AGRICULTURAL SOCIETY.

This great meeting of the agriculturists of the Border, was held at Coldstream on Tuesday, April 2nd, and fully maintained its former celebrity, both in the quantity of superior stock brought forward for exhibition, and in the attendance of company. Among the general company in the show-yard, we noticed—Right Hon. Lord Polworth; Mr. Spottiswoode, of Spottiswoode; Colonel Spottiswoode, of Gladswood; Mr. Robertson, of Ladykirk; Sir John Halket, of Pitfirrane, Bart.; Mr. Sprot, of Riddell; Captain Spottiswoode; Mr. Tod, of Drygrange; Sir Henry Askew, of Pallinsburn; Mr. Renton, of Mordington; Mr. Roy, of Nenthorn; Mr. Wilson, of Cumledge; Mr. Hood, of Stoneridge; Mr. Campbell, of Jura; Captain Nisbet, of Lochton; Mr. Milne, of Faldonside; Mr. Grey, of Dilston; Mr. G. Grey, Milfield-hill; Mr. Darling, Hetton House; Mr. James, of Kirknewton; Mr. Rea, of North Middleton; the Mayor of Berwick; Mr. Nairn, Waren Mills; Mr. Boyd, of Cherrytrees; Mr. Oliver, of Blakelaw; Mr. Atkinson, of Ewart; and a number of other gentlemen celebrated as breeders of stock, &c.

The whole short-horned stock, pigs, and implements of husbandry were properly stationed by half-past ten o'clock, and the general company was admitted to the ground at eleven o'clock, when the show commenced. The stock exhibited was allowed by the best judges to be of a most superior description—so much so as to call forth a very high compliment from a Yorkshire gentleman, who had travelled all the way from that great county to act as one of the judges of short-horns. Of short-horned bulls upwards of 50 were entered as competitors for the premiums offered by the Society, and about 20 more were entered as extra stock for sale or hire, in which department, we understand, a very considerable amount of business was as usual, transacted, the price of year-old bulls ranging from 21*l.* to 30*l.* About 15 cows were shown for premiums and as extra stock, and nearly the same number of two-year-old and one-year-old queys. Many of the

older bulls shown as extra stock were greatly admired, and the year-olds, generally speaking, were very superior. Among the extra stock, three cows shown by Mr. Simson, Blainslie, and two half-bred queys, a cross between a short-horned bull and a Highland cow, shown by Mr. Curry, Cornhill, attracted much notice from the company, and were particularly commended by the judges, as will be seen by their award. There was also a very good show of pigs, both of premiums and as extra stock.

In the horse department there was a great variety. The number of draught stallions was not so great as on some former occasions; there were, however, fourteen exhibited, some of which were indeed noble animals. Several celebrated blood stallions were also on the ground. Among which were Captain Barstow's beautiful Arab, Alexander the Great, Mr. Robertson's, of Ladykirk, The Little Known, Lord John Scott's Uncle Toby, Major St. Paul's Cheviot, &c., &c. The other description of horses exhibited were as under:—Cart mares, 8; colts for agricultural purposes, 3; fillies, 3; brood mares, for hunting or riding horses, 14; four-year-old hunting colts and fillies, 4; three-year-old ditto, 10; one-year-old ditto, 13; and a few other colts were shown as extra stock.

The gentlemen who acted as judges on this occasion were:—

*For Short-horned Stock and Pigs.*—Mr. Black, Dalkeith Park; Mr. Reid, Ballencrieff; and Mr. Leonard Severs, Oliver, Richmond.

*For Draught Horses.*—Mr. Darling, Hetton House; Mr. Wilson, Simprin; and Mr. Brodie, Clarilaw.

*For Hunting or Riding Horses.*—Mr. Campbell Renton of Mordington; Captain Spottiswoode, of Spottiswoode; Mr. Tod, of Drygrange; and Mr. Hunt, Thornington.

*Committee for Implements.*—Mr. Hood, of Stoneridge; Mr. Roy, of Nenthorn; Mr. Hogarth, Akeld; Mr. Dove, Eccles Newtown; and Mr. Nisbet, of Lambden.

The award given in by these gentlemen was as under:—

#### CLASS FIRST.

##### SHORT-HORNED CATTLE.

Premium 1. For the best bull, not exceeding four years old, to Mr. Hogarth, Eccles Tofts, 20*l*.

2. For the second best ditto, to Mr. Jobson, Chillingham Newtown, 15*l*.

3. For the best yearling bull, to Mr. Crisp, Hawkhill, 5*l*.

4. For the best cow, fit for breeding, to Mr. Turnbull, Crooks, 5*l*.

5. For the second best ditto, to Mr. Hunt, Thornington, 3*l*.

6. For the best quey, fit for breeding, two years old, to Mr. Milne, of Faldonside, 5*l*.

7. For the best ditto, one-year-old, to Mr. Atkinson, Ewart, 5*l*.

N.B.—The judges highly commended the following animals shown as extra stock, viz., Mr. Hunt's bull, Mr. William Jobson's bull, Mr.

Simson's, of Blainslie, three cows, Mr. Curry's, of Cornhill, two half-bred queys, and Mr. Renton's, of Mordington, pen of five wedder hogs.

#### CLASS SECOND.

##### HORSES.

Premium 1. For the best draught stallion, to Messrs. Shearer and Clark, Sandford, Renfrewshire, 25*l*.

2. For the second best ditto, to Mr. Rea, North Middleton, 20*l*.

3. For the best cart mare, fit for breeding, to Mr. Oliver, Venchen, 5*l*.

4. For the best colt for agricultural purposes, foaled after 1st January, 1841, to Mr. Penny, Bartlehill, 5*l*.

5. For the best filly for ditto ditto—premium not awarded.

6. For the best mare for breeding hunters or riding horses, not thorough-bred, to Mr. Lynn, Mindrim Mill, 5*l*.

7. For the best hunting colt or filly, 4 years old, bred and reared within the district, to Mr. Baillie, of Jerriswoode, 5*l*.

8. For the best ditto, 3 years old, to Mr. Brown, Blanerne House, 5*l*.

9. For the best yearling ditto, to Mr. Grey, Milfield-hill, 5*l*.

#### CLASS THIRD.

##### SWINE.

Premium 1. For the best boar, to Mr. Scott, Courthill, 2*l*.

2. For the best sow, to Mr. Roy, of Nenthorn, 2*l*.

#### CLASS FOURTH.

##### IMPLEMENTS OF HUSBANDRY.

To Mr. Bennet, Thirlstane, for his plough with Screen Bridle—1*l*.

To Mr. Hope, Coldstream, for his Corn Dressing machine—1*l*. 10s.

To Mr. Bertram, mill-wright, Newcastle, for his Machine for grinding Oil Cake, &c.—2*l*.

To Mr. Scott, Courthill, for his Liquid Manure Cart—1*l*.

To Mr. Murray, Maxwellheugh, for his Improved Turnip Sowing Machine—1*l*.

To Mr. Mather, Kalemouth, for the good workmanship of the Implements shown by him—10s.

#### THE DINNER.

At four o'clock in the afternoon, upwards of a hundred gentlemen sat down to dinner in the large room of the Newcastle Arms Inn, and were afterwards joined by a party who dined in another room. David Robertson, Esq., of Ladykirk, occupied the chair, having on his right Lord Polwarth and F. L. Roy, Esq., of Nenthorn, and on his left the Rev. T. S. Goldie, Chaplain to the society, Mr. Herriot, Foleyhills, &c. John Grey, Esq., Dilston, officiated as croupier.

The usual loyal and complimentary toasts having been drunk,

The CHAIRMAN rose to propose prosperity to the Union Agricultural Society. He had been

called upon in a manner wholly unexpected, to take that chair, which should have been occupied by the brother of the Duke of Buccleugh; but he ever would come there when they asked him, and discharge his duties as well as he could, whatever those duties might be. (*Loud Cheers*). He regretted the unavoidable absence of Lord John Scott the more, because, if he had been present, he would have entered into a long detail of the origin of this society, and the benefit it had conferred upon agriculture, as set forth in a pamphlet which was now being published for the use of the members of the society by Mr. Jerdan. Lord John Scott, in writing to him, said, that if he (the Chairman) could get a few minutes' conversation with Mr. Jerdan, he would be able to tell the meeting all about it. Mr. Jerdan's pamphlet, however, would put them much better in possession of it; but there was one thing which should advantage this society. In spite of the absurd feeling which kept away some whose duty it was to attend, there were others who did attend, and who came from great distances—their Vice-President had come 30 or 40 miles, and there were others from beyond the Dunse hills and the Cheviots—and he was sure there was never an occasion on which they assembled at those meetings, when they did not spend the evening in the greatest pleasure, and were not happy to meet again (*cheers*). He would make one remark in regard to this society, as showing its usefulness, and the good it had done. It was the first society of the kind established in Scotland, existing at first under the name—he might say the sacred name—of the Tweedside Society. It took the lead of all Scotland in giving premiums for agricultural produce. It was afterwards joined by the Border Society, and then took the name of "The Union," thus doing away the distinction between the two sides of the Tweed; and he did not believe they were all aware that the Highland and Agricultural Society of Scotland took its cue from this society. It was not until two years after the establishment of the Union Society that the Highland Society ever thought of giving premiums for the rearing of animals (*applause*). That was a remarkable fact, and one of which they had just reason to be proud. The Union Agricultural Society knew no distinction of parties. It had but one object, and that was to promote the common good, by promoting the improvement and prosperity of agriculture. They gave prizes for the production of the best animals, and thereby did a public good to their common country. Individuals also could do a good deal, to further the same object, and more than they imagined, if they would only try. There was nothing more beneficial than a rivalry, such as that which this society encouraged. Individuals could do a great deal for mankind, when incited by an ambition to excel each other in good works. If they were beat this year, they would not rest contented, but would only be the more determined to win the prize next year. That was the best principle. He had been present at the annual meetings of this society for the last eight or ten

years, and he had seen nothing but the best of feeling. No one went away who was not glad that his friend and neighbour had got the prize, though himself unsuccessful. That was acting upon a principle which was the best for mankind. They sought to benefit society. They might seek it by different roads, but their object was the same. He would now conclude by proposing prosperity to the Union Agricultural Society. (The toast was drunk with all the honours).

The CHAIRMAN having called for a bumper, gave the health of the President of the Society, the Duke of Roxburghe. Any man who knew that young nobleman, knew that if he could in any way benefit his country generally, or this society in particular, to which he was much attached, he would only be too happy to do it. But sometimes distress comes, over which it is necessary to draw a veil, and to which he would not further refer, than to say that such was the cause of the noble President's absence that day. But to mark the interest which he felt in this society, he had written a letter to the secretary, in which he stated that he should be happy to give 20 guineas for prizes; to be divided as the committee of the society should see fit, but with a wish on the part of the noble Duke, that Cheviot sheep should not be excluded. This was independent of the Duke's handsome subscription, and was an instance of his value in the neighbourhood in which he lived. The greatest misery of Scotland was the absence of so many of her landed proprietors (*applause*), and we should therefore know how to appreciate the value of those who, like the noble Duke, lived upon his own estate. The kindness of the Duke of Roxburghe was not publicly known, but was felt in the neighbourhood in which he lived. (The toast was drunk with all the honours, and with loud cheering.)

Mr. SPOTTISWOODE, of Spottiswoode, gave the healths of the successful competitors that day. (Drank with three times three, and one cheer more.)

Mr. HOGARTH, Eccles Tofts, returned thanks for the toast.

Mr. SPOTTISWOODE next proposed the unsuccessful candidates.

Lord POLWARTH returned thanks.

The CROUPIER had great pleasure in proposing the healths of the judges. (Drank with the honours.)

Mr. SEVERS, Oliver, near Richmond, returned thanks. This was the thirty-second time he had acted in the capacity of a judge, and he never saw so many bulls on any occasion as on the present. They would easily suppose that such a number could not be all first-rate; but there were remarkably few deficient. The stock in general was very good indeed; and he would go home to Yorkshire and tell them what an excellent stock they had in this part of the country. (*Loud cheers*.)

The CHAIRMAN then rose and said—Gentlemen, before I have the honour of proposing a toast, which you will afterwards drink with all

your hearts, I wish to say a few words; and, to use a parliamentary expression, we must form ourselves into a committee of the whole house, to perform one of the most important ceremonies that has engaged the attention of the members of this Society for many years. Gentlemen, I have now the especial honour, and I will add at the same time, the great pleasure of being, as your chairman, the medium of presenting a testimonial to one of the most valuable and devoted servants that ever a public body had the good fortune to have—and whose services are given in a way that is little known, for they have been services most gratuitous, as well as most valuable. (*Loud cheers.*) Gentlemen, I allude to this lovely piece of plate which I have now the honour, in the name of the assembled members of the Union Agricultural Society of this border country, of presenting to your Secretary, Mr. Jerdan, after gratuitous services of more than thirty years. The chairman then addressed Mr. Jerdan, and said—Sir, you stand in the unprecedented position, that no envious breast is disturbed at seeing this testimonial presented to you. (*Loud cheers.*) No jealous rival seeks to pluck from your brow the laurels you have won. (*Renewed cheering.*) This is not a thing which you have sought; but it is, as I have said, the spontaneous effusion of those you see around you—men who knew your worth, and who appreciated your value to this society. They were the means of originating that which I have now the honour of presenting to you, this testimonial. And, sir, I have peculiar pleasure in doing so, for two reasons. In the first place, testimonials of this kind are often given when men are withdrawing their services; and although you may be older now than when you commenced your labours as secretary, yet some of the old ones are twice as good as the young ones at the present day; and I trust that long may you yet continue to be the secretary of this society. (*Loud cheers.*) Mr. Jerdan, it is not only because I consider the feelings with which you will receive this testimonial, but because I hope you will, by having it placed in your house, make it an heir-loom in your family, a testimonial of your virtues to your children, and a stimulus to them to imitate your course; and as there are a number of young men here, it will be one of those bright examples to them, which shew that when a man does his best, he will always receive the thanks of his fellow-men. (*Loud applause.*) I have no hesitation in saying that the manner in which you have for so long a period pleased such a body of men, has been greatly conducive to the welfare of this society. Your labours have been great and your attention constant. You took the trouble to write letters when other men were asleep; and one of the greatest reasons of the success of this society is, its having had a valuable secretary for thirty years. I have only to add, may we have you as secretary for thirty years to come. (*Loud and continued cheering.*)

Mr. JERDAN was welcomed with renewed cheers on rising. He seemed to be very power-

fully affected—so much so that at a distance it was impossible to hear distinctly the earlier part of his address. We understood him to say he deeply regretted it was not in his power to express the feelings of regard and of gratitude which had been almost too powerfully excited by the manner in which his health had been proposed by Mr. Robertson and received by the company, in connection with the handsome testimonial which he was requested to accept, as a public acknowledgment of the humble services he had done to the society. These services had, he feared, been greatly over-rated; but he agreed with what had been said by the chairman, that when any duty was performed with zeal and attention, and with the heart, such service was sure to be valued; and all the merit he claimed was, that he had from first to last so done his duty to the society. (*Cheers.*) He begged to assure them that, valuable and elegant as the present now offered him was, he valued it not for itself, but as the medium by which the kind feelings of the members of the society and other friends, had been publicly conveyed to him and recorded, and which were prized by him beyond silver or gold. They had paid him for all the trouble he had had—and he would rather go to another subject and say a few words upon the excellent qualities of the society. What he had to observe with reference to the society's usefulness was this, that when it commenced there were very few short-horns or good sheep to be seen. They had seen that day how different it was now. They had done him the honour to say that his humble services had been useful, and he at once confessed that he should not have received with pleasure the testimonial they had that day presented to him, unless he had thought the result of those services were estimated as of use to the public (*hear, and cheers*), and he would only mention that now when the tenants connected with that institution, from the improvements that have been effected, are able to turn over their capital twice in the period that it formerly took them to do once, he did say, that the hours and days he had spent in the service of this society had not been uselessly spent. (*Loud cheers.*) He had said more than he intended, but he must not sit down without returning thanks, more especially to the noble president of the society, and other members of the highest rank, as well as those who were of his own circle, from all of whom he had ever received the greatest courtesy and kindness. To Mr. Turnbull and Mr. Dudgeon he was most deeply indebted for the generous part they had acted in reference to the compliment they had paid him that day; he had begged of them that they would limit it to the lowest possible point; as, he would repeat it, he cared not for its intrinsic value, but for the good feeling it would display towards him on the part of the members of that society. He begged most cordially to thank them, as well as the absent members, who had, by letters of all descriptions, joined them in this mark of favour. In reference to what had fallen from the chairman, he must say he would rather retire from

office (*loud cries of "no, no"*); but if his health permitted him, he should feel honoured in going on, re-invigorated by this new proof of their kind support. (*Great applause.*)

The CHAIRMAN then read the inscription on the plate, and, at his request, Mr. Jerdan advanced and received it from his hands, amid great cheering.

The plate itself was in the form of a splendid silver tray, manufactured by Messrs. Reid and Sons, of Newcastle, and the inscription was as follows:—

## PRESENTED

BY

THE MEMBERS OF THE UNION AGRICULTURAL SOCIETY, AND OTHERS INTERESTED IN ITS WELFARE,

TO

GEORGE JERDAN, ESQ.,

*Secretary to that Institution.*

In testimony of their high sense of his valuable and efficient services in that capacity for the long period of upwards of thirty years.

1844.

Lord POLWARTH called for a bumper to the health of a private friend of his own, whose value and worth cannot be too highly estimated—he ment their worthy Chairman. They should be particularly grateful to him for having so faithfully and ably given expression to their feelings on this occasion, and he hoped they would have frequent opportunities of drinking his health in the same capacity. (The toast was drank with all the honours, and continued cheering.)

The CHAIRMAN returned thanks in a neat and appropriate speech.

The CHAIRMAN, after calling for a bumper, said he had yet to propose the health of a gentleman—a farmer by profession, but a gentleman in every sense of the word—his honoured Croupier—Mr. Grey of Dilston, better known in this part of the country as Mr. Grey of Milfield Hill. (*Loud Cheers.*)

Mr. GREY of Dilston, said, that where it not that he had on many previous occasions experienced their great kindness, he should have felt at a loss how sufficiently to thank them for the very flattering manner in which they had drunk his health. He well knew that in visiting Tweed-side he was visiting the land of hospitality and kind hearts, and he could not have greater pleasure than in coming. The Chairman had expressed himself towards him (Mr. G.) with great kindness, but he had also expressed himself with regard to the Union Agricultural Society in a way which excited in his, (Mr. G.'s) mind, reflections, somewhat troublesome, but which he would state. He had the distinction, along with his friend, Mr. Jerdan, of being one of the original members of this Society. He was one of the Tweedside Society, which was named after that beautiful stream, whose hardy sons had long since exchanged the foray and bale-fire and the vengeful feeling, for the nobler rivalship in which

they were now engaged; and they had very wisely determined to sink the two societies on both sides of the Tweed into one, and they formed the Border Union Society. All that the chairman had stated was correct, with one exception. It was true that this was the first society that gave premiums—and liberal premiums too—for the exhibition of stock, but Mr. Robertson made a little mistake when he stated that they preceded the Highland Society by two years. They gave premiums ten years before the Highland Society.

The CHAIRMAN.—I said after the Union.

Mr. GREY.—Then we are both right, and both wrong. (*A laugh.*) He had been witness of the extraordinary improvements which followed the efforts of this society. At that time they had here and there individual specimens of stock equal to what they had now, but these kinds of stock were now general, and the society's object was accomplished. When the society commenced there were very few; they were to be seen at Ladykirk and Carham, and one or two other places; but they were looked upon as objects to be admired, but not to be reared in this country. "They are grand creatures," it was said, "but not fit for us." But what had been the result of the efforts of this society, and the cultivation and knowledge which it promoted? Those animals which were then in the hands of only a few individuals, were now diffused throughout the whole district. It appeared to him that they had now reached a point at which they were not likely to continue to improve. Every one was now alive to the advantage of good stock, and knew the means of obtaining it; and he was not sure but that other things had arisen which had a claim upon more of the society's attention. (*Applause.*) He conceived that the means of the society, instead of being exclusively devoted to the rearing of stock, should be applied to other objects. There were yet great and unapplied means of improving the cultivation of the land; and those now in operation had been eminently successful. The introduction of the drilled turnip system was the greatest era in promoting and increasing the produce of the land, not only in reference to the turnip crop, but every other. It was recorded in the histories of Messrs. Bailey and Culley, and Mr. Pringle, that in the year 1750 they had been led to look into that curious old book of Jethro Tull, and introduced the drill system in a small way; but they did it very imperfectly, making the drills three yards apart. It was then further reduced from time to time, till that active agriculturist, Mr. Dawson of Frogden, fixed it at thirty inches, and there it remained. We had known by experience that different districts were more or less favourable to different kinds of stock. This soon became obvious to us; but it was left to the introduction of chemistry to tell us that different kinds of plants require different kinds of food, and that by keeping the qualities of the soil in proper proportions, we might get on more rapidly. This was somewhat of an occult science, but one which everybody agreed deserved the highest attention. He therefore suggested that it might be advisable to apply

some portion of their funds to the promotion of improvements on the land, which, though it might not be so attractive as the showing of a good breed of stock, would be of great advantage; for the next important step to a good breed of stock, which they had now succeeded in obtaining, was the greatest amount of produce they could raise to feed them. He would not detain them at that social hour of the evening; but he would just suggest whether, having effected the object for which the society was instituted, it was not desirable to take into consideration the giving of premiums for experiments on the land by thorough-drainage, the difference between the produce raised from different manures and their price, the effect upon the succeeding crops, and so on. He thanked them for the compliment they had paid him, and assured them that nothing gave him greater pleasure than to be there. His visits to that society were the green spots in his life (*cheers*), and although he had latterly been called upon to occupy a position of much responsibility and labour elsewhere, he rejoiced he could still meet, occasionally, with his friends on Tweedside (*loud cheers*).

The CHAIRMAN proposed the health of Lord John Scott.

Mr. JERDAN here read a letter apologising for his Lordship's absence.

Mr. SPOTTISWOODE returned thanks.

The CHAIRMAN proposed the healths of Lord Polwarth and Mr. Spottiswoode.

Lord POLWARTH, in the name of himself and Mr. Spottiswoode, returned thanks; and, in the course of his speech, said he was authorized to state that Mr. Etheridge (a gentleman to whom the country was greatly indebted for the improvements which he had made in tile-making), intended to present a silver cup to the society for the best cultivated farm of not less than 200 acres. Mr. Etheridge left it to the society to notice any particular points, but he requested particular attention to the amount of profit realized by the tenant, and if turnips or other green crops, to minute what artificial manures are used.

The CHAIRMAN gave the healths of the Duke of Buccleugh and Lord Elcho, with their hounds, and stated that the latter nobleman had notified his intention of becoming a member of the society, and had sent 20*l.*—10*l.* as a prize for a filly, and 10*l.* for the best Cheviot tup.

A number of other toasts were afterwards given, which our limits will not permit us to particularize.

## OBSERVATIONS ON THE MANAGEMENT AND APPLICATION OF MANURES.

BY A PRACTICAL FARMER.

The application of substances to the soil with a view of adding to its fertility, or, in other words, of contributing to the increase of the cultivated produce obtained from it, is of very great antiquity. The practice had

its origin, no doubt, in the observation of the effects of substances adventitiously employed; as in the case of the excrements of animals in pasturage, being accompanied by a more luxuriant herbage, wherever they happened to be scattered over the surface of the ground. The importance of the application of fertilizing matters to the soil increased as improvements in agriculture advanced, and it may now be regarded, among the farming community, as the all-absorbing topic of the day. Our fields have been enriched by bones imported from other countries for many years past, in addition to the home supply; but now our farmers, assisted by the enterprise of our merchants, are laying even the South Seas under contribution to enrich their fields and increase their harvests. The list of fertilizers has in fact extended to such a length that the difficulty is to select that which will best answer the intended purpose. The dung of the farm-yard was, it may be said, the only manure in use some twenty or thirty years ago. Before that period even the value of bones, which subsequent experience has proved to be so great, was unknown, and they might be seen strewed about in all directions, going to waste. It is not, however, my present purpose to enter into a history of the numerous fertilizers of the present day, but shall attempt one which I hope will be of more practical value—that of making the reader acquainted with their properties and modes of application. I would merely observe here, that when we reflect on the vast improvements which have been effected in the science and practice of agriculture during the past quarter of a century, our minds cannot fail to be struck with astonishment, and yet we can only regard the past as merely laying the foundation for further improvements. He who has hitherto been satisfied to follow on in the path of his fathers, must now see that it is only by the adoption of the improvements of the day that he can expect to maintain his ground. While he manures his land at a cost of from £6 to £8 per acre, he will be astonished to find his more enterprising neighbours be able to apply fertilizers quite as efficacious at about one fourth of the expense. The time has in fact arrived when the practical farmer should endeavour to make himself acquainted with the science of agriculture, as well as the practice; nor is this the difficult matter it is supposed to be, as will be apparent to all who set about the work with energy and spirit. The researches of scientific men are at the present time directed to the elucidation of principles for the guidance of the farmer with unexampled zeal and ability; so that much may be expected from their labours, if those for the benefit of whom they are intended will only take advantage of them.

In preparing a series of papers on the important subject of manures for the *Mark Lane Express*, it shall be the object of the writer, himself a practical farmer, to bring what is really established, both by scientific investigation and experience, prominently forward; reminding those who may favour his observations with a perusal that they must not be disappointed if they do not find every nostrum now vended under the specious titles of fertilizers and specifics, treated of at such length as the encomiums of their inventors or vendors would seem to warrant.

The object in the application of manures being to increase the cultivated produce of the soil, it is important, before proceeding further, to ascertain how this is effected. Plants, during their growth, are dependent both on the soil and the atmosphere for their support, each furnishing a certain portion of the necessary ingredients for the purpose; and further, when subject to the test of analysis, plants are found to consist of a

certain number of substances common to every vegetable production, and of certain others, some of which are peculiar to particular plants. Thus, the *elementary* or simple substances, *oxygen, hydrogen, carbon, and nitrogen*, are present in every case in different forms and various proportions, constituting the great bulk of the vegetable structure, so as to be denominated the bases of all *organic* matter.\* In the process of combustion, these matters entirely disappear, although they form from 88 to 99 per cent. of the whole weight of plants, even after being dried. The quantity of ashes, or residuary matter after burning, which constitute the *inorganic* portion of plants, is therefore seen to be exceedingly small; in fact, so inconsiderable as to give rise to the opinion formerly entertained by physiologists that this *inorganic* or *fixed* portion was merely adventitious, and of trifling moment, but subsequent investigations have shown that the presence of this portion is quite as essential to the healthy development of the vegetable structure as those other matters which enter more largely into its composition.

A striking circumstance connected with this part of our investigation is that of the constancy of the precise proportion of the elementary substances before enumerated in the same species of plants. This proportion is invariably maintained, however distant the localities from which different plants of the same species may be obtained, provided they are healthy and fully developed. What is more remarkable still, these, with one exception, namely carbon, are known to us only in the form of gas, the first and last of which, oxygen and nitrogen, united, form the air we breathe; and the first and second, oxygen and hydrogen, combined in certain proportions, form the waters, which constitute so large a portion of the surface of the globe. At the ordinary temperature of the atmosphere, when separate, they form invisible kinds of air, each possessing very peculiar properties and distinguishing characteristics; but, as we have seen, in combination with each other, they form a very large proportion of the vegetable forms which surround us, from the oak of the forest which has braved the blasts of centuries, to the sensitive plant which recoils even from the slightest touch. In consequence of these substances not being appreciable to our senses without the aid of scientific investigation, little is known practically of their properties and effects in a separate state. This remark, however, does not apply to carbon, which, being a solid substance and easily obtained in a tolerably pure state, many of its most important properties are familiar to every one. The diamond is well known to be the purest specimen of carbon, but it may be obtained in a tolerably pure state, by burning wood in a close vessel, or in a heap, covered so as to exclude the air. When the carbon or charcoal thus obtained is again burned in the open air, it disappears, with the exception of the *fixed* portion of the vegetable structure to which allusion has been already made. It then, in combination with the oxygen of the atmosphere, assumes the gaseous form and becomes an acid, being hence known by the name, carbonic acid gas.

Such then, are the substances forming the organic portion of the apparently simple but really complicated structure of vegetables. It is not necessary that we should enter more at length into their properties in this place, as we shall come to treat this subject more in detail in another series of papers on "the Applica-

\* It may be here necessary to apprise the less scientific portion of our readers that the term *organic* is applied to all animal and vegetable substances, these being composed of pores, vessels, and fibres, which are the *organs* of life. From this explanation the signification of the term *inorganic* will be easily understood.

tion of Chemistry to Agriculture," to appear in future numbers of the *Express*. An important circumstance connected with the subject under consideration, must not, however, now be overlooked; namely, that the elementary substances just enumerated form also the bases of animal as well as vegetable matters, differing merely in the proportions in which they exist; nitrogen being much more abundant in the animal than in the vegetable structure. Hence the adaptation of each of these as food for the other. The different classes of vegetables on the surface of the earth serve, in the first place, as food for the various races of animals inhabiting the globe; and these, in their turn, contribute to the support of vegetable life, both by their excrement during their lives, and by the decomposition of their bodies after their death. What a wonderful provision of nature is here unfolded to our view! In the great laboratory of nature nothing is useless or allowed to go to waste; for no sooner are any of the component parts of the numerous wonderful forms which surround us disengaged from the state in which they previously existed than they instantaneously enter into new combinations, calculated in some manner to preserve that equilibrium so essential to the existence of the almost innumerable classes of beings which people our globe. Thus the decomposing animal matters, which would otherwise prove an intolerable nuisance, are, by an admirable arrangement, employed in contributing to the growth of our cultivated crops, and thereby, indirectly, again to the means of our sustenance. This cycle of changes is therefore carried on in unceasing activity throughout the entire scale of living beings, each, in its turn, supplying the matters from which the food of the others is derived.

The elementary substances, oxygen, hydrogen, carbon, and nitrogen, have now been seen to comprise the greater part of all vegetable structures; but, as has been already remarked, the *inorganic* or *fixed* portion obtained from the residuum, after burning, is not less essential to healthy vegetation. Existing in such small quantities in plants it was long supposed to be of no essential or vital importance, and was rather accidentally present, being derived from the soil on which they grew; but further experience showed that in all cases in which the vegetation was healthy, the quantity of inorganic matter was remarkably constant in the same species of plants, even without regard to the constitution of the soil on which they were produced. If the required matters did not previously exist in the soil, no doubt they could not at all have been present in the plants grown on it, but then such would not have been *healthy* or fully matured plants. If adventitious, as had long been supposed, it might be considered that different plants on the same soil would each contain equal quantities of the inorganic matters peculiar to that soil, having had similar opportunities for absorbing it; but there is nothing now better ascertained within the whole range of physiological science than that different species growing even upon the same soil, will absorb various quantities of earthy matters, the precise proportion being constant in each; and differing most in the case of plants being most remote in their natural affinities; thus leaving it no longer doubtful that such matters really formed an essential part of the vegetable structure.

The inorganic constituents of plants have been seen to be no less essential for the healthy development than those which have been previously mentioned. They are more numerous than the organic elements, and also more variable in the proportion in which they are present in different plants—which, in some degree,

accounts for the circumstance of the soil producing one kind of crop luxuriantly, and being, at the same time, incapable of growing others. They consist of earths and metals in combination with acids. These inorganic matters are also present in the animal structure, thus rendering the composition of animals and vegetables almost identical.

It has now been seen that plants consist of *organic* and *inorganic* matters, in various proportions and in different states of combination; and that without a due supply of each be available, suited to the wants of the different kinds, healthy and vigorous vegetation cannot be produced. An important part of our enquiry is, therefore, ascertained; it being essential, in supplying substances to the soil as food for plants, to know what those substances are which are really required. The necessity of supplying manures containing organic matters has been long known, and, to a certain extent, satisfactorily accounted for by physiologists; but here they stopped short, from the erroneous idea that no other matters were required, and that, therefore, it was not necessary to apply them to the soil. Calcareous matters, it is true, have been applied to the land from a very early period, but they were considered to be beneficial rather from their effects in acting upon substances already in the soil, than as serving directly to constitute vegetable food. A certain stimulating quality was also attributed to this class of substances; but plants being devoid of a nervous system, it seems not a little anomalous to calculate on their being affected by stimulants, as in the case of animals. That the substances under consideration are useful, both mechanically and chemically, the investigations of scientific men have now placed beyond doubt. They contribute to give to the soil a proper degree of consistence, so as to fit it better for the operations of tillage by their mechanical action; and, besides entering directly into the vegetable system, they combine chemically with various injurious matters so as to neutralize their effects; in which latter case substances directly inimical to vegetation are resolved into new compounds—not only harmless in their action, but really serving as manures. Examples of this neutralization occur in the case of lime or other calcareous matter being applied to soils containing uncombined acids, which are eminently injurious to vegetation; but the new compound, or neutral salt thus formed, will serve directly as food for the growing crops.

Regarding the source whence the different substances forming the constituents of plants are derived, a few words of explanation are necessary. With respect to the inorganic portion of them, little doubt can exist as to their being derived from the soil, though it may also be believed that inorganic matters are present in the atmosphere in the form of an impalpable powder, and thus, coming in contact with growing plants, may be absorbed; however, this must be in exceedingly small quantity, and need not be taken into account in this investigation. It is apparent, therefore, that unless the necessary inorganic matters which chemical analysis has shown to be present in plants, already exist in the soil, they must be supplied to it by the cultivator before healthy and vigorous vegetation can be insured.

The sources whence the organic elements of vegetables are derived have not, however, been so satisfactorily ascertained; and for most of the information we are in possession of in this department we are indebted to recent investigations—more especially to those of Liebig—whose labours in organic chemistry are now so well known. Until lately, indeed, chemistry scarcely deserved the name of a science; and even

when the researches of Davy and numerous others raised it from its former empirical position, inorganic chemistry came in for more than an ordinary share of attention; and so defective was our knowledge of organic chemistry, that it is only of recent date that the constitution of plants was, with any degree of precision, ascertained. Nitrogen, for example, was supposed to exist only in certain plants, or in certain parts of the plant. In the gluten of wheat it has been long known to exist, and in cruciferous plants it was also known to be present; but subsequent investigations showed it was present in every case, and formed a constituent part of all plants, often, indeed, in exceeding small quantity, but still not the less essential. As it is our object at present to show the existing state of our knowledge on this important subject, the circumstance just mentioned might not have been adverted to, and is only brought forward as accounting for the still imperfect state of our knowledge on the subject.

Before proceeding further, a few observations as to the more remarkable characteristics of these two classes of substances will not be devoid of interest. These must, however, be brief, otherwise this series of papers would be prolonged to an unreasonable extent, and probably exhaust the patience of the reader.

An important characteristic of all combinations of these organic elements is that they are easily decomposed, and separated into their primary elements, either by heat or by fermentation. Thus they are all combustible, and entirely disappear after burning, leaving only the inorganic matters behind. The same effect is produced, but more slowly, when they are exposed to the air, and heat and moisture present; the putrefactive process then sets in with greater or less rapidity, according to the state of the vegetable and animal matters, and the peculiar circumstances under which they are placed. Organic compounds are also distinguished by another important characteristic, that they cannot be formed by art. Great as is the command of mind over matter, the philosopher is unable by any combinations or by any process to form a piece of flesh, a handful of flour, or a grain of sugar. In all these respects organic substances differ from inorganic. The latter will not disappear under heat, however intensely it may be applied, nor can they be made to undergo fermentation; and further, there are few, if any, inorganic compounds existing in nature which may not be artificially formed by a combination of their elementary ingredients.

There are evidently three sources from which the organic elements of plants must be derived: they are supplied either by the soil, by water, or by the atmosphere. Before further considering this matter, it may not be irrelevant to direct the attention of the reader to the period when, as appears from the records of sacred history, as well as from the deductions of scientific investigations, no vegetable matter existed in the soil which overspread the surface of the globe, and when the vegetable productions of the earth must have been supported without the presence of either animal or vegetable substances. From this it would appear that such matters are, in reality, much less essential than is commonly supposed. In many cases, indeed, it would seem that the mere attachment of the plant to the soil was all that was necessary; and this is more especially the case in warm climates, where the transmission of fluids proceeds with a rapidity of which the inhabitants of more temperate regions can scarcely form an idea. In several cases tropical plants have been preserved in a growing state in this country by means of artificial heat, without any

portion of them being in contact with a particle of earth from which animal or vegetable matters could be supplied; and this merely by a plentiful supply of moisture to their leaves. It appears in such cases not a little singular to such as have not turned their attention to the subject, how even a large plant can be maintained in vigorous vegetation, suspended from the roof of a stove, and cannot fail to direct the attention very forcibly to the enquiry as to the manner in which this is effected. The circumstance of bulbous flower roots flourishing in pure water is familiar to every one, though no doubt this is attributable in part to the store laid up in the bulb itself at a former period, and under different circumstances; but still the fact is worthy of observation. All this does not, however, warrant the conclusion that the soil merely serves to attach the plants to the earth without directly supplying them with any considerable portion of their food, as it is only certain classes of plants that can be supported in the manner just mentioned. While the bulb will flourish in water, and the lichen spread itself on the naked rock, the more valuable plants which serve as food for man and the lower animals will not succeed under such circumstances; but the habits of the former will serve to illustrate many of the statements which will occur in subsequent papers.

Premising these general considerations, we shall next consider the source of *carbon* in plants, and afterwards of *hydrogen*, *oxygen*, and *nitrogen* in succession.

In our rapid sketch of the sources whence plants derive their elementary ingredients, the conflicting opinions still prevailing on the subject cannot be noticed at length. Of the organic matters, *carbon* is the most abundant, forming in most cases about one half of the organic portion of the vegetable structure. This substance is incapable of entering directly, in its solid state, into the circulation of plants. It may be here, indeed, premised that solid matters of every kind are unfitted to be taken up by the organs of plants, and that only such as are in the liquid or gaseous state can be absorbed by the minute vessels of which the cellular substances of plants are composed. Carbon, therefore, enters into the vegetable structure in the gaseous form, in combination with oxygen, the compound thus formed being termed carbonic acid gas. This latter substance exists in the atmosphere, and though present only in small quantity, is never wanting, being produced by animals in respiration. As observed in our last paper on this subject, the original source of carbon in plants must have been the atmosphere, *exclusively*, previous to the existence of what we now term soil. Liebig contends that it is so still, but in this opinion he is at issue with most of the scientific men of the day. A seed will no doubt germinate in soil in which no vegetable or animal matter exists, and in this case no difference of opinion can exist as to the source whence the various matters required for the purpose, carbon among the number, are derived. However vigorously it may sprout in such a case, it will increase slowly in growth, and after remaining in a languid condition for a time, it will be subject to premature decay. By its decomposition a certain quantity of organic matter is added to the soil, which enables the succeeding vegetation to assume a more vigorous form; and the decay of this, in its turn, affords the means of sustaining a still more valuable class of plants; and in process of time the matters thus constantly deposited being incorporated with the mineral matters of the soil render it fitted for the labours of the cultivator.

The absorption of carbonic acid gas by the leaves of plants is constantly going on, and if surrounded by an

atmosphere deprived of this substance by chemical means, they quickly die. The same substance is also taken in by the roots of plants, carbonic acid gas being evolved by matters fermenting in the soil. Carbon is also absorbed in other forms, though in small quantity. The precise proportion of carbon found in different plants is easily ascertained, but to what extent the soil and the atmosphere have each contributed to its production will of course depend on the circumstances in which the plant is placed. Every tiller of the ground knows that the soil is deprived of certain matters by cropping, organic as well as inorganic, so that plants are clearly dependent to a greater or less extent on the soil for their carbon, the chief supply having been derived from the atmosphere. From the latter source the supply is at all times constant; but from the former it is variable, according to the state of the soil and nature and quantity of manure employed.

The next elementary ingredient, *hydrogen*, is not found to exist in an uncombined state, and must therefore enter into the vegetable structure in combination, also, with oxygen. These two substances combined form water, a compound which, in a liquid state, everywhere pervades the soil, and, in the form of vapour, is constantly present in the atmosphere. That the hydrogen of plants, if not exclusively supplied by water, is for the most part obtained from that source, there can be no doubt. Ammonia, now attracting so much attention as fulfilling important functions in the vegetable economy, is composed of hydrogen and nitrogen, and from this source a portion of the hydrogen found in plants may be obtained. The decomposition of the water is effected in the vegetable structure, and oxygen is disengaged. The same phenomena occur in the case of the absorption of carbonic acid gas; and when we reflect on this wonderful provision of nature by which the continued existence of animals and vegetables is made dependent on each other, our minds cannot fail to be struck with astonishment. Animals generate carbonic acid gas largely in respiration, which, if present in the atmosphere in large quantity, would prove destructive to animal life; but this contributes to the support of plants, and these in their turn give off oxygen, to make up for its consumption by respiration and combustion.

Regarding the supply of *oxygen* to plants, little grounds exist for speculation. The atmosphere contains 21 per cent. of its bulk of oxygen, and eight-ninths of the weight of water are also composed of it. Further, carbonic acid gas contains upwards of 70 per cent. by weight of oxygen, and this gas was formerly seen to be absorbed in considerable quantity by plants. From any of these sources an ample supply might be procured, but the chief supply required by plants is believed to be obtained by the decomposition of water.

The proportion of *nitrogen* present in plants has been already seen to be small, indeed so inconsiderable when compared with the remaining organic ingredients, that it was not until lately supposed to be a constant component part of their structure. This is supplied by the decomposition of ammonia, which abounds in animal matters, and constitutes much of their value as manures. It does not appear that any of the nitrogen of the atmosphere goes to supply that of plants, but Liebig has shown satisfactorily that a supply to a certain extent is always present in rain water, a new and remarkable fact. That ammonia is directly absorbed by plants, there can be little doubt; as it is found to be actually present in the juices of many plants. Some plants even perspire ammonia, among which may be mentioned *chenopodium olidum*, stinking

goosefoot. An appreciable quantity of ammonia is also given off by most plants during distillation.

The foregoing sketch will serve to convey an idea of the sources of the organic constituents of plants, and the practical character which we are anxious these papers should retain prevents any more extended notice of their peculiar properties. It has already been mentioned that they exist in very different proportions, but this will appear more distinctly by the following statement of the exact quantities of each element contained in 1000 parts by weight of some of the more important cultivated crops, as given by Boussingault, and quoted by Professor Johnston, in his Lectures on Agricultural Chemistry.

	Wheat	Oats	Peas	Clover seed	Hay	Turnips'	Potatoes
Carbon ....	455	507	465	494	458	429	441
Hydrogen ..	57	64	61	58	50	56	58
Oxygen ....	430	367	491	350	387	422	439
Nitrogen ...	35	22	42	70	15	17	12
Ash .....	23	40	31	28	90	76	50
	1000	1000	1000	1000	1000	1000	1000

The foregoing numbers represent the constitution of the plants and seeds in the state in which they are ready for use, and then dried at 230° of Fahrenheit.

(To be continued.)

## ON MANURES.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—In your last number I observed an Essay by Mr. Banton, on Manures, delivered before the Stewpony Farmers' Club; and which you dwell rather largely upon as a most valuable essay. Now, I do not seek to deprive Mr. Banton of that praise which is justly due to him for his great exertions in experimental agriculture; but I cannot discover that merit in the production which you declare it to possess: indeed, it appears to me to mystify the subject altogether, and to be so full of incongruities that I cannot resist the temptation to examine its claim to consistency.

Mr. Banton was, also, the author of a Prize Essay, which appeared in a former number of your Magazine. I allude to this because I shall have occasion to refer to it hereafter.

I will not encroach upon your valuable columns by noticing aught but the reports of experiments on two manures in the two Essays referred to.

Mr. Banton's experiments, in the first Essay, were on wheat, and, in the second, on turnips. In both cases nitrate of soda and lime were tried, and both were unsuccessful. Therefore he comes to the conclusion that they are too high-priced for wheat, and not good for turnips. Why was not the same reason assigned in both cases? If they had cost him nothing, they would have answered in each case; then why declare them too high-priced in the one, and unnecessary in the other? Again, why did not Mr. Banton state, in each case, how long since the soils in question had been previously dressed with lime—since it is well known that lime is

not required every year. Every practical man well knows that once in five or six years is quite sufficient to apply that material. How, then, could it be expected that there would be a profit from its application in the first year, and by the first crop. In the case first cited, the total expense of liming is £3 8s.; this dressing would not require to be repeated under five years; during that time four crops would be taken off; the expense of liming being apportioned upon those four crops, would make the cost to the wheat 17s. It appears that the increase in the value of the crop, from the application of lime, was £2 2s. 8d.; hence it is clear that, instead of the lime having been a loss of £1 5s. 4d. (as Mr. Banton most erroneously concludes), it was a clear gain of £1 5s. 8d.! Then, with respect to the turnips, in the second case, lime was a *direct* loss; and what does this prove? Not that lime is either too dear, or unnecessary; but that Mr. Banton applied lime to land which did not require it. This must be the case, because there are hundreds of instances on record where lime has *directly* increased the crop of turnips.

Again, with respect to nitrate of soda, I know this is an application which has either an immediate effect, or none at all. But, is it fair for Mr. Banton to conclude that, because it has failed in two little strips of land where he has applied it, therefore it is unnecessary elsewhere? Facts prove to the contrary. Nitrate of soda has proved beneficial, in other cases, to turnips and wheat. It acts as a stimulant for, as well as a food of plants; but the soil spoken of by Mr. Banton did not require it.

In each case Mr. Banton attributes the fault to the manure, but in each case we have shewn that the manure is not in fault. He applied lime and nitrate of soda where they were not required; this was no fault of the manure, but entirely his own. It is a perfect fallacy to talk of these materials being unnecessary and injurious, when there are so many instances on record of their having been beneficial. But practical men apply manure for their crops, without any reference to the previous constitution of the soils whatever; they find it fails, and then they condemn the manure for ever.

Mr. Banton's Essays are calculated to prove more injurious than beneficial, because of this; and it is this unscientific spirit which does more than anything else to retard the progress of agricultural improvement. The ridiculous conclusions of those who are content to rely upon practice solely, may be easily illustrated. I will suppose that a fertile soil should consist of seven elementary materials, which I will name—A, B, C, D, E, F, and G, without which the soils cannot be productive, and the want of any one of which it is the farmer's object to make good. Mr. Banton, or any other purely practical man, commences the cultivation of a soil where G and A are wanting; he straightway applies B, C, and D, of which there already exists sufficient; of course their application proves injurious, and they are condemned forthwith. Another un-

dertakes soil where B, C, and D, are deficient, and he applies G and A; they fail, and hence he condemns those. Thus it is that many of our most valuable artificial manures have been condemned through the ignorance of those who have applied them. No greater degree of ignorance and inconsistency would be shewn by the physician, if he prescribed the same medicine in all cases, and wondered at its failure.

Essays such as Mr. Banton's may be very pleasing to *practical* men—men who laugh at *science*—but they rather prove injurious than otherwise to agriculture. If a man draws wrong conclusions, he must injure the cause he attempts to advocate. If he blames matter where mind is in error, his arguments are worse than useless.

I hope, for the sake of agriculture in general, no less than for his own in particular, that the next Essay, by Mr. Banton will be written in a far more scientific spirit than those he has yet produced. I hope he will not condemn manures because he may have misapplied them.

I am, Sir, yours &c.,

A FARMER, and a Member of the Stew-  
poney Farmer's Club.

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#### BURTON-ON-TRENT FARMERS' CLUB.

At the monthly meeting on the 4th of April, Mr. G. Greaves, surgeon, introduced the subject of the evening's discussion by reading a paper "On the use of lime in agriculture," of which the following is a brief summary:—Lime has been deservedly called "the basis of all good husbandry;" but it seems doubtful whether it be not capable of becoming the basis of a very bad husbandry when it is injudiciously applied. Farmers are apt to believe that in adding lime to their land they are providing a substitute for farm yard manure, and thus are led to apply it to land which does not require it at all, and at improper times, and in improper quantities, to the land which is capable of being benefited by its use. There must always be great difficulty in reducing to practice a general principle deduced from chemical science, because the properties of the soil cannot be easily ascertained; yet it would serve to obviate a great many errors in practice if it were known what effect was likely to follow the application of lime in given circumstances of the soil. The enquiries of agricultural chemists seem to have led to a theory of the action of lime which is very consistent with the experience of practical agriculturists. Lime is used in several states for agricultural purposes. It is found in the state of a carbonate in limestone rock. When the stone is burnt the carbonic acid is driven off, and it is converted into hot or caustic lime. When caustic lime is exposed to the air, it absorbs, first, moisture, and is then called a hydrate; and afterwards, more slowly, it takes carbonic acid from the air, and becomes again a carbonate or mild lime. Chalk is also a carbonate of lime. Marl contains a

varying quantity of mild lime, and hence the use of these two earths to produce the same effect as lime on land. There seems reason to believe that though lime in small quantity is necessary as the food of plants, and though it benefits the soil by improving its texture, the chief effect of it is due to its chemical action on the organic matter in the soil. Caustic lime will produce benefit in some soils by assisting in disintegrating the small particles of rock of which they are composed, and thus setting free alkalis which are constituents of plants; but the unvarying good effect of lime on soils in which organic matter is in excess, and its almost total inefficacy on those in which it is deficient, prove its good effect to be due to its action on organic matter. Both caustic and mild lime have the property of assisting the decomposition of vegetable and animal matters, but they have it in a different degree, and produce rather different results. When caustic lime is added to organic matter, and the mixture is exposed to the influence of warmth, moisture, and air, as it is in the soil, the lime unites itself to part of the elements of the organic matter, and becomes converted into the carbonate; it thus robs the soil of a part of the manure, while it assists in effecting the decomposition of the whole. If the matter be partly animal, or vegetable matter which contains a substance partly composed of nitrogen, caustic lime sets free from it ammonia, and hence it is injudicious to mix it in a caustic state with decomposing farm yard manure. Caustic lime destroys insects, and may be beneficial to land on this account; but it is injurious to living plants and should not therefore be applied in considerable quantity at the same time a crop is sown. The carbonate or mild lime has not so speedy effect on organic matter, but it nevertheless assist in its decomposition. It seems to promote more quickly the same changes as are produced slowly by the combined agency of air, moisture, and warmth in the soil. It is not injurious to young plants, and does not dissipate any of the ammonia when added to manures. An attention to the different agency of caustic lime and mild will enable the farmer generally to decide which of the two is preferable for his particular soil. There are sometimes salts of iron, &c., in the soil, which lime will neutralize. Vegetable matter, also, in undergoing decomposition under favourable circumstances, produces compounds which are injurious to plants; these are for the most part organic acids, and lime will either neutralize them when formed, or prevent their formation. The uses of lime are, to serve as the food of plants; to correct a sour soil; to assist the decomposition of organic matters; to improve the texture of the soil. The questions a farmer should ask himself are,—For which of these purposes is lime required to my land? and—What quantity is required? A small quantity of lime is required in all soils to furnish what is needed as a constituent part of plants. A common Norfolk course would require more than 200lbs. of lime; that quantity would be found in

the ashes of the whole crops of the four years. A soil may have lime naturally, but as it has a tendency to be carried down lower, and washed away by rains, or to be conveyed away by crops, it may become deficient. Very remarkable benefit is sometimes seen to follow a light dressing of lime on land, which is owing, no doubt, to its not having previously existed in the soil in sufficient quantity for the food of plants. It might, perhaps, be reckoned that a ton of lime would be enough to last for this purpose eight or ten years. It is evident that if the benefit to be derived from lime is to depend on its assisting in decomposing organic matter in the soil, it will follow, that those soils in which organic matter most accumulates, and which have least natural power to promote its decomposition, will require lime in the greatest quantities. What promotes vegetable decay in soils is, the presence of air, warmth, and moisture. These are found in greatest perfection in a friable loam. Strong clays exclude air; all wet soils also exclude air, and are cold; peaty soils are always wet at first, and when laid dry do not retain moisture; sandy heaths are too dry. Accordingly, it is seen that in all these last cases vegetable matter collects, and it is to these lime is most required. And the same soils which least favour decomposition are most liable to form such compounds as are injurious to plants; lime is therefore needed in them for the purpose of correcting the products, as well as promoting the decomposition. There are perhaps, no soils which in our climate are not benefited by a proper quantity of lime; it is very seldom that we fail to see even the finest loamy land improved when lime is used after a long interval; but the quantity applied, and the frequency of the application, should depend upon the properties of the soil, as regards its natural power to convert organic matter into the compounds which are the food of plants, and upon the abundance or want of such organic matter in the soil. It is scarcely possible to adjust the quantity of lime to the requirement of the land in any other way than by practical trial on each particular soil. As long as a soil continues to repay in increased produce the expense of lime it cannot be wrong to repeat it. When the soil once contains enough of lime to enable it to produce a quick and wholesome decomposition of the organic matter in it, all that is needed is to repair the waste which it suffers from year to year. The waste is occasioned by the minute particles of lime sinking lower, and being washed out by the rains; the quantity thus lost will obviously be greatest where the whole quantity in the soil is greatest, and will be more where the subsoil is porous than where it is compact. A strong obstinate clay might require ten tons of lime as a permanent stock, while a manageable loam might require one-fourth the quantity; the first would, under like circumstances of the subsoil, suffer four times the waste as the last, and consequently require perhaps two tons every fourth year, while the same quantity would serve the loam twelve years. As lime in its caustic state robs the soil of part of its richness, it

should only be applied where the quantity of vegetable matter is in excess or where the land is so wet and obstinate that decomposition will not go on freely without its stimulus. Its use is, perhaps, more to bring newly reclaimed lands into fertility than to maintain them in that state in a regular course of husbandry. It is on obstinate clays in the fallow year, and on wet peats and on deteriorated pastures that its use is most beneficial. In these soils it is even good to burn the vegetable matter, and it seems that caustic lime produces much the same result as burning. On all land which is moderately light and dry, mild lime is called for. A remarkable case of the injurious action of caustic lime, contrasted with the fertilizing effect of mild lime, is seen in the experiments of Mr. Fleming, quoted by Professor Johnson. Mild lime (20 bushels) was applied to the turnip crop, and produced 16 tons, 11 cwt.; the unmanured soil produced 12 tons, 6 cwt.; while 50 bushels of caustic lime yielded only 11 tons, 5 cwt. Lime may be rendered mild by mere exposure to the air; or it may be formed into compost and applied to the land; but, where mild lime is required, it will frequently be more advantageous to apply in the form of marl. On strong lands, which are benefited by being rendered more open, lime is best; but on lighter soils, which are improved by being made more compact, marl is preferable. To know which is most economical, a farmer must learn what proportion of lime his marl contains, and he will then be able to judge which is the cheapest. A good marl may contain from 30 to 70 per cent. of lime; say that it contains 40 per cent. of carbonate of lime; then five tons of it would be equal to one ton of burnt lime from the kiln. But the lime in marl is not in a state of such minute division as it would be in the carbonate formed from burnt lime, and, therefore, a something greater proportion would be required to produce an equal effect. As it is only by its action on vegetable matter that lime produces benefit, it is worse than useless to apply it to lands which are already exhausted of the only material by means of which it can do good. It is but too much the practice in some neighbourhoods to use lime to exhausted land. Lime has been itself called exhausting, but it is only so in the same way as good tillage is exhausting. Both lime and assiduous stirring of the soil cause the manures in it to decompose and become food for plants. If land in either case be severely cropped it will become exhausted, but it is not the lime or the tillage which causes the exhausting, it is the cropping without manure. Farmers can, by means of lime, grow a crop on land which will not carry one without its aid, and they then exhaust the soil. Instead of treating the lime as an aid to manures, they use it as though it were manure in itself. It is expected that land will grow corn crops oftener with lime than without it; this is the great mistake as to its use. Lime is commonly used in very much greater quantity to tillage land than to grass; but it is as good for grass as for corn, and the tillage would rather render lime less than more necessary.

REPORT OF EXPERIMENTS ON THE ACTUAL AND COMPARATIVE EFFECTS OF SPECIAL MANURES.

BY MR. JOHN HANNAM, NORTH DEIGHTON, NEAR WEATHERBY.

(From the Transactions of the Highland and Agricultural Society of Scotland.)

[Concluded.]

III.—EXPERIMENTS ON POTATOES.

G.—Experiment on the actual and comparative effects, upon the Potato crop, of Sulphate of

Soda, Sul. and Nitrate of Soda (mixed), Sulphate of Soda and Sulphate of Ammonia (mixed), and Gypsum, used as Top-dressing Auxiliaries to Manure.

Details.—Soil—moderate limestone, worth 22s. per acre rental. Prior crops—barley (rape-dust), seeds (pastured), wheat (rape-dust).

Management.—Ridged at 27 inches, and set with American natives (cuttings), May 6, 1842. Manured, on the top of the sets, with 16 loads of farm-yard manure per acre, and top-dressed as follows:—

1.	2.	3.	4.	5.
Sulphate of soda.	Sulphate of soda and nitrate of soda.	Sulphate of soda and sulphate of ammonia.	Nothing.	Gypsum.

- No. 1. 10 Ridges, area  $\frac{1}{2}$  of an acre. Sulphate of soda, 2 st.—applied June 18.  
 2. Do. do. { Sulphate of soda, 1 st. } do.  
 3. Do. do. { Nitrate of soda, 1 st. } do.  
 4. Do. do. { Sulphate of soda, 1 st. } do.  
 5. Do. do. { Sulph. ammonia, 1 st. } do.  
 6. Do. do. Nothing.  
 7. Do. do. Gypsum 5 st. do.

Observations.—Dry weather (with the exception of a slight shower) coming after the application was made, the sulphate of soda appeared to blister the leaves of the plants. In a few weeks, the effects of the sulphate of ammonia was very evident, in the rich dark green foliage of the plants, upon No. 3. No. 2 (dressed with the mixture of nitrate and sulphate of soda) shewed, in a less degree, similar results—the foliage being improved in colour and strength by the application. Nothing else particular was observable in any

of the plots till the whole were gathered and weighed, with the following results:—

No.	Large Potatoes,	st. lbs.	Small do.	st. lbs.
1.	174	12	48	6
2.	187	4	33	12
3.	228	6	47	2
4.	177	8	37	7
5.	182	5	46	0

From these particulars, at 84 lbs. in the bushel, we have the

Final Results per Imperial Acre.

Tillage.	Quantity.	Gross Produce.		Cost of Tillage	*Increase or †Decrease of Crop.			
		Large.	Small.		£.	s.	d.	
1. Sulphate of soda	2 cwt.	233 bush.	64 bush.	0	19	0	†3	*14
2. { Sulphate of soda	1 do. }	250 do.	45 do.	1	13	0	*14	†5
{ Nitrate of soda	1 do. }							
3. { Sulphate of soda	1 do. }	305 do.	62 do.	1	10	6	*69	*12
{ Sul. of ammonia	1 do. }							
4. Nothing.		236 do.	50 do.					
5. Gypsum.	5 cwt.	243 do.	61 do.	0	15	0	*7	*11

Conclusions—In the above experiment we observe—

1° That sulphate of soda increases the amount of small potatoes, i. e., it encourages the formation of, but does not support an increase of, tubers.

2° That nitrate of soda, along with sulphate of soda, does encourage and also support an increase production of tubers.

3° That sulphate of ammonia as a top-dressing, along with sul. soda, has a similar though more potent effect.

4° That gypsum—so largely used in many countries for the potato crop—has also a beneficial effect upon the yield of the potato.

4° That nitrate of soda and sulphate of ammonia promote, in a similar manner, the luxuriance of the foliage, giving upon potatoes, as upon grain and turnips, a darker green leaf than the other manures used.

H.—Compound Experiment on the actual and comparative effects of Farm Manure, Farm

Manure and Gypsum, Guano, Guano and Gypsum, and certain Waste Matters from Manufactories, as *Manures for the Potato crop*. Also on the actual and comparative effects upon the Potato crop, of Artificial Bones, Nitrate of Soda, Sulphate of Ammonia, Sulphate of Magnesia, and Sulphate of Soda, as *Auxiliaries to Farm-yard Manure*.

*Details.*—Soil—thin limestone; annual value, about 24s. per acre. Prior crops—*barley* (rape-dusted), *seeds* (pastured), *wheat* (rape-dusted).

*Management.*—Ridged at 27 inches; planted with potatoes (American natives), May 20, 1843, and manured as follows:—

SECTION 1st.									SECTION 2nd.					
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Farm Manure	Farm Manure and Gypsum.	Guano	Guano and Gypsum	Nothing	Singeing dust	Croppings.	Flax Waste and Soap Liquid.	Woollen Waste.	Farm Manure and Artificial Bones	Do. and Nitrate of Soda.	Do. and Sulphate of Soda	Do. and Sulphate of Ammonia	Do. and Sulphate of Magnesia	Farm Manure only.

Section 1st.	No. 1.	Area $\frac{1}{16}$ acre or 8 drills.	Farm manure $1\frac{1}{4}$ loads—put on the ridge.
	2.	do.	do. and gypsum 35 lbs., put on the ridge.
	3.	do.	Guano, 35 lbs. do.
	4.	do.	do. 35 do. and gypsum 35 lbs. do.
	5.	do.	Nothing.
	6.	$\frac{1}{32}$ acre or 4 drills,	Singeing dust, 3 <sup>l</sup> stones.
	7.	do.	Croppings, 3 $\frac{1}{2}$ stones.
	8.	do.	Flax waste, 3 $\frac{1}{2}$ stones, and soap liquid, 6 $\frac{1}{2}$ gallons.
	9.	do.	Woollen waste, 3 stones.
Section 2nd.	10.	$\frac{1}{16}$ acre, Artificial bones, 21 lbs. and farm manure, $1\frac{1}{4}$ loads (mixed).	
	11.	do. Nitrate of soda, 10 $\frac{1}{2}$ lbs. do.	
	12.	do. Sulphate of soda, 21 lbs. do.	
	13.	do. Sulphate of ammonia, 10 $\frac{1}{2}$ lbs. do.	
	14.	do. Sulphate of magnesia, 21 lbs. do.	
	15.	do. Farm manure, $1\frac{1}{4}$ loads only.	

*Observations.*—Sec. 1st.—Nos. 1 and 2 came very well up. Nos. 3 and 4. seeded, for a week or two, as though the dose had been too strong for the young plants—no difference was perceptible from the addition of gypsum to the farm manure and to the guano. Nos. 5, 6, 7, 8, and 9, came more slowly than the rest of the section, and were a week behind at hoeing time.

After hoeing, the guano patches began to grow away with astonishing vigour, and soon came up with the farm manure; the others following, *sed longo intervallo*. Of these, No. 6 (singeing-dust) was by far the worst, looking as though the application had injured or retarded germination—indeed *nothing* (No. 5) was superior to it.

During the month of August, great improvement took place in the patches 6 and 7, the foliage assuming a dark luxuriant colour, approaching that of the guanoed patches. No. 7, however, took the lead. At *October 2*, the various patches stood in order of excellence as below.

Section 2nd.—Nothing peculiar was observable in the early appearance of any of these plots. All came very well and continued to flourish equally for some weeks, when No. 13 assumed the lead, and was closely followed by No. 11; No. 13 (sul. ammonia) putting out a foliage like that of the guanoed plots (sec. 1st), and No. 11 (nit. of soda) assuming a similar luxuriance of leaf. On *October 2*, they stood as below:—

(*Substitutes for Farm Manure.*)

1.	Guano.	First-rate; very luxuriant in foliage.
	Do. and gypsum.	Do. do.
	Manure.	Do. not so dark as the above in the leaf.
2.	Do. and gypsum.	Do. no difference.
	Croppings (No. 7).	Good; very dark leaf.
3.	Woollen waste (No. 9).	Pretty good.
4.	Flax do. (No. 8).	Moderate.
	Nothing (No. 5).	Do.
	Singeing (No. 6).	Do. dark in the leaf.

(Auxiliaries to Farm Manure.)

1. Sulphate of ammonia (No. 13). First-rate; very dark and luxuriant in the stem.
2. Nitrate of soda (No. 11). Do. not quite so dark in colour.
3. { Artificial bones. Very good; light coloured leaf.  
Sulphate of soda. Do. do.  
Sulphate of magnesia. Do. do.  
Nothing. Do. do.

The weight of the whole produce of each plot, in November 1, 1843, ascertained the

Final Results per Imperial Acre.

	Name of Tillage.	Quantity.	Cost of Manure.	Gross Produce of		Total Produce.	* Increase or † Decrease of Produce.		Total * Increase or † decrease.	
				Large.	Small.		Large.	Small.		
SECT. 1.	<i>As Substitutes for Man.</i>			£. s. d.	bush.	bush.	bush.	bush.	bush.	
	1	Farm manure . . . . .	20 loads.	6 0 0	165.5	63.2	228.7	*48.4	*9.3	*57.7
	2	Do. and gypsum } 5 cwt.	20 loads.	6 15 0	194.0	63.2	257.2	*76.9	*9.3	*86.2
	3	Guano . . . . .	5 cwt.	3 5 0	161.8	68.8	230.6	*44.7	*14.9	*59.6
	4	Do. and gypsum . . .	5 ct. ea.	4 0 0	189.6	37.2	226.8	*72.5	†16.7	*55.8
	5	Nothing . . . . .			117.1	53.9	171.0			
	6	Singeing-dust . . . . .	100 st.	nominal.	53.9	39.0	92.9	†63.2	†14.9	†78.1
	7	Croppings . . . . .	100 st.	do.	120.8	83.7	204.5	*3.7	*29.8	*33.5
	8	Flax waste and soap } liquid . . . . . } 200 gal.	100 st.	do.	132.0	66.9	198.9	*14.9	*13.0	*27.9
9	Woollen waste . . . . .	100 st.	do.	128.3	65.0	193.3	*11.2	*11.1	*22.3	
SECT. 2.	<i>As Auxil. to Farm Man.</i>									
	10	Artificial bones . . . . .	3 cwt.	1 5 6	206.6	72.5	279.1	*43.6	*19.1	*62.7
	11	Nitrate of soda . . . . .	1½ cwt.	1 11 6	239.9	53.4	293.3	*76.9		*76.9
	12	Sulphate of soda . . . . .	3 cwt.	1 8 6	163.0	63.2	226.2		*9.8	*9.8
	13	Sulphate of ammonia . .	1½ cwt.	1 11 6	239.9	61.3	301.2	76.9	*7.9	*84.8
	14	Sulphate of magnesia . .	3 cwt.	1 5 6	176.7	57.6	234.3	13.7	*4.2	*17.9
15	Farm manure . . . . .	20 tons.		163.0	53.4	216.4				

Observation.—The items in the columns of "increase or decrease of produce" of the various plots in section 1st, are obtained by comparing the gross produce of each with the produce of No. 5; those in section 2nd are obtained by taking No. 15 as the standard of comparison.

Conclusions.—In the foregoing trials we see—  
1°. That guano may be used as a substitute, cheap and efficacious, for the growth of potatoes.

2°. That gypsum has a beneficial effect when used as an auxiliary to farm manure.

3°. That the waste matters (with the exception of singeing-dust) act beneficially on the crop.

4°. That singeing-dust appears to retard the vegetation of the plant.

5°. That, as an auxiliary to farm manure, the artificial bones act well.

6°. That a saline application is, in some cases, a useful auxiliary to farm manures, and in others worthless.

7°. That sulphate of ammonia and nitrate of soda act extremely well as such application; improving the foliage, the gross produce of tubers, and also the quality of the same; as they do not appear to increase the small potatoes so much as the large ones.

8°. That sulphate of magnesia has a slight beneficial effect, and sulphate of soda also, the latter slightly increasing the quantity of small potatoes.

The experimenter would here observe that, in his opinion, the potato crop is one to which experiment should be particularly directed, because it is a crop which is of very great *acreable value*, one which is valuable as supplying winter food for cattle, and one which, on some lands, prepares the soil for barley. It is, however, said that it is a crop which a good farmer (unless on warp soils, &c.) should not cultivate except for family use. But what is the reason of this? It is because it is an *expensive crop*; because it robs the rest of the farm of the manure which may be more advantageously applied, as six or eight acres of potatoes, on a farm of 150 acres of arable land, make sad havoc in the manure heap. If, however, we can find a *substitute* for farm manure, or even an *assistant* to it, we do away with this robbery of the manure heap, and may then leave the grass, seeds, and turnip lands to have their share of the compost heap, and yet, at the same time, secure a crop worth £12 to £20 per acre, make sure of winter food for our cattle (for Svedes cannot be entirely depended on always, witness the present year), and prepare our soil for barley. This, I know well, may be done by an outlay of from £3 to £4 in rape-dust, and present experiments infer that it may by an equal outlay in guano.

IV.—EXPERIMENTS ON OATS.

I.—Experiment on the actual and comparative effects upon the Oat crop, of Nitrate of Potash, Nitrate of Soda and Salt (mixed), Salt (only), and Rape-dust.

Details.—Soil—thin limestone, worth 20s. per

acre rental—exposed to the north. Prior crops—barley (after turnips eaten on), seeds (pasture), wheat (rape-dust).

Management.—Hopetoun oats, drilled April 14, 1842, and the following tillages applied:—

1.	2.	3.	4.	5.
Nitrate of soda and salt.	Nitrate of potash.	Nothing.	Common salt.	Rape-dust.

- No. 1. Area  $\frac{1}{4}$  acre, Nitrate of soda  $1\frac{1}{2}$  st., salt 3 st., applied as a top-dressing, May 2.
- 2. Do., Nitrate of potash 2 st. do. do.
- 3. Do., Nothing.
- 4. Do., Salt 6 st., applied as a top-dressing, May 2.
- 5. Do., Rape-dust 3 bush., drilled with the seed, April 4.

Observations.—Rain coming a few days after the top-dressings were applied, the effects upon Nos. 1 and 2 were soon visible in the dark green hues assumed by the young plant. No. 5 (rape-dust) at this time was much a-head of all the other patches, owing to the manure having been applied when the grain was drilled. During June,

Nos. 1 and 2 came up with No. 5, No. 3 (nothing) and No. 4 (salt) being much in the background.

July 1.—A change had now taken place in the respective positions, as regarded appearance, of the plots, No. 4 having made a push that quite astonished me. At this time they stood thus—

- 1. { No. 1, Nitrate of soda and salt, long and rich in foliage.
- 2. { 2, Nitrate of potash, do. do. partially lodged.
- 3. { 4, Salt, good standing crop, do.
- 5, Rape-dust, good.
- 3, Nothing, full of plant but shorter in the straw than the other patches.

In this order they stood up to August 24, when they were reaped; and, after being well fielded, were thrashed immediately, with the following results:—

No. 1	gave 175 sheaves, yielding 588 lbs. of straw,	431 lbs. of grain, weighing 40 lbs. per bushel.
2	172 do. 582 do.	416 do. 40 do.
3	150 do. 512 do.	378 do. 40 $\frac{1}{2}$ do.
4	180 do. 601 do.	451 do. 41 do.
5	162 do. 561 do.	410 do. 40 do.

From the above we therefore obtain the following—

Final Results per Imperial Acre.

No.	Tillage.	Quantity of Tillage.	Gross Produce.		Cost of Manure.	Increase of		Weight per Bushel.
			Grain.	Straw.		Grain.	Straw.	
			bushels.	st. lbs.	£. s. d.	bushels.	st. lbs.	lbs.
1	{ Nitrate of soda and salt . . . . .	6 stone. 12 stone.	43.1	168 0	1 2 1 $\frac{1}{2}$	5.76	21 10	40
2	{ Nitrate of potash . . . . .	1 cwt.	41.6	166 4	1 16 0	4.26	20 0	40
3	{ Nothing . . . . .	..	37.3	146 4	.. ..	..	.. ..	40 $\frac{1}{2}$
4	{ Salt . . . . .	24 stone.	44.0	171 4	0 9 0	6.66	25 6	41
5	{ Rape-dust . . . . .	1 $\frac{1}{2}$ qrs.	41.0	160 4	1 13 9	3.76	14 0	40

Observation.—Be it observed that the straw here weighed is the good marketable straw, and does not include the short and broken which goes away in what is technically termed “falls” or pulls.

Conclusions.—In this experiment we observe—  
1°. That, for the oat crop, upon land that has been for a length of time under a system of rape-dust tillage, a dressing of saline manures may be used with greater effect than another application of rape-dust.

2°. That, in such cases, common salt has a tendency to increase both the quality and the quantity of grain, and to increase the quantity of grain in a greater ratio than the quantity of the straw.

5°. That nitrate of soda mixed with salt increases the quantity of straw and grain in a greater degree than nitrate of potash, and in a less degree than salt only.

6°. That nitrate of potash increases the straw

in a greater ratio than the grain, and diminishes the weight per bushel.

7°. That rape-dust increases both straw and grain, and diminishes the weight per bushel of the grain.

8°. That the nitrates act more quickly than salt.

9°. That the nitrates render the straw bulky, soft, and coarse; while salt makes it white and brittle.

V.—EXPERIMENTS ON BARLEY.

J.—Experiment on the actual and comparative

effects on the Barley crop, of Nitrate of Potash, Nitrate of Soda and Salt (mixed), Salt (only), and Rape-dust.

*Details.*—Soil—good turnip soil, upon the limestone range, worth 26s. per acre rental. Situation—level, and free from all extraneous influences. Prior Crops—*seeds* (pastured); *wheat* (rape-dust); *turnips* (farm manure, and partially consumed on the land by sheep).

*Management.*—Drilled, April 6, 1842, and applications made as follow:—

1.	2.	3.	4.	5.
Nit. soda and salt.	Nitrate of potash.	Nothing.	Salt.	Rape-dust.
No. 1. Area $\frac{1}{4}$ acre,	{ Nit. soda, $1\frac{1}{2}$ st. Salt, 3 st. }	} applied as a top dressing, May 2, 1842.		
2. do.	Nit. potash, 2 st.	do.	do.	
3. do.	Nothing.			
4. do.	Salt, 6 st.	do.	do.	
5. do.	Rape-dust, 3 bush.	drilled with the grain.		

*Observations.*—This experiment being precisely similar to the preceding one upon oats, and made at the same time, the effects in both cases were very similar. At the time of top-dressing, rape-dust (No. 5) had the lead, which it maintained somewhat longer than in the oats, as the effect of the saline dressings upon the foliage of the plant was not so visible as in the other case. The

bulk, however, was increased, though the colour was not so much affected in Nos. 1 and 2; so that, on July 1, I placed Nos. 1, 2, and 5 equal, No. 4 next, and No. 3 last—all, however, being good. During the month of July, No. 4 made an extraordinary push, so that at the end of the month they stood thus:—

1. { No. 4, Salt.	Very good; forward.
{ 1, Nit. soda and salt.	do. rather coarser in the straw.
2. 2, Nit. potash.	do. stronger in the straw than any other.
3. 5, Rape-dust.	Good; forward.
4. 3, Nothing.	Fair crop; forward.

At reaping time, the above peculiarities were more fully developed. Thus, Nos. 1, 4, and 3 were riper than No. 2. Nos. 2 and 1 were coarser in the straw than the other, especially No. 2, which was much lodged. No. 4 was particularly white and brittle in the straw, and was fit for cutting before any other portion. No. 5

was also yellow in the straw; while No. 1 was darker than 4, and lighter in colour than 2. By these features the plots were distinguishable by the casual observer.

After reaping, August 29, 1842, the produce of the several plots was well weathered, and then thrashed, with the following results:—

No. 1	gave 234 sheaves,	yielding 830 lbs. straw,	and 670 lbs. of grain,	weighing 56 lbs. per bushel.
2	do. 233	do. 860	do. 668	do. 55
3	do. 178	do. 680	do. 524	do. 56
4	do. 236	do. 792	do. 696	do. 57
5	do. 205	do. 814	do. 612	do. 55½

From these results per rood we obtain the following  
*Final Results per Imperial Acre.*

No.	Name of Tillage.	Quantity.	Gross Produce.		Cost of Manure.	Increase of		Weight of Grain per bush.
			Grain.	Straw.		Grain.	Straw.	
			bushels.	st. lb.	£. s. d.	bushels.	st. lb.	
1	{ Nit. soda { Salt	{ 6 st. } { 12 st. }	47.84	237 2	1 2 1½	10.42	42.12	56
2	Nit. potash	8 st.	48.58	245 10	1 16 0	11.16	51 6	55
3	Nothing	....	37.42	194 4	.. ..	.. ..	.. ..	56
4	Salt	24 st.	48.84	226 4	0 9 0	11.42	32.0	57
5	Rape-dust	1½ qrs.	44.08	232 8	1 13 9	6.66	38.4	55½

*Conclusions.*—In this experiment we observe—

1°. That, upon a soil which has had rape-dust as a manure for a length of time, a dressing of saline manures may be advantageously used upon the barley crop.

2°. That, as upon oats, so upon barley, common salt has a tendency to increase the quantity of grain in a greater ratio than the straw, to improve the *quality* of the grain, and to render the straw white and brittle, and to promote its ripening.

3°. That the nitrates have a tendency to increase the quantity of straw in a greater ratio than the grain, to render the straw soft and bulky, and to retard slightly the ripening.

4°. That the nitrates have not such a decided effect upon the colour of the young plant of barley as upon oats or wheat.

5°. That the action of salt upon the crop is not visible so soon as that of the nitrates.

6°. That rape-dust has a tendency in this case to diminish the weight of the grain per bushel.

7°. That nitrate of potash also diminishes the weight per bushel of the grain.

K.—Experiment on the actual and comparative effects upon the Barley crop, of Rape-dust, Guano, Rape-dust and Salt, Nitrate of Soda, and Nitrate and Sulphate of Soda.

*Details.*—Good limestone soil, worth 24s. per acre per annum; exposed to the north; low fences; no trees. Prior crops—*barley* (upon turnips eaten on the land); *seeds* (pastured;) *wheat* (rape-dust); *turnips* (bones, crop pulled off.)

*Management.*—Ribbed and sown April 10, 1843, with barley and clover seeds. Manures applied as follow:—

1.	2.	3.	4.	5.	6.	7.
Nothing.	Rape-dust.	Guano.	Rape-dust and salt.	Nit. of soda.	Nit. of soda and sulphate of soda.	Salt.

No. 1.  $\frac{1}{4}$  acre. Nothing.  
 2. do. Rape-dust, 3 bushels, sown in the furrows with the seed.  
 3. do. Guano, 4 st. do. do.  
 4. do. { Rape-dust, 3 bush. do. do.  
           and  
           Salt, 3 st. applied as a top-dressing, May 3.  
 5. do. Nitrate of soda, 3 st. do. do.  
 6. do. { Nitrate of soda, 2 st. } mixed, and do. do.  
           { Sulphate of soda, 2 st.  
 7. do. Salt, 8 st. do. do.

The remaining portion of the field (about 5 acres) was manured with 2 cwts. of guano per acre, in alternate lands or stitches, with 12 bushels of rape-dust per acre.

*Observations.*—The effects of the guano and rape-dust were distinctly marked from the first appearance of the plant—the portions left for a top-dressing being in one month a full week behind the Nos. 2 and 3. If anything, No. 3 had the lead of the two.

At the beginning of June, the top-dressings had not begun to show any effects, Nos. 1, 5, 6, and 7, being much in the background. Indeed the difference between them and Nos. 2, 3, and 4, could be seen half a mile off. At this time No. 3 was very decidedly superior to No. 1.

This was the case, too, throughout the field, the lands dressed with guano being very distinguishable by their superior luxuriance from those manured with rape-dust.

A week of fine weather, about the middle of June coming after a month of almost constant rain, made a wonderful improvement in the top-dressed portion; so much so, that some of them (Nos. 5 and 6) came up with No. 2, which had not progressed so well as No. 3. No. 4, however, at this time pressed No. 3 very closely in the race; so that, at the end of July, the whole field, with the exception of No. 1 (unmanured), was a splendid crop. The experimental plots at this time stood as follows:—

1. (No. 3) Guano. Splendid crop thick and luxuriant.
2. (No. 4) Rape-dust and salt. Ditto, not quite so luxuriant; more forward.
3. (No. 5) Nitrate of soda. Nearly equal to the preceding; rather more backward.
4. { (No. 6) Ditto, and sulphate of soda. Not quite so good as No. ; backward.
- { (No. 2) Rape-dust. Equal to No. ; not quite so backward.
5. (No. 7) Salt. Not so luxuriant in the straw; very forward.
6. (No. 1) Nothing. Very poor crop; much worse than any of the above.

The remainder of the field was a very excellent crop. The lands guanoed were, however, decidedly superior in every case to the rape-dust. On one marly hill, where there is scarcely an

inch of soil, (the whole being formed of shelly limestone and chalky marl mixed,) and from which the turnips (grown with bones *only*) had been carted away, it was surprising to see the

effect of the guano. The place where every handful had fallen was particularly marked, and the whole crop (where scarcely ever a crop, under more favourable circumstances, grew well before) was good. At this time an extensive dealer in rape-dust and bones went over the field with me, and gave, without hesitation, his opinion that the guano beat the rape-dust throughout the field by a quarter per acre. This gentleman, Mr. Robert Snowdon, was the very person who had supplied the rape-dust used in the experiment; his testimony, therefore, was decidedly free from prejudice *in favour of guano.*

As a curiosity, I send a sample of the soil from the marly hill alluded to, where, by the aid of guano, a crop of barley, of full 4 quarters per acre, was produced after tunips pulled off the land. (*Vide* "Extra Sample of Soil," marked "K.")

At reaping time, certain peculiarities were observable. No 1, thin and short in the straw, was

ripe first. No. 7 (salt), though backward at the time the top-dressings were applied, was ripe sooner than any other, except No. 1. The straw was white and brittle. No. 4 partook of these peculiarities in a less degree. Nos. 5 and 6 (nitrated) were ripe last, having been at the time of top-dressing a full week behind Nos. 2 and 3. The straw of these portions was very yellow and coarse, appearing as though it had been forced to a quick vegetation. The straw of the patches 2 and 3 (rape-dust and guano) was yellow and soft. All the plots, with the exception of No. 1, which was too light to break down, were lodged so much, that they were very difficult to mow. Nos. 7 and 4 were less lodged than the others.

The whole of the field was mown August 30, and the produce of the various patches kept separate, when, after being well weathered, the following were the results obtained from each plot:—

1	gave	206	sheaves,	yielding	587	lbs. of straw,	and	421	lbs. of grain,	weighing	54 $\frac{2}{3}$	lbs. per bush.
2	do.	212	do.	644	do.	496	do.	54 $\frac{1}{3}$	do.			
3	do.	255	do.	785	do.	625	do.	54	do.			
4	do.	206	do.	738	do.	622	do.	55	do.			
5	do.	219	do.	730	do.	603	do.	53 $\frac{2}{3}$	do.			
6	do.	201	do.	695	do.	579	do.	54 $\frac{2}{3}$	do.			
7	do.	187	do.	607	do.	554	do.	55 $\frac{2}{3}$	do.			

*Final Results per Imperial Acre.*

No.	Manure.	Quantity.	Gross Produce.		Cost of the Manure.			Increase of			
			Grain.	Straw.	£.	s.	d.	Grain.	Straw.		
			bushels.	st.	lbs.				bushels.	st.	lbs.
1.	Nothing.....	..	30.75	167	10	..	..	..	..	..	..
2.	Rape-dust.....	12 bush.	36.23	184	0	1	7	9	5.48	16	4
3.	Guano.....	2 cwts.	46.29	224	4	1	6	0	15.54	56	8
4.	{ Rape-dust and { salt.....	12 bush. } 12 st. }	45.23	210	12	1	12	3	14.48	43	2
5.	Nitrate of soda..	1 $\frac{1}{2}$ cwt.	44.87	208	8	1	11	6	14.12	40	12
6.	{ Nit. of soda.. { Sul. of soda..	1 cwt. } 1 cwt. }	42.30	198	8	1	10	6	11.55	30	12
7.	Salt.....	4 cwt.	39.74	173	6	0	12	0	8.99	5	10

Observe here that the weight of straw upon No. 1 is greater than it would have been had there been no clover seeds sown, as the light crop of barley *encouraged* the growth of the clover, while the heavier bulk of straw upon the other plots *retarded* its growth. Hence the straw of No. 1 weighed well, and the *gain* of straw on the other patches appears less than it really was. Again, the same circumstance affected the number of sheaves on No. 1; the quantity of clover making it necessary to bind *small sheaves.*

trate of soda has a *positive effect*, and sulphate a *negative* one, upon the barley crop.

4°. That salt increases the *grain* more than the *straw.*

5°. That salt, as a *top-dressing auxiliary to rape-dust*, is extremely valuable; improving the produce in quantity and quality. (*Vide* gain per acre and weight per bushel, of No. 4.)

6°. That salt alone, or mixed with another substance, has the same visible effects—acting at the latter period of the plant's growth, and blanching the straw and stubble.

7°. That guano and nitrate of soda diminish the weight per bushel of the grain produced.

*Conclusions.*—In this case we see—  
1°. That guano is superior to rape-dust.  
2°. That saline applications may be used with success upon soil *requiring manure.*

3°. That nitrate of soda increases the crop of straw and grain, and that sulphate of soda mixed with nitrate does not improve the crop so much as nitrate alone; hence we infer that ni-

L.—Experiment on the comparative effects on the Barley crop, of Rape-dust, Rape-dust and Salt, and Guano.

*Details.*—Soil—moderate limestone, worth

24s. per acre per annum. Prior crops—*wheat* (rape-dust), *oats* (rape-dust), *turnips* (bones—eaten on the land).

*Management.*—Sown with clover seeds, and drilled with barley, May 6, 1843. Manures applied as follow:—

- |        |         |  |
|--------|---------|--|
| No. 1. | ½ acre. | Rape-dust, 6 bushels; drilled along with the seed.                         |
| 2.     | do.     | Rape-dust, 6 bushels, and salt, 6 stones; mixed and drilled with the seed. |
| 3.     | do.     | Guano, 1 cwt.; mixed with earth, and do. do.                               |

*Observations.*—The whole came up well, no difference being visible in any of the three for some time, when No. 3 took the lead. All the plots thrived well, and, though sown late, at harvest promised a very fair crop. The clover seeds came equally well in all the patches. On reaping, September 7, No. 3 still had the advantage in weight of straw; No. 1 being also a shade

1.	2.	3.
Rape-dust.	Rape-dust and salt.	Guano.

better than No. 2 in quantity of straw. No. 2, however, shewed somewhat similar effects from the application of salt that we observed in the other experiments on barley—the straw was whitened, sooner ripe, and promised a better yield. The seeds were equally good throughout. The following were the results from each portion—

- |    |   |
|----|---|
| 1. | 370 sheaves, yielding 1142 lbs. of straw, and 902 lbs. of grain, weighing 56 lbs. per bushel. |
| 2. | 314 do. do. 1124 do. 918 do. do. 56½ do.  |
| 3. | 376 do. do. 1192 do. 948 do. do. 56 do.   |

From the above we obtain the following

*Final Results per Imperial Acre.*

No.	Name of Manure.	Quantity.	Gross Produce.			Cost of Manure.	Weight per Bushel.
			Grain.	Straw.			
			bushels.	st.	lbs.	£. s. d.	lbs.
1.	Rape-dust.....	12 bushels	32.21	163	1	1 7 9	56
2.	Rape-dust and salt ....	{ 12 bushels & 12 stones	33.55	160	4	1 12 3	56½
3.	Guano .....	2 cwt.	32.78	170	2	1 6 0	56

*Conclusions.*—In this experiment we note—

1°. That guano and rape-dust, in comparative effect, are nearly equal; from want, however, of a patch *without manure*, we are unable to see what was the positive effect of each; hence we cannot say whether the equal yield from each plot arises from the *equal working* of the manures or from the *total failure* of both.

2°. That salt applied by drill, along with rape-dust, produces somewhat similar though not so decided effects, as when applied as a top-dressing auxiliary to rape-dust. Thus we have, in No. 2, the *highest yield* of grain and the *lowest* of straw; also the heaviest weight per bushel of grain.

VI. EXPERIMENTS ON WHEAT.

M.—Experiment on the actual and comparative effects upon the Wheat crop, of Nitrate of Soda, Nitrate of Potash, Sulphate of Soda, Soot, and Salt.

*Details.*—Soil—moderate limestone, worth 24s. per acre. Prior crops—*turnips* (manured), *barley* (rape-dusted), *seeds* (pastured with sheep).

*Management.*—Sown with red wheat, November 7, 1841, and top-dressed as follows:—

Nitrate of Soda.	Nitrate of Potash.
1.	2.
Nothing.	Sulphate of Soda.
3.	4.
Soot.	Common Salt.
5.	6.

- |        |  |
|--------|--|
| No. 1. | ¼ acre Nitrate of soda, 2½ stones, applied as a top-dressing, May 2, 1842. |
| 2.     | do. Nitrate of potash, 2 stones, do. do. do.                               |
| 3.     | do. Nothing.   |
| 4.     | do. Sulphate of soda, 2½ stones, do. do. do.                               |
| 5.     | do. Soot, 8 bushels, do. do. do.   |
| 6.     | do. Salt, 6 stones, do. do. do.  |

*Observations.*—Showers coming after the applications were made, Nos. 1 and 2 began to shew the effects of the nitrates in a few days; in a fortnight, however, they assumed a rich dark green hue, very different from any other portion of the field.

In the course of a month after the top-dressings were applied, No. 5 (soot) also assumed a

darker colour than the rest, but was not so flourishing as Nos. 1 and 2.

When reaped (August 18, 1842), Nos. 1 and 2 were much the best crop to the eye—the rest being nearly equal. The straw and stubble upon No. 5 were quite blanched.

When thrashed, the following was the produce of each plot:—

No. 1.	152 sheaves, yielding	734 lbs. straw and	562 lbs. grain, weighing	64 lbs. per bushel.
2.	146 do.	707 do.	540 do.	64 do.
3.	118 do.	628 do.	472 do.	64 do.
4.	124 do.	635 do.	459 do.	64 do.
5.	122 do.	645 do.	508 do.	64 do.
6.	132 do.	604 do.	495 do.	64½ do.

From the foregoing data we obtain the following

*Final Results per Imperial Acre.*

No.	Manure.	Quantity.	Gross Produce.		Cost of Manure.	*Increase or †Decrease.		Weight per Bushel.
			Grain.	Straw.		Grain.	Straw.	
			Bushels.	St. lb.	£. s. d.	Bushels.	St. Lb.	Lbs.
1.	Nit. of soda...	1¼ cwt.	35.125	209 10	1 9 4½	*5.62	*30 4	64
2.	Nit. of potash.	1 cwt.	33.75	202 0	1 17 0	*4.25	*22 8	64
3.	Nothing.....		29.5	179 6	..	..	..	64
4.	Sulph. of soda.	1¼ cwt.	28.68	181 6	0 11 10½	†.82	* 2 0	64
5.	Soot .....	32 bush.	31.75	184 4	0 16 0	*2.25	* 4 12	64
6.	Salt .....	3 cwt.	30.9	172 8	0 9 0	*1.4	† 6 12	64½

*Conclusions.*—It will be here observed that—

1°. Nitrate of soda, nitrate of potash, and soot, have a tendency to increase the produce of wheat, both straw and grain,

2°. That common salt has a slight tendency to increase the produce of grain, and to decrease the weight of straw (mark the weight of straw, as it will be observed—vide number of sheaves per rood—that it does not diminish the bulk), and that common salt increases the weight per bushel of grain; thence it may, from these properties, be advantageously used as an auxiliary to other manures.

3°. That sulphate of soda has no visible effects upon the wheat crop. The slight variation in yield of straw and grain may be fairly attributed to accidental circumstances, such as variation of soil, &c., as no two patches can be perfectly equal in every respect.

N.—Experiment on the actual and comparative effects upon the Wheat crop, of Bones dis-

solved in Sulphuric Acid, Ammoniacal Liquid, Nitrate of Soda, Nitrate of Soda and Sulphate of Soda (mixed), Sulphate of Magnesia, and Common Salt.

*Details.*—Soil—moderate limestone, worth 20s. per acre; perfectly level, and free from all local prejudicial influences. Prior crops—turnips (manured, and eaten on land, with hay, &c.), barley (rape dust), seeds (pastured).

*Management.*—Ribbed and sown, November 15, 1842, with yellow chaff-wheat. Manures applied as follows:—

1.	2.	3.	4.	5.	6.	7.
Dissolved bones.	Ammoniacal liquid.	Nothing.	Nit. & sulph. of soda.	Sulphate of magnesia.	Nit. of soda.	Salt.

- |    |   |  |   |   |
|----|---|--|---|---|
| 1. | ¼ acre, Bones dissolved, viz.,              | { Bones, 84 lbs.<br>Acid, 42<br>Water, 126 | } Mixed with 50 times weight of water, and applied as a top-dressing, April 29, 1843. |   |
| 2. | do. Ammoniacal Liquid,                      | 40 gallons,                                |   | } Diluted with 500 gallons of water, and applied as a top-dressing, April 29, 1843. |
| 3. | do. Nothing.                                |  | } Mixed and used as a top-dressing, April, 29.  |   |
| 4. | do. { Nitrate of Soda,<br>Sulphate of Soda, | 2 stones,<br>do.                           |   |   |
| 5. | do. Sulphate of Magnesia,                   | 4 do.                                      |   | do.   |
| 6. | do. Nitrate of Soda,                        | 3 do.                                      |   | do.   |
| 7. | do. Common Salt,                            | 6 do.                                      |   | do.   |

*Observations.*—The whole of this field being in excellent condition for a crop, it was deemed unnecessary to use rape-dust, or any other tillage, along with the seed. I was, therefore, fully prepared to anticipate no very striking results from the application made at spring, as the full force of a manure can be best seen when the soil actually requires it for the purposes of the next crop. At the same time, though the effects of the manures might not be so marked as in some cases, the experiment, I was aware, would be equally interesting, as it would serve to shew the effects of the various substances, as *extra* fertilizers, upon a soil deemed capable of producing a good crop without any application.

Although the whole of the plots looked well, in the course of three weeks the colour of the nitrated plots grew much darker; and, in the course of a few day more, No. 2 (ammoniacal liquid) assumed the same hue. By the commencement

of July, No. 2 had assumed a decided lead, being much the best, as far as luxuriance of vegetation went; the nitrated portions also look very vigorous, being superior to all the other plots. These were much alike. By August 1st, all the plots, except those nitrated (Nos. 6 and 4), and No. 2, were nearly ready for the sickle. No. 2 was now a beautiful patch, and so much superior to the rest—all of which were, *considering the soil, good*—that the first inquiry of every observer was—*What tillage was used upon it?*

Nos. 1, 3, 5, and 7 were reaped August 24; Nos. 6 and 4 on the 24th; and No. 2, which retained its verdure longer than the rest, on the 26th of the same month. The produce of each plot, after being well fielded (for which the unusually fine harvest afforded every opportunity), was thrashed September 5, with the following results:—

No. 1.	136 sheaves,	yielding 702 lbs. of straw,	and 540 lbs. of grain,	weighing 64 $\frac{3}{4}$ lbs. per bushel.
2.	161 do.	964 do.	616 do.	64 $\frac{1}{4}$ do.
3.	134 do.	690 do.	502 do.	64 $\frac{1}{4}$ do.
4.	138 do.	828 do.	553 do.	64 $\frac{1}{4}$ do.
5.	133 do.	684 do.	515 do.	64 $\frac{1}{4}$ do.
6.	135 do.	852 do.	566 do.	64 $\frac{1}{4}$ do.
7.	129 do.	612 do.	509 do.	64 $\frac{1}{2}$ do.

From the above data we calculate the annexed table of the

*Final Results per Imperial Acre.*

No.	Manure.	Quantity.	Gross Produce		Cost of Manure.	*Increase or †Decrease of		Weight per Bushel.
			Grain.	Straw.		Grain.	Straw.	
			Bush.	st. lbs.	£. s. d.	Bushels.	st. lbs.	lbs.
1	Dissolved bones ..	{ 8 bush., and } 168 lbs. acid }	33.35	200 8	1 19 0	*2.1	*3 6	64 $\frac{3}{4}$
2	Ammoniacal liquid ..	160 gallons	38.35	275 6	1 13 4	*7.1	*78 4	64 $\frac{1}{4}$
3	Nothing .....		31.25	197 2				64 $\frac{1}{2}$
4	Nit. and sul. soda ...	1 cwt. each	34.42	236 8	1 10 6	*3.17	*39 6	64 $\frac{1}{4}$
5	Sulphate of magnesia	2 cwt.	32.06	195 6	0 17 0	*0.81	†1 10	64 $\frac{1}{4}$
6	Nitrate of soda .....	1 $\frac{1}{2}$ cwt.	35.29	243 6	1 11 6	*4.04	*46 4	64 $\frac{1}{4}$
7	Common salt .....	3 cwt.	31.56	174 12	0 9 0	*0.31	†22 4	64 $\frac{1}{4}$

*Conclusions.*—We here observe upon soil in good condition—

1°. That ammoniacal liquid has an *astonishing tendency* to increase the produce of wheat.

2°. That nitrate of soda increases the produce of wheat, and that, by being mixed with sulphate of soda, its tendency to promote the growth is diminished—one cwt. of sulphate of soda failing to supply the place of one-half cwt. of nitrate, (*vide* Nos. 4 and 6.)

3°. That sulphate of magnesia and common salt produce no very marked effects on the yield of grain, (the slight variation in the produce of Nos. 5, 7, and 3, being caused probably by the difference of soil, &c.)

4°. That dissolved bones increase the production of grain more than that of straw, and also increase the weight per bushel of the grain.

5°. That common salt diminishes the *weight*

of straw more than the bulk, renders it white and brittle, and improves the weight of the sample of grain.

6°. That the gas liquid has the same effect upon the green plant as the nitrates, viz., renders the colour darker and retards the process of ripening.

O.—Experiment on the actual and comparative effects upon Wheat crop, grown on pea-stubble, of Potter's Guano, Natural Guano, Rape-dust, as a winter application; also on the effect of Nitrate of Soda as a Top-dressing for spring-sick Wheat.

*Details.*—Soil—very poor limestone, worth 12s. per acre. Prior crops—*Swede turnips* (manure), *barley* (rape-dust), *peas* (manure). At the opposite end of this field the experiment P., on peas, was made in 1842; the soil at that end,

however, is of much better quality (*vide* samples) than this now experimented on.

chaff-wheat, November 10, and manured as follows;—

*Management.*—Ribbed and sown with yellow

SECTION 1.				SECTION 2.
1.	2.	3.	4.	5.
Potter's Guano.	Guano.	Nothing.	Rape-dust.	Rape-dust and Nitrate of Soda.

- SECT. 1. { 1.  $\frac{1}{4}$  acre, Potter's Guano,  $\frac{1}{2}$  cwt., sown in the furrow with the seed, November 10.  
 2. do. Natural Guano,  $\frac{1}{2}$  cwt., do. do. do.  
 3. do. Nothing.  
 4. do. Rape-dust, 3 bushels, do. do. do.
- SECT. 2. 5. do. { Rape-dust, 3 bushels, do. do. do.  
 Nitrate of soda, 2 stones, applied as a top-dressing upon a plot which was perishing at spring, applied May 16.

*Observations.*—During winter all the plots looked well—better, indeed, than the wheat upon clover lea (Experiment N)—the fine tilth of the stubble land promoting the quick growth of the plant. At the end of April, however, symptoms of a falling off began to shew themselves, and, by the middle of May, Nos. 1 and 4 looked very sickly and patchy; No. 3 was more backward, but still was more healthy in colour, than Nos. 1 or 4; No. 2 was as yet pretty good, the colour being still fresh. At this time another rood was measured off (alongside No. 4), which looked so yellow and sickly that it seemed scarcely a skeleton of a crop, and was, as an additional experiment, dressed with  $\frac{1}{4}$  cwt. of nitrate of soda. This plot, be it remembered, was manured with rape-dust, same as No. 4, and the remainder of the field (with the exception of Nos. 1, 2, and 3) at the time the seed was sown; the nitrate being now used as a medicine intended to stimulate the failing plant.

*The effect of this application was magical.* In ten days the yellow patches were lost, and, in a week more, the only trace to be found of them was in the increased luxuriance of the same places, the tillage being applied most liberally on the diseased spots.

Seeing this, the sickly patches throughout the whole field were now top-dressed, not as an experiment, but for the benefit of the crop. The results were equally astonishing with those upon No. 5; the worst places in the field soon being distinguishable as the best. Indeed, those who ran could read, and I had, in no few cases, to explain how the marvel had been accomplished; few imagining that, a short time before, these

were actually the *worst parts* of the field, the question generally asked being, *why* they were *now so decidedly the best*.

During this time, the plots Nos. 1, 3, and 4, had improved a little; No. 2 was, however, decidedly best; but No. 5 had made most progress. In five weeks from the application of the nitrate the wheat was full six inches higher, much thicker, and more luxuriant in colour, than No. 4. All marks were, therefore, unnecessary; setting aside the distinction in the hue, there was a perfect ridge or step formed by the superior height of the straw in No. 5, which was a sufficient line of demarcation. The ears put forth on No. 5 were also much larger than those on the unnitrated portions.

A talented chemist, who viewed the crop at this time, called the experiment a perfect illustration of *agricultural pharmacy*. Although, however, a tonic or aperient may act upon the digestive organs so as, in many cases, to improve health—though a stimulant may excite the languid nerves, or a bitter rally the sickly appetite, they cannot in all cases succeed, nor can they remove organic infirmities; so, in this case, when harvest came, many of the ears on No. 5 were blighted. On the unnitrated portions, especially No. 4, these were, however, still more numerous.

At this time, in Section 1, No. 3 (Guano) looked decidedly *best*, Nos. 1, 3, and 4 being all bad.

August 18.—The various plots were mown, and, after standing in the field till perfectly dry, were thrashed, with the following results:—

1	gave 110 sheaves, yielding 415 lbs. of straw and	234 lbs. of grain, weighing 62 $\frac{1}{2}$ lbs. per bushel.
2	do. 114 do. 518 do.	308 do. 62 $\frac{1}{2}$ do.
3	do. 132 do. 427 do.	244 do. 62 $\frac{1}{2}$ do.
4	do. 124 do. 439 do.	230 do. 62 do.
5	do. 170 do. 523 do.	320 do. 62 do.

Here we have the following

*Final Results per Imperial Acre.*

No.	Manure.	Quantity.	Gross Produce.		Cost of Manure.	* Increase or † Decrease.	
			Grain.	Straw.		Grain.	Straw.
			bush.	st. lb.	£. s. d.	bush.	st. lb.
1	Potter's guano ..	2 cwt.	14.97	118 8	2 0 0	† 0.64	3 6
2	Natural guano ..	2 cwt.	19.71	148 0	1 6 0	* 4.10	26 0
3	Nothing.....		15.61	122 0			
4	Rape-dust.....	12 bush.	14.83	125 0	1 7 9	† 0.78	* 3 0
5	{ Rape-dust, and . { Nit. of soda....	12 bush. 1 cwt.	} 20.64	149 6	Extra cost. 1 0 0	* 5.81	* 24 6†

‡ Be it observed that this is the gain arising from the *extra* top-dressing, and is obtained by comparing No. 5 with No. 4, where no top-dressing was used, both having had the same rape-dust.

*Conclusions.*—From the above we see—

1°. That winter manuring is, generally speaking, injudicious for a wheat crop on pea stubble, as it induces an *early growth*, but does not *maintain* it. The fine state of division in which the soil is after a stubble crop, the consequent facility with which the plant finds the nutritive matter which is in the soil, and the free access which the atmosphere has to the roots of the plant, (causing the ammonia in the soil to be so readily evolved), may, perhaps, explain the *proud* growth of the plant in its early stages: while this quick escape, or use, of the tillage in the soil—leaving little food for the summer feeding of the plant when it requires most, and when the very luxuriance of foliage calls for a greater supply than if it had not grown so quickly at first—may explain the gradual falling off in the crop, after the winds and rains of spring, and the sun of summer, have exercised their influence on the soil. Again, the natural aversion which the wheat plant has to a light porous soil, and the greater danger which, in such cases—and especially when it has put out such a flush of foliage at first—it suffers from winds, &c., causing damage to the root or the stem, may also have some effect in producing the results spoken of. These remarks, however, be it remembered, relate only to *thin or light soils*. The stiff texture of strong lands prevents the evils we speak of; and, even on light land, it is only upon stubble that the evil is common; for on clover-lea the artificial compression caused by pasturing the crop, leaves the soil in such a mechanical condition, that it acts as a *safe store-house* for the manure in it (being less penetrable by the atmosphere or rain), and as a better support for the root and the stem. In such case, too, the less ready supply of manure, and the less free medium for the roots to spread in, prevent that overgrowth at first which requires afterwards such an extra supply of food, and such an extra mechanical support against winds and storms. At the same time the roughness and firmness of soil which prevent *early* waste of tillage, provide

for and encourage its use at a later and more important season; thus the clods (*which the farmer takes care to preserve* in preparing the soil), after having endured the action of winter frosts and spring showers, gradually fall to pieces, and convey *fresh soil* and *fresh food* to the roots of the plant.

2°. That guano is superior to rape-dust and artificial guano, as a winter tillage on the pea-stubble wheat crop.

3°. That nitrate of soda may be applied with the greatest success as a top-dressing for winter wheat, which may at spring not answer our expectations.

The whole field, as well as the experimental plot, was an example of the truth of this. In every spot where nitrate was applied, its results were, to the harvest, most palpably beneficial—in some cases to a greater extent than the preceding details show. This is one instance of experimental knowledge applied to immediate practical utility; and, in evidence of its success, I may add that it is the opinion of some farmers of no mean standing, who saw the working of the experiment, that it justifies us in concluding, 1st, That, in *all cases*, it is injudicious to use manure with winter crops upon stubble *until spring*; and, 2nd, That, by the aid of nitrate of soda, the farmer has a *perfect command* of the straw (and hence a high probability of grain in proportion) of his crops.

#### VII.—EXPERIMENTS ON PEAS.

P.—Experiment on the actual and comparative effects upon the Pea crop, of Nitrate of Soda, Sulphate of Soda, Gypsum, and extra Farm Manure as *auxiliaries* to Farm-Yard Manure.

*Details.*—Soil—thin limestone, worth 16s. per acre. Prior crops—*wheat* (rape-dust), *Swede turnips* (manure), *barley* (rape-dust).

*Management.*—Ribbed, and sown with the partridge pea as a change for clover seeds. Manured with 4 loads of farm-yard manure per acre, and the extra applications made as follows:—

1.	2.	3.	4.	5.
Nit. of Soda, Sulph of Soda.	Gypsum.	Nothing.	Sulph. of Soda.	Extra Manure.
No. 1. $\frac{1}{4}$ acre.	{ Nit. of soda, 1 st. Sulph. of soda, 2 st. }		mixed and applied as a top-dressing, May 10, 1842.	
2. do.	Gypsum, 1 cwt.	do.	do.	
3. do.	Nothing.			
4. do.	Sulph. soda $\frac{1}{2}$ cwt.	do.	do.	
5. do.	1 load of extra manure, spread on the soil before sowing the seed.			

Observations.—No. 5 had the lead before top-dressings were put on; after this, however, No. 1 soon came up with it. No. 2 also began to exhibit signs of luxuriance soon after.

At flowering time No. 4 had the lead, being more advanced in growth, though not so long in straw as the rest. At harvest, Nos. 1 and 5 stood first in weight and strength of straw, and No. 4, as respected corn, every stem being loaded

with pods. No. 2 was not quite so full of straw as Nos. 1 and 5, nor so full of corn as No. 4. No calculation as to the yield could be formed; for No. 3, though short in the straw, was very well podded.

August 15.—The plots were reaped, and on the 26th were thrashed with the following results:—

No. 1.	216 sheaves, yielding 918 lbs. of straw, and 729 lbs. of grain, weighing 61 lbs. per bushel.
2. 210 do.	892 do. 787 do. 61
3. 192 do.	720 do. 636 do. 61
4. 186 do.	786 do. 778 do. 61
5. 212 do.	896 do. 630 do. 61

Hence we have the following

Final Results per Imperial Acre.

No.	Manure.	Quantity.	Gross Produce.		Cost of Tillage.	* Increase or † Decrease of		Weight per bushel
			Grain.	Straw.		Grain.	Straw.	
			bush.		£. s. d.			
1. {	Nit. and sulph. } soda . . . . . }	$\frac{1}{2}$ cwt. and 1 cwt.	47.8	262.4	1 1 3	*6.1	*55.8	61
2.	Gypsum. . . . .	4 cwt.	51.6	254.12	0 12 0	*9.9	*49.2	61
3.	Nothing. . . . .		41.7	205.10				
4.	Sulph. soda ..	2 cwt.	51.01	224.8	0 19 0	*9.3	*18.12	61
5.	Extra manure .	4 loads.	41.3	256.0	1 4 0	† .4	*50.4	61

No difference was perceptible in any of the samples.

Conclusions.—In this case we see—

1°. That nitrate of soda, sulphate of soda, and gypsum, may be used with beneficial effect upon the pea crop.

2°. That nitrate of soda, as an auxiliary to manure, increases the straw in a greater ratio than the grain—that sulphate of soda increases the grain in a greater ratio than the straw—and that gypsum increases both in nearly an equal ratio; thus the undressed plot gives about 1 bushel of grain to 69 lbs. of straw, while nitrate and sulphate of soda (No. 1) give an increase of 6.1 bushel of grain, and 55 stone 8 lbs. of straw, being 1 bushel of grain to 127½ lbs. of straw.

Sulphate of soda—a gain of 9.9 bushel of grain, and 18 stone 12 lbs. straw, being 1 bushel of grain to 26½ lbs. of straw.

And gypsum, an increase of 9.3 bushels of

grain, 49 stone 2 lbs. of straw, being 1 bushel of grain to 69½ lbs. of straw.

3°. That a large application of farm-yard manure for peas is injudicious, as it increases the straw but not the grain. We have a gain of 50 stone 4 lbs. of straw, and a loss of 4-10ths of a bushel of grain; this trifling loss, however, may be considered as one arising merely from accidental circumstances.

Another experiment on peas, made during the present year (1843), with guano and farm-yard manure (1 cwt. of guano on  $\frac{1}{2}$  an acre, and 9 loads of manure on 1½ acre), I have not recorded—no difference being perceptible between the two applications. The result on each patch was as good as could be wished for, the particulars of each I have not ascertained.

VIII.—EXPERIMENTS ON MEADOW-GRASS.

Q.—Experiment on the actual and comparative

effects upon Meadow-grass of Nitrate of Soda, Sulphate of Soda, and Salt.

*Details.*—Soil—good sandy loam, upon sub-soil of gravel, perfectly dry, and in good condition; mown annually and manured occasionally; worth 50s. per acre per annum.

No. 1.	¼ acre, Nitrate of soda, 2 stones,	applied as a top-dressing, May 4, 1842.
2.	do. Sulph. of soda, 3 stones,	do. do. do.
3.	do. Nothing.	
4.	do. Common salt, 1 cwt.,	do. do. do.

*Observations.*—The effects of the nitrate of soda were soon apparent, No. 1 assuming a dark green foliage. No distinguishable effects were shewn in the other plots. No. 1 maintained a

*Management.*—Tillages applied as follows:—

1.	2.	3.	4.
Nit of Soda.	Sul. of Soda.	Nothing.	Salt.

decided superiority up to the time of mowing. The whole of the plots were cut July 4, and the hay on each weighed, July 18, with the following results:—

No. 1.	3830 lbs. of grass, or	1228 lbs. hay, when stacked.
2.	2672 do.	931 do. do.
3.	2768 do.	973 do. do.
4.	2838 do.	1044 do. do.

From which we get the following

*Final Results per Imperial Acre.*

No.	Manure.	Quantity.	Gross Produce.		Cost of Tillage.	*Increase or †Decrease of Hay.		Hay in 100 lbs. of Grass.
			Grass.	Hay.		St.	lbs.	
1.	Nitrate of soda . . . . .	1 cwt.	St. lbs. 1094 4	St. lbs. 350 12	£. s. d. 1 3 6	*72	12	32.06
2.	Sulphate of soda . . . . .	1½ cwt.	763 6	266 0	0 13 9	†12	0	34. 8
3.	Nothing . . . . .	..	790 12	278 0	..	..	..	35. 1
4.	Common salt . . . . .	3 cwt.	810 12	298 4	0 9 0	*20	4	36.78

*Conclusions.*—In this experiment we learn—

- 1°. That nitrate of soda increases the produce of grass in a greater proportion than that of hay.
- 2°. That sulphate of soda has no visible effect upon the hay or grass crop.
- 3°. That salt increases the per centage of hay from a given weight of grass.

R.—Experiment on the actual and comparative effects upon Meadow-grass, of Nitrate of Soda, Sulphate of Magnesia, Guano, and Potter's Guano.

No. 1.	¼ acre, Nit. of Soda 1¼ st., top-dressing	May 10th, 1843.
2.	do. Nothing,	do.
3.	do. Nit. of potash, 1 st.	do.
4.	do. Sul. soda, 2 st.	do.
5.	do. Nothing,	do.
6.	do. Sul. magnesia, 2 st.	do.
7.	do. Guano, 2 st.	do.
8.	do. Nothing,	do.
9.	do. Potter's guano, 2 st.	do.

*Observations.*—The effects of the nitrates were visible, in a fortnight, in the increased luxuriance of the colour of the grass. In the course of a week or two more, the guanoed plot began to

*Details.*—Thin limestone soil, worth, if under the plough, 24s. per acre. Pastured for many years, and mown for the first time four years ago. Since then it has been manured twice, and limed once. The turf is very mossy and full of weed, being what is termed hide-bound.

*Management.*—Manured in three sections; one plot in each section being left without tillage, as follows:—

Nit. Soda.	Nothing.	Nit. Potash.
1.	2.	3.
Sul. Soda.	Nothing.	Sul. Magnesia.
4.	5.	6.
Guano.	Nothing.	Potter's Guano.
7.	8.	9.

thrive vigorously. No. 9 also shewed some progress. Up to the time of mowing, Nos. 1, 2, and 7, maintained a decided superiority over every other—the bottom grass in each of the three

being doubled in length by the application. After mowing, the stubble appeared cleaner and more open—the weeds, plantain leaves, &c., no

longer clinging so close to the ground. The crops were mown July 18, and stacked on the 29th—

No. 1 giving	1133 lbs. of grass, or	342 lbs. of hay, when ready for stack.
2 do.	788 do.	260 do. do.
3 do.	1002 do.	305 do. do.
4 do.	724 do.	253 do. do.
5 do.	681 do.	238 do. do.
6 do.	672 do.	235 do. do.
7 do.	1064 do.	351 do. do.
8 do.	743 do.	260 do. do.
9 do.	911 do.	302 do. do.

From these results we obtain the

*Final Results per Imperial Acre.*

No.	Manure.	Quantity.	Gross Produce.		Cost of Manure.	*Increase or †Decrease of Hay.	Hay, from 100 lbs. of Grass.
			Grass.	Hay.			
			sts. lbs.	sts. lbs.	£ s. d.	sts. lbs.	
{ 1.	Nitrate of soda.....	1 1/4 cwt.	647 6	196 6	1 6 3	*46 12	30.1
{ 2.	Nothing.....	..	450 4	148 8	..	..	33 nearly
{ 3.	Nitrate of potash ....	1 cwt.	572 8	174 4	1 17 0	*25 10	30.4
{ 4.	Sulphate of soda ....	2 cwt.	413 10	144 8	0 19 0	*8 8	35 nearly
{ 5.	Nothing.....	..	389 2	136 0	..	..	35 ..
{ 6.	Sulphate of magnesia	2 cwt.	384 0	134 4	0 17 0	†1 10	35 ..
{ 7.	Guano .....	2 cwt.	608 0	200 8	1 6 0	*52 0	33 ..
{ 8.	Nothing.....	..	424 8	148 8	..	..	35 ..
{ 9.	Potter's guano .....	2 cwt.	520 8	172 8	2 0 0	*24 0	33.15

It will be observed that the increase or decrease in the produce of each plot is obtained by comparing the gross produce of that plot with the gross produce of the unmanured portion in the same section.

*Conclusions.*—From the above we learn—

1<sup>o</sup>. That nitrate of soda, nitrate of potash, guano, and Potter's guano, increase the produce

of grass and hay, and that they all have a tendency to diminish the per centage of hay obtained from a certain quantity of grass. (The aftermath afterwards shewed a continuance of the beneficial effects.)

2<sup>o</sup>. That sulphate of soda and sulphate of magnesia have no visible beneficial effects upon the hay crop.

ON MANURES.

AND THE PROPER APPLICATION THEREOF.

**LIME.**—Next to farm-yard dung, lime is in most general use, as a manure, though it is one of a quite different character, and, when judiciously applied, and the land laid to pasture, or cultivated for white and green crops alternately, with an adequate allowance of putrescent manure, its effects are much more lasting, and, in many instances, still more beneficial than those of farm-yard dung. Fossil manures “must produce their effect, either by becoming a constituent part of the plant, or by acting upon its more essential food, so as to render it more fitted for the purpose of vegetable life.”\* It is, perhaps, in the former of these ways that wheat and some other plants are brought to perfection, after lime has been

applied, upon land that would not bring them to maturity by the most liberal use of dung alone. “The most common form in which lime is found on the surface of the earth, is in a state of combination with carbonic acid or fixed air. If a piece of limestone or chalk be thrown into a fluid acid, there will be an effervescence. This is owing to the escape of the carbonic acid gas. The lime becomes dissolved in the liquor. When limestone is strongly heated, the carbonic acid gas is expelled, and nothing remains but the pure alkaline earth. In this case there is a loss of weight, and if the fire have been very high, it approaches to one half the weight of the stone; but, in common cases, limestones, if well dried before burning, do not lose much more than from 35 to 40 per cent., or from 7 to 8 parts out of 20. When burned lime becomes mild, it regains its power of effervescing, and is the same chemical substance as chalk or limestone. When newly-burnt lime is

\* Davy's Agricultural Chemistry, page 314.

exposed to air, it soon falls into powder. In this case, it is called slacked lime; and the same effect is immediately produced by throwing water upon it, when it heats violently, and the water disappears. Slacked lime is merely a combination of lime with about one-third of its weight of water; that is, 55 parts of lime absorb 17 parts of water. When lime, whether freshly burned or slacked, is mixed with any moist fibrous vegetable matter, there is a strong action between the lime and the vegetable matter, and they form a kind of compost together, of which a part is usually soluble in water. By this kind of operation, lime renders matter which was before comparatively inert, nutritive; and as charcoal and oxygen abound in all vegetable matters, it becomes, at the same time, converted into carbonate of lime. Mild lime, powdered limestone, marls, or chalks, have no action of this kind upon vegetable matter. By their action, they prevent the too rapid decomposition of substances already dissolved, but they have no tendency to form soluble matters. It is obvious, from these circumstances, that the operation of quick lime, and marl or chalk, depends upon principles altogether different. Quick lime, in being applied to land, tends to bring any hard vegetable matter that it contains, into a state of more rapid decomposition and solution, so as to render it a proper food for plants. Chalk and marl, or carbonate of lime, will only improve the texture of the soil, or its relation to absorption; it acts merely as one of its earthy ingredients. Quick lime, when it becomes mild, operates in the same manner as chalk; but, in the act of becoming mild, it prepares soluble out of insoluble matter. The solution of the question, whether quick lime ought to be applied to a soil, depends upon the quantity of inert vegetable matters that it contains. The solution of the question, whether marl, mild lime, or powdered limestone, ought to be applied, depends upon the quantity of calcareous matter already in the soil. All soils are improved by mildlime, and ultimately by quick lime, which do not effervesce with acids; and sands more than clay.\* From the modes in which lime operates, it necessarily follows that quick lime should not be applied to lands that contain much soluble matter, nor be mixed up with composts with animal manures. "It had been long known to farmers in the neighbourhood of Doncaster, that lime made from a certain limestone, applied to the land, often injured the crops considerably. Mr. Tennant, in making a series of experiments upon the calcareous substance, found that it contained magnesia; and, on mixing some calcined magnesia with soil, in which he sowed different seeds, he found that they either died, or vegetated in a very imperfect manner, and the plants were never healthy. And with great justice and ingenuity, he referred the bad effects of the peculiar limestone to the magnesian earth it contains."† Yet it is advantageously employed in small quantities,

seldom more than 25 to 30 bushels on the acre. A simple test of its magnesia in the limestone, is the circumstance of its effervescing little when plunged into an acid, and its rendering diluted nitric acid of aquafortis milky. Stones of this kind are usually coloured brown or pale yellow, and are found in several counties of England, and in many parts of Ireland, particularly near Belfast. With regard to the quantity of lime that ought to be applied to different soils, it is much to be regretted that Sir Humphrey Davy has not thought proper to enter fully into the subject. Clays, it is well known, require a larger quantity than sands or dry loams. It has been applied, accordingly, in almost every quantity, from 100 to 500 bushels or upwards per acre. About 160 bushels are generally considered a full dressing for lighter soils, and 80 or 100 bushels more for heavy cohesive soils.

In the application of lime to arable land, there are some general rules commonly attended to by diligent farmers, which are given in a recent publication in nearly the following words:—

1st. As the effects of lime greatly depend on its intimate admixture with the surface soil, it is essential to have it in a powdered state at the time it is applied.

2nd. Lime having a tendency to sink in the soil, it should be ploughed in with a shallow furrow.

3rd. Lime may either be applied to grass land, or to land in preparation for green crops or summer fallow, with almost equal advantage; but, in general, the latter mode of application is to be preferred.

4th. Lime ought not to be applied a second time to nourish soils, unless mixed up as a compost; after which, the land should be immediately laid down to grass.

5th. Upon fresh land, the effect of lime is much superior to that of dung. The ground, likewise, more especially where it is of a strong nature, is more easily wrought; in some instances, it is said, "the saving of labour would be sufficient to induce a farmer to lime his land, were no greater benefit derived from the application than the opportunity thereby gained of working it in a more perfect manner."\*

In improving hilly land with a view to pasture, a much smaller quantity of lime has been found to procure permanent and highly beneficial effects, when kept as near as possible to the surface, by being merely harrowed in with the seeds, after a fallow or green crop, instead of being buried with the plough. As this is a matter of much importance to farmers of such lands, especially when lime must be brought from a great distance, as was the case in the following instance, the successful practice of one of the most eminent farmers in Britain cannot be too generally known. "A few years after 1754," says Mr. Dawson, "having a considerable extent of outfield land in fallow, which I wished to lime

\* Davy's Agricultural Chemistry, page 315, et

seq.

† Davy's Agricultural Chemistry, page 322.

\* General Report of Scotland, vol. ii, page 536.

previous to its being laid down to pasture, and finding that I could not obtain a sufficient quantity of lime for the whole in proper time, I was induced, from observing the effects of fine loam upon the surface of similar soil, even when covered with bent, to try a small quantity of lime on the surface of this fallow, instead of a larger quantity ploughed down in the usual manner. Accordingly, in the autumn, about 20 acres of it were well harrowed, and then about 56 Winchester bushels *only*, of unslacked lime, were, after being slacked, carefully spread on each English acre, and immediately well harrowed in. As many pieces of the lime, which had not been fully slacked at first, were gradually reduced to powder by the dews and moisture of the earth, to mix these with the soil, the land was again well harrowed in three or four days thereafter. This land was sown in the spring with oats, and white and red clover and rye grass seeds, and well harrowed, without being ploughed again. The crop of oats was good; the plants of grass sufficiently numerous and healthy; and they formed a very fine pasture, which continued good till ploughed some years after, for corn. About twelve years afterwards, I took a lease of the hilly farm of Grubbet, many parts of which, though of an earthy mould tolerably deep, were too steep and elevated to be kept in tillage. As these lands had been much exhausted by cropping, and were full of couch grass, to destroy that, and produce a cover of fine grass, I fallowed them, and laid on the same quantity of lime per acre; then harrowed, and sowed oats and grass seeds in the spring, exactly as in the last experiment. The oats were a full crop, and the plants of grass abundant. Several of these fields have been now above 30 years in pasture, and are still producing white clover and other fine grasses; and no bent or fog has yet appeared on them. It deserves to be particularly noticed that more than *treble* the quantity of lime was laid upon fields adjoining, of a similar soil, but which, being fitter for occasional tillage, upon them the lime was ploughed in. These fields were also sown with oats and grass seeds. The latter thrived well, and gave a fine pasture the first year; but, afterwards, the bent spread so fast that, in three years, there was more of it than of the finer grasses."

The conclusion which Mr. Dawson draws from his extensive practice in the use of lime and dung, deserves the attention of all cultivators of similar land.

"1st. That animal dung, dropt on coarse benty pastures, produces little or no improvement upon them; and that, even when sheep or cattle are confined to a small space, as in the case of folding, their dung ceases to produce any beneficial effect, after a few years, whether the land is continued in pasture or brought under the plough.

2ndly. That, even when land of this description is well fallowed and dunged, but not limed, though dung augments the subsequent crop of grain, and of grass for two or three years, thereafter its effects are no longer discernable, either upon the one or the other.

3rdly. That, when this land is limed, if the lime is kept upon the surface of the soil, or well mixed with it, and then laid down to pasture, the finer grasses continued in possession of the soil, even in elevated and exposed situations for a great many years, to the exclusion of bent and fog, in the case of Grubbet-hills, it was observed that more than 30 years have now elapsed. Besides this, the dung of the animals pastured upon such land adds every year to the luxuriance, and improves the quality of the pasture, and augments the productive powers of the soil when afterwards ploughed for grain; thus producing, upon a benty outfield soil, effects similar to what are experienced when rich infield lands have been long in pasture, and which are thereby more and more enriched.

4thly. That when a large quantity of lime is laid on such land, and ploughed down deep, the same effects will not be produced, whether in respect to the permanent fineness of the pasture, its gradual amelioration by the dung of the animals depastured upon it, or its fertility when afterwards in tillage. On the contrary, unless the surface is fully mixed with lime, the coarse grasses will, in few years, regain possession of the soil, and the dung thereafter deposited by cattle will not enrich the land for subsequent tillage.

Lastly. It also appears from what has been stated, that the four-shift husbandry is only proper for very rich land, or in situations where there is a full command of dung. That by far the greater part of the land of this country requires to be continued in grass two, three, four, or more years, according to its natural poverty. That the objection made to this, *viz.*, that the coarse grasses in a few years usurp possession of the soil, must be owing to the surface soil not being sufficiently mixed with lime, the lime having been covered too deep by the plough."\*

Limestones differ much in purity, or in the quantity of calcareous matter which they contain. According to Mr. Headrick, "it is usually from 60 to 85 per cent.; but he afterwards analyzed some limestones from Fife, which contained from 99½ per cent. of carbonate of lime, the residuum being fine clay. Farmers generally estimate the purity of limestones by the quantity of slacked lime produced from a given quantity of burnt limestone, or shells, as it is usually called, the pulverized lime of the best shells being three times the measure of the shells. But it is easy to ascertain the quantity of calcareous matter in the stone itself, by the use of muriatic acid; that stone being the best which leaves the least sediment, the lime itself dissolving in the acid.

MARL.—Marl, which was more extensively employed as a manure in former times than it has been of late, since the properties of lime have been better understood, is usually divided into *stone, clay, and shell* marl, of which the last is the most valuable. All marls contain a portion of calcareous matter, and their operation is not materially different from that of mild lime, as has

\* Farmer's Magazine, vol. xiii, page 69.

been before noticed; but the greater quantity required, owing to the smaller proportion of calcareous matter which they contain, confines the use of them to a few miles around the places where they are found. The effects of marl are slower than those of quick-lime; but, from the earthy substances combined with the calcareous matter, and the larger quantity usually applied, the staple of the soil is deepened, and the benefit is considered more durable.

SEA-WEED.—This is an excellent manure, though not lasting in its effects, suited to all soils and crops, with the exception, perhaps, of clovers of the first year's growth. It should be applied fresh as it is gathered, if the land be ready to receive it; otherwise, it may be mixed up with fresh dung, or used as a top-dressing to grass lands.\*

### ON PLOUGHING.

TO THE EDITOR OF THE FARMER'S GAZETTE.

SIR,—I read with much pleasure the directions for ploughing matches in your paper of last week. The directions are good so far as they go; and to one like me, whose early and happiest days were spent in holding the plough, it must ever be a source of gratification to see the details of the too-much-despised art of ploughing, honoured with a place in the republic of letters. From a conviction that—among all but the front-rank men amongst the ploughmen—there are still various practical blunders committed, on which the directions of your correspondent do not bear; and that there are some points connected with the art, which, even in these latter days of its life and history, are still debatable, I am induced to offer a few hints on the subject. It may be objected that it is now too late to offer anything on the subject; but I have held converse with ploughmen long enough to know, that at this time many of them are occupied in reflecting on, or discussing with one another, the various causes of success or defeat at the late matches, and in forming resolves how to secure the one, or avoid the other, on a future opportunity. I am, therefore, not without hopes that the following hints may, at this time, prove not altogether unacceptable.

I have had occasion to observe that, at some of the late ploughing matches, the ploughmen had plunged deeply into error at the very first start. The veering furrows are generally too heavy. This is not merely an eye-sore, it is worse—it leaves in the plot on which they rest too much undisturbed soil. The veerings should be light; the second one overlapping the first in such a manner that a transverse section of the two together form an equilateral triangle. It will then be seen, that when the succeeding sods are thrown on each side they will cover the veerings. Although thus hidden there is no other part of his day's work, unless perhaps the finish-

ing furrow, that demands so much expertness on the part of the ploughman as the veerings. It is requisite that they be straight and equal throughout. That he may the better obtain these conditions, the ploughman must observe whatsoever little objects, such as stones, tufts of grass, &c., lie in the direct line in which the coulter of his plough must progress: by keeping a constant and successive line of these objects, at short distances from each other, in his notice, he cannot deviate very far from the proper course. The reins must be well measured and adjusted; then, by sliding his hand backward or forward on the handles of the plough, he may, by the agency of the reins, direct his horses, still keeping his hand on the handle. These hints may appear trifling, but it is for want of attendance to these things that the ploughmen so often fail in this trying part of their duty. The mishap of a deviating step or two on the part of the horses, is sure to irritate their master, who at this time is very susceptible of excitement. The poor horses readily catch the infection, and matters get worse and worse. Nothing is so likely to prevent this as laying out a straight-forward, well-marked path to follow, and laying down rules to be strictly adhered to. The necessary movements then, after a little practice, are performed as it were instinctively. In turning at the ends of the field it is a slovenly way to let the plough fall over on the mould-board, and the horses to edge their way lazily round, trampling on their tackle. The horses should be trained to wheel round smartly, obeying the slightest touch of the rein, and the plough should be held on its sole. If rest be required during the time of work, the plough ought to be entered some distance into a furrow before the horses be stopped.

I cannot help here censuring the unmeaning terms in which the ploughmen are often heard to address their horses. These are so indiscriminately and indistinctly applied, that horses must needs have the comprehension of a *houyhnhnms*\* to be able to know them. This jargon of unmeaning sounds is often mingled with oaths that are worse than unmeaning. I would have all ploughmen to substitute such simple terms as "right," "left," "onward," "slow," "stop,"—terms which in certain districts have, by the fiat and high authority of certain debating societies, been "established as the only acknowledged terms of verbal communication between men and horses." Discipline requires the greatest amount of attention. It must be constantly and systematically kept up all the year round; and it is essential in a good disciplinarian that he make himself perfectly understood at all times, and act always on principles of kindness and justice towards his charge. Very often we see a pair of horses walking much faster than usual when the veering or finishing furrows are in course of formation, at the very time when their master wishes them to walk slowly. But the cause of this misconduct on the

\* Farmer's Magazine, vol. v, page 451.

\* See Gulliver's Travels.

part of the horses is obvious—at that part of the operation the master is often excited, and if he lash the horses when they do not deserve it, they cannot but mistake his meaning.

I may now allude to the size and form of the furrows. The principles of good ploughing are said to be, that the whole of the ridge be ploughed to a proper and uniform depth, and that the greatest amount of surface be exposed to the atmosphere; but in actual practice these principles are necessarily in part compromised. A very common-sized sod is nine inches in width. To make this sod lie at the proper angle of inclination, which is 45 degrees, and to expose the greatest amount of surface to the atmosphere, its depth must be a little more than six inches (by calculation it is 6.3639 inches.) This supposes the section of the sod to be a right-angle figure. Now, ploughs in their ordinary construction and trim cut the sods in that form; but it is found that that angle of the sod which is exposed to the atmosphere, and is termed the *aris*, is always depressed by the action of the mould-board, pressing it on both sides, so that when the sod is put into its place, this angle, instead of being a right angle, has become an obtuse angle, consequently the work comes short of what is required. To remedy this, the plough for ploughing lea is trimmed to cut the sod, with the exposed angle, acute, which allows something for the depression by the mould-board.

The least attention will show that to cut the sod in the manner required the plane or sole of the share must form an angle something less than a right angle with the plane of the coulter. But if this position of the share be continued through its entire breadth, one side of the sod will be far less than the proper depth; the upward inclination in the share is therefore continued only as far as the middle of its edge, and the wing is left inclined nearer to its former position. Because the wing in respect to the rest of the share appears depressed, the ploughmen call this trimming, "putting down the wing;" and by attaching a very improper meaning to this phrase and acting accordingly, they often frustrate their purpose. In a plough trimmed in the most approved style, the wing is raised about half an inch from its position in a right-angled plough. From the non-observance of this, most egregious blunders are committed. The wing of the share, in accordance with the improper meaning attached to that phrase, is "put down," and the plough is found to cut the sod with an obtuse angle where a right angle was expected. There is still a remedy for this error, but it is a hurtful one. The coulter may be set with its point to the left hand, so that it will lessen the measure of its angle with the plane of the share—but this obstructs the plough in the performance of its other functions. The coulter should be always in the same plane with the land-side of the plough, and the game is up with the unlucky wight who is necessitated to make it deviate from that position.

While it is very desirable to form the sods with their exposed angles *right angles*, a good

judge will never ask more. An *acute-angled* aris can only be produced at a great waste of power, and at the sacrifice of other principles of good ploughmanship. The objects to be looked for in a well-ploughed ridge, and which may be obtained by attending to the foregoing hints, are: all the sides of the sods inclining at an angle of 45°, that part of every sod left uncovered by the succeeding sod equal to the depth of the furrows, and all the angles right angles.

One of the greatest eye-sores in the ploughed fields of this country is, the want of a finishing or ground furrow. This furrow adds so much to the general appearance of the work, and is for better reasons so desirable, that the total neglect of it is unaccountable. It lessens the width of the "hintin," and keeps the sod on which it rests from being returned by the harrows. But it is high time for to look to the finishing part of this long epistle. I have, in the above remarks, studied to throw out such hints as may induce ploughmen to consider and to investigate the principles on which their art depends. They are now the only class of workmen, almost, that work at random and without a system of rules. When I took up my pen I intended to have alluded to several other points connected with ploughs and ploughing, and especially to have investigated the relative merits of the different kinds of mould-boards, and of wheel and swing-ploughs. But the subject has been so unaccountably neglected, and there is so much to bring forward from the back-ground that I could not, in the compass of any reasonable addition to this letter, treat of these things with any degree of clearness.

I remain, &c.,  
CLOD.

## THE DRAINAGE OF THE COUNTRY.

BY W. MULLINGAR HIGGINS, ESQ., C.E., &c.,  
FORMERLY PROFESSOR OF EXPERIMENTAL  
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(From the *Civil Engineer and Architect's Journal*  
for March).

During the next three or four years there will probably be such an opportunity of improving the internal resources of the country, as has never before occurred. It is generally understood that the government intends to introduce, during the next session of parliament, a general measure, which will, probably, embrace the sewerage of towns and the drainage of the land. That such a measure, wisely planned and carried out with skill, will be an invaluable boon to the nation, every one admits; but it may be doubted whether the public is at all aware of the extent of its value, and perhaps not many of its most sanguine promoters. The health of the population in towns, and the improvement of cultivated lands, are the two results which are generally acknowledged; but the effect of a good system of

drainage will be scarcely less beneficial to the internal navigation of the country, than to the agricultural condition of the lands which are now, or may be, brought into a state of cultivation. This view of the subject is so important, that a few remarks may not be inappropriate in the present state of the question.

There are numerous rivers in this country which would be of immense value to the districts through which they flow if they were navigable, and would become competitors with the railways for the carriage of merchandize and the transit of passengers. Many of these have been at former periods large and deep rivers, and have carried vessels of considerable burthen. By great ignorance, or want of attention, and small temporary expenditures, natural causes, which man ought not only to control but to render subservient to the accomplishment of his objects, have, in various ways, so changed their former condition that they are not only altogether useless for navigation, but are scarcely sufficient channels for the drainage of the country through which they lazily flow. As soon as the commercial wants of some town situated on or near their banks demand a rapid and commodious transit by sea, an engineer is required to give his opinion as to the method of improving the river; dredgings and embankments are immediately commenced, and the streams which had before only tended to the destruction of the channels, are made to assist in their excavation. The difficulty and expense which attend these local improvements, are only known to those who have been engaged in conducting or performing them. And after the expenditure of millions in various parts of this country, during the present century, the good which has been effected is confined to a few districts, and is not appreciated, if in any degree felt, by the country at large.

Should a general plan of drainage be adopted, there will be an opportunity of improving, and perhaps rendering sufficiently navigable, every river in the kingdom. They are the natural and proper channels by which all the waters that fall on the surface of the island should be conducted to the sea. In the present state of the country, these waters are allowed to lie upon cultivated lands, to be evaporated by the heat of the sun, or to collect in low lands, forming bogs and marshes. But, carry them by a perfect system of drains into the rivers, and with a little assistance they will deepen the channels, and improve the outfalls.

It is not my intention, at present, to enlarge upon this subject, as I may, at some future time, offer a few suggestions upon the manner in which this drainage, as a national measure, should be performed, and take a more enlarged view of the benefits that may be obtained. The importance of the measure, however, will entirely depend upon well devised plans and careful execution. The subject is one almost unknown to a large number of engineers, and there is no work in the language which treats the subject systematically. My attention has been many years directed to this and

similar pursuits, but although I could mention many admirable reports delivered by British engineers during the last two centuries, in which the great principles of drainage are fully enforced for particular localities, I do not know of any paper containing so excellent a practical view of the subject as is given in one chapter of Gughelmini's work on rivers. I have, therefore, been induced to offer a translation of it. The Italians still look to the writings of this great man as authorities on all questions relating to the motion of water, and although in some particulars he has erred in judgment, the credit given to him by his countrymen can scarcely be denied by us, notwithstanding the advance that has been made in both the theory and practice of hydraulic engineering. It is at present uncertain to whom may be intrusted the works necessary for carrying out the intentions of the government, but I have no hesitation in saying that a careful study of the following paper, considered in connexion with the works which have been performed in this country, particularly in the Fens, may be the means of preventing many errors that would be fatal to the success of the plans, in the ever-varying conditions of the districts in which the improvements are to be made. It is with the view of assisting those who may be thus employed, and the agriculturists who are attempting to secure the effectual drainage of their particular districts, that I have made the following translation:—

“Beside the large rivers, which have their origin in high mountains, and the torrents which, although they are not fed by springs, have also their birth in mountainous districts, there are channels which carry rain water only, and these commence in the plains. They have seldom if ever been formed by nature alone, but by the art of man, who, to drain his fields and render his ground fit for cultivation, has excavated ditches, into which the rain water immediately flows, and these uniting with others, are finally discharged into a common bed, formed by manual labour and called a drain,\* or by other names, according to the custom of the country, and such drains have their own proper names, in the same manner as rivers. Most of these drains are public property, because the right of introducing the rain water into them is common to many, and by their channels the united waters flow towards their outlet. It happens, however, that some fields have no need of the public drain to keep them dry, and these are they which are contiguous to rivers properly embanked, into which, by means of private ditches, their waters are introduced; but these do not need any explanation, as they are but few, and nature herself teaches the mode of managing them.

“The declivity of plains is generally so small, and the surface so unequal that it is not possible for the rain water, unless it moves with great impetuosity, to run off from the high to the low lands, and leave the fields in a state of perfect

\* *Scolo, fossa di scolo, condotto, tratturo, discursorio, o in altra maniera.*

cultivation, particularly in the time of spring and summer, when the grasses greatly impede its discharge. It is true that the waters are ultimately united in low places, and leave the higher free, but it is also true that for this end a long time is necessary, during which the earth, imbibing an excess of moisture, becomes barren; and as there are in the plains low places shut up on all sides by more lofty grounds, the water is collected in them, and not being able to escape, necessarily forms a marsh or bog, as frequently occurs in countries unoccupied or neglected by man. This has made it necessary for civilized nations to cause all the plains to be connected by excavated ditches, and to direct the outlet of these ditches to the places where experience has proved they may find basins or continued low grounds, and along these to excavate a capacious canal to receive the atmospheric water from the drains of the country. From this artifice arose the drainage of all the provinces which have been brought into a fertile state, but they can only be kept in that condition by the preservation of the first excavations.

"These drains have their termination either in neighbouring rivers, in marshes, in ponds, or in the sea. Those that discharge themselves into rivers can serve only those fields that are at least higher than their beds, if temporary, or than the lowest surface of their water if permanent. The mouths of drains, where they discharge themselves into a river, may be either open or closed. Those only can have their mouths free, that are open at all times, which have their beds higher, or at least as high, as the greatest flood of the river, for otherwise, if the river be turbid, regurgitation through the drain would stop it with deposits, and close the outfall; hence it is that only higher grounds can be drained by open conduits in rivers. But if these channels are embanked (a certain evidence that the flood rises over the surface of the country), it will not be possible to have the mouth always open, but some mechanical arrangements will be necessary to prevent the floods of the river from being introduced into them, and that the rain waters, if there are any, should be retained either in them, or in the ditches of the fields, until after the flood has subsided, when the impediments at the mouth may be removed, and the water discharged.

"Many artifices have been adopted to prevent the regurgitation of rivers in drains; but this is not the place to speak of them: they may be seen in Baratter's "Architettura dell' Acque," part I, lib. 8, cap. 19. The most common are the before mentioned. We should however, in these cases, carefully observe the conditions of the districts, which give occasion for as many rules.

"1. If the lands which are to be drained by a channel, furnished with a gate, are on the same horizontal plane, it is not necessary that the sides of the conduit should be embanked; because when the gate is closed the water is unable to overflow any one part, or if through too great an abundance it should overflow a part, it will distribute itself equally over all the country, an effect embankments could not prevent, which are there-

fore of no utility; but if the inundation of the country should not be prevented (in case the gate should break, an accident very rare), other cautions will be demanded.

"2. If the country should decline towards the mouth, as it commonly does, it will be necessary that the banks of the drain towards the outlet should be so much elevated as to equal the height of the highest part, or the water that flows down will overflow and cause inundations. Hence it is

"3. That the districts which have a great declivity on the surface cannot have drains with gates, without overflowing the low lands when they are closed; and therefore in such a case we ought

"4. To separate the drains of the high lands (as far, at least, as the highest flood of the river) from those of the lower grounds, and to make the former discharge by an open mouth, enclosed with banks sufficiently high to support the regurgitation of the river, while the latter may be provided with a gate and banks if necessary, in the manner above named. It is true that if the water of the open drain should not run in such abundance as to prevent the regurgitation of the high waters, during the freshes, a deposit will be formed, and there may be so small a quantity of water in the drain, that it has not sufficient power to remove the impediments when they are formed: in this case new and repeated excavations will be required.

"5. The flood-gate may be closed when the river is swollen, until the water in the drain shall be raised to the same level, and then it may be opened to discharge such additional water as may flow into the drain; in this way the regurgitation of the flood will be prevented, and the water that comes afterwards into the drain, will be discharged without inundating the country.

"6. The low grounds may be drained by the use of flood-gates either in rivers or in the channel above named, but more easily by the former than by the latter, because the water of the river is lower than that of the drain, and also because the deposit which is formed in the channel cannot be produced in the river, in which the fall must consequently be greater.

"The drains which fall into marshes, stagnant waters, and similar places, have generally an open discharge, and the reason is, because the difference between the highest and lowest surface of the water in the marshes is, for the most part, not so great as to require the application of a flood-gate (which is difficult to manage) to prevent regurgitation; and especially as the fields which are to be drained into them are higher than the surface of the marshes, and it is from the fields that the water comes which swells them; besides which, no deposit is to be feared from the regurgitation of the waters. Sometimes, however, the country has so little declivity in those parts contiguous to the marsh, that, remaining dry the great part of the year, in consequence of its elevation, it only spreads the waters at the time of floods. Under such circumstances it may be useful to defend the higher ground by sur-

rounding it with banks, so that the water of the marshes increasing, may not overflow it, and at such times to arrest the rain-water in the fields, which, when the surface of the water in the marshes begins to fall, may be discharged into it by one or more cuttings in the bank. Such localities cannot be brought into a state of perfect cultivation, being by nature marshy, but they must be kept for pasture or meadows, to which the dampness of the soil is useful. When marshes are occasionally much flooded, as, for example when rivers enter them, or when rivers overflow their banks, flood-gates may be used at the mouth of the drains, but before they are introduced it is necessary to consider the duration of the floods, the state of the country, and other similar questions, for upon these their usefulness depends.

“Those channels which have an immediate discharge into the sea must be differently treated according to their circumstances. The rise and fall of the tides, and the swell produced by winds, is sometimes productive of damage, and sometimes of advantage, to the mouths of the drains. Every one knows that the sea forms its own banks, and throws up mounds of gravel upon the shore. The height of these defends the interior low grounds from inundation, which would otherwise be the result in time of storm, and sometimes also at the time of the usual high tides. These beaches must be cut to form an outlet, but the openings must, at the same time, be protected by strong banks, in order that when the water of a stormy sea introduces itself into the drain, it may not spread into the back country, and overflow it for ever, as has sometimes happened in low grounds. Therefore, not to run such a risk, they are usually provided with strong gates, which being shut when the sea is high, keep it within its ordinary limits, and being opened when it is low, give a free discharge to the water that was retained during their closure. In some drains, however, which on account of their length, or for some other reason, carry a large quantity of water at all times, and are equal to small rivers, it may happen that gates are not necessary, the continued flow of the water of the drain being sufficient to keep back the water of the sea; nor are they necessary in those places where the country rises as it recedes from the shore. By comparing the elevation of the sea when tempestuous with the level of the country, it is easy to determine what drains require gates, and what kind of banks should be employed. There are some drains which have outlets so large and deep that they form small harbours, and give shelter to vessels of moderate size. This may be occasioned by the natural depth of the sea in that situation, by the abundance of the water in the drain, or by the position of the shore; it may arise from the direction of the mouth being such that it is not exposed to those impetuous winds, which, in tempest, drive sand or beach to the coast, or from the great rise and fall of the sea; or it may be occasioned by the operation of other causes, which prevent the formation of a deposit,

and promote excavation, but which cannot be described without a particular examination of the place. On the contrary, the outlets of some other drains are closed when certain winds blow, and these drains must either be diverted and discharged in other places, or the water must be penned up so that it may enter the sea with velocity, and remove the deposit formed at its mouth.

“In drains not large enough to have a good outlet, it is especially necessary that they should be sufficient to carry all the surface water of the country, and that they should not overflow their banks. It must, therefore, be borne in mind, that as they have, under ordinary circumstances, a comparatively small quantity of water, they must, when the stream is turbid, have a considerable fall before they can establish their beds. In a plain of little declivity the bed would be elevated above the level of the country, and the drain be rendered incapable of receiving the surface waters. In streams of this kind it is useless to expect any excavation, but it is, on the other hand, necessary to form the channel by manual labour, and prepare the course the waters should have to their discharge.

“We must then be careful that the channels shall be excavated sufficiently deep to receive the water in great abundance, so that it may not be raised above the plane of the country, and, if possible, not within the drains that run into them. In addition to this, every excavation is superfluous, as, for the drainage of the land, it is enough that the private drains should remain dry after the fall of rain. Such benefits, however, cannot be obtained in low places with any amount of excavation; for, the bed being horizontal at a lower level than the place of its reception, where the mouth of the conduit ought to be, if greater excavations were made, they would only serve to produce a greater regurgitation, or to cause an eddy; besides which, when the excavations are deeper, a greater width is required, which would, in such a case, be a waste of ground, without a corresponding utility. It is true, that in the excavation of these channels it is better that they should be made too large than too small, for, although the drains of the country carry only limpid waters, they must always hold some earthy compounds brought from the surface of the cultivated land, particularly at the time of heavy rains, or, if from nothing else, from the washing and breaking down of the banks of the conduit, and therefore, the water having but little velocity, in consequence of the little declivity of the bed, as well as the small quantity of water, the earthy matters being deposited, must raise the channel. The water of the drain being raised by the elevation of the bed, the surface waters of the country, can no longer have a free discharge; hence it is, that the greater the excavation, so much the longer will it be before the bed is raised to that height at which further deposition will become injurious; but, on the contrary, if the first excavation be too small, the defect will be immediately felt, and

will continually increase. Hence it is, that the drains not being able to maintain a free discharge, and being necessarily obstructed by the inevitable accidents above mentioned (besides many others which ignorance permits and malice creates), repeated excavations are required, which must, as the occasion demands, be done according to established rules."

### THE DRAINING AT TIPTREE-HALL FARM.

SIR,—As I have frequent enquiries, I will endeavour to give you a tolerably succinct account of my draining operations at Tiptree-Hall Farm.

The land is of such various qualities, and so particularly situated thereby for the retention of both top and spring water, that the Essex people considered it never could be improved even to become of tolerable goodness.

About two-thirds of it was a strong yellow loam subsoil, in a state between putty and bird-lime, according to the season, here and there mixed with a hodge-podge of stones, to which its attachment was so affectionate that there was no separating them, and it was only by the constant use of water that the land drainers could get their spades in or get rid of this adhesive substance; at intervals might be found veins of silt (the reverse of adhesive), and here and there the soil would assume a rusty appearance, indicating iron, with a bluish or slaty character: then a patch of gravel occasionally amongst the loam in which would rise a small weak spring, sufficient, however, to ruin the crops in its immediate neighbourhood. Over this subsoil and between it and the cultivated soil, was a hard, dry and impervious pan, formed of the subsoil, but hardened and rendered solid by the heat of the sun and the constant action of the plough-sole. The soil itself partook in some considerable degree of the nature of the subsoil, being, however, ameliorated by mixture of manures and by cultivation. Still so great was the fear of the wretched subsoil that the pan was never disturbed, consequently, there being but nine or ten inches of cultivatable earth with an impervious basis, a dry summer burnt all up, and a wet one ruined the crop by rotting the roots. A showery season was the only suitable one for this description of land.

Now, however, after draining, in the short space of a few months, we are subsoiling to the depth of fourteen or sixteen inches, and working it like a garden; the water having left it, and the frosty air following the water, it is as mellow and friable as could be desired. In fact, during the last month, whilst our neighbours were unable to move, we were harrowing on our wheat and beans like a rich garden; the earth crumbling down after the drill like sand—very much to the astonishment of the tenant and labourers; and this after so much carting and disturbance, and so much of the subsoil thrown up, that two months

previously it was thought a whole summer would hardly suffice to condition the soil.

The drains cross, at a very acute angle, the slope of the land; they are four yards apart, with a leader to every fourscore rods—the leader being rather deeper than the other drains, but not wider. Still, as it never runs full, it proves in practice my subsequent proposition, that, "the filtration of water, in strong soils, is far inferior to the velocity of its passage through the drains."

Each acre contains twelve score rods; and costs ten pounds, requiring 3,200 pipes and 360 bushels of stones.

The style of drainage applied to this part of the farm is as follows:—

First, a double turn of the plough takes out nine inches; then a narrow spade (sufficiently wide to admit the drainer's foot) takes out ten inches; then comes a still narrower spade (fourteen inches long, three and one eighth wide at top, and one and a half at bottom), which removes thirteen inches more—making the whole depth from the surface thirty-two inches. The drain being well cleared out, we first fill in the drains, to the depth of ten inches, with nice clean gravel-stones, and then place, on the top of these stones, a drain-pipe, thirteen inches long and three inches wide outside, having a two-inch bore. This fits so exactly into the space made by the last or narrow spade, that it not only rests on the stones, but binds against the sides of the drain, thereby preventing the stones being choked by the superincumbent earth, but also forming the earth above it into an arch; which in the stronger soil would, it is presumed, retain its form even if the pipe were broken or decayed. As this is a plan of my own, and contrary to the entertained opinions, that the tiles should be at the bottom, I will give my reasons for so doing; because,

1st. It is cheaper.

2nd. It is more durable, and less liable to choke.

3rd. There is a large *area of space* for the *escape* or *filtration* of the water; and this I consider of the utmost importance, and not sufficiently considered. It is quite evident, that the *filtration* of the water must be according to the *area of the pores presented in the air to the drains*.

It might be illustrated by saying, it is of little use having a large passage unless you have enough side doors to admit a sufficient number of passengers to travel down it.

The pores, in contact with *air*, which are constantly admitting the water by its superior gravity, should form, if practicable, by admeasurement, a *superficial area equal to the solid unoccupied contents of the pipe or drain*, (reduced to an area); the velocity of passage in the drain being certainly, in a general way, equal or superior to the velocity of percolation.

It must be considered, that in dense subsoils the continued winter rains expand the particles and render filtration more difficult—especially during the first year or two after drainage; therefore, I prefer deep and narrow stone drains, protected from earth by a pipe over them, because

they afford ready access to a large and porous surface; filtration going on both on the tops and sides at the drain.

I would observe, that even on the recently drained strong loam, but little surface water ran away, most of it percolated, except in cases of the ground being frozen hard, and very heavy and sudden rains. It appears to percolate tolerably clear according to the season—but on this point my observations must be more extended. On cutting across some of the drains that had been made six months, the stones were found to be washed as clean as the gravel in a brook.

The other third of this farm was the reverse of the first two thirds, and required an entirely different system of drainage. It is mostly black, sandy, and boggy soil, with numerous springs rising at various points where obstructed by perpendicular walls or veins of dense clay or hard gravel, sometimes both.

The drainage here has been effected by a person named Pearson, from Warwickshire, a man of extensive knowledge and ability in this department of drainage, who I understand has essentially improved Lord Digby's estates by his judicious sub-draining of the springs. His plan is to take his fall from the lowest point, and gradually work up to where the spring shows itself, having previously ascertained the whereabouts by digging, and by those plants that invariably show themselves over a spring. As springs are generally attended by sandbeds, a single drain will often lay dry a large extent of ground. In one case, where there was a swamp of four acres, the drain was opened at two feet, and continued in a trench till it reached eleven feet in depth; the sand boiling up at intervals like water in a cauldron, of course it was necessary to shore up the sides, and when his level was accurately taken, he commenced laying his pipes on hay (two half pipes, four-and-a-half inches diameter were put together, being internally nine inches by four-and-a-half), but so strong was the force of the water, it was necessary to have two strongly made iron skeleton arches with wooden sides, about thirty inches high, and the width of the drain two feet. In these arches were laid the pipes, and firmly loaded to the top of the arch with soil to keep the pipes from being forced up by the boiling waters and sand; when loaded, the arches were removed by a lever, the mouths of the pipes being carefully stopped with hay, till the next length of pipes was laid in the next arch (two always being in use, one in front of the other).

The result is, that one such drain laid perfectly dry four acres of bog (having a smaller spring carried over or across it); the first drain runs permanently 30,000 gallons every twenty-four hours, and several others nearly as much. It has laid our neighbours' wells dry, a quarter of a mile off being in a bed of sand, below their level. The land (which has been double spitted) is now always perfectly dry, although previously dangerous for cattle and entirely worthless.

In conclusion, allow me to say, I have derived

most valuable information, in draining, from those excellent and standard works on agriculture, "Stephens's Book of the Farm," "London's Encyclopædia of Agriculture," and "Morton on Soils." There may be found, ample and satisfactory evidence and matters of fact in every branch of draining. It is with extreme regret I frequently see money completely wasted, by placing tiles without soles, and pipes without stones, and temporary and imperfect draining by bushes. That soil in a few years becomes absolutely much worse than it was originally, for when the drains choke, there is a much larger accumulation of water to the destruction of the crops.

I hope that in time to come, farming will be treated as a science, and that there will be as much uniformity in cultivating land as there is in manufacturing cotton. That can only arrive by our young farmers deriving an uniform agricultural education—the mechanism for which does not at present exist. Let us hope it may hereafter, and that whilst we have collegiate education for the learned and other professions, we shall at least have agricultural universities and apprenticeships. There can be no doubt that agriculture is the basis of society,—the most paramount interest in a pecuniary point of view; the regulator of currency and manufactures, which are subservient to it. If we want a proof of this, let us consider that the *stomach* cannot wait a day; its claims are paramount, and to hunger must succumb all our other enjoyments, whether of manufactures or luxuries.

Let every landlord and every tenant improve their land, where opportunity exists, and the Anti-Corn-Law League may visit other countries, whose fear of our *exportations* will then be great. For it is quite clear that if all the land in this country that required it, were perfectly drained and cultivated, we should be quite as able to export our superfluous corn and meat as our superabundant cotton; a result devoutly to be wished, when we consider the effect of ample food and employment to our labouring population in a moral, physical, and social point of view—to say nothing of the immense pecuniary advantage of employing our capital at home, instead of lending it to other nations, to enable them to compete with our own already insufficiently employed countrymen.

I am, Sir, your obedient servant,

4 Leadenhall Street,  
London, March 28th, 1844.

I. J. MECHI.

#### WESTBURY AND NEWNHAM FARMERS' CLUB.

The first monthly meeting of this club took place at Newnham, on Tuesday, the 27th February. The subject of "mineral manures, and the inorganic principles of plants," was ably introduced by Mr. Henry Bird, from which we extract the following:—Previous to entering upon the subject, he stated that it was necessary to make

some observations upon the soils in the neighbourhood, and called their attention to the beautifully wooded and undulating country extending from the city of Gloucester to the town of Chepstow, which, with the magnificent river Severn, could scarcely be exceeded in the beauty and grandeur of its scenery. He stated the soils of that district to consist of several varieties, but all of them very productive if properly cultivated; and divided them into the stiff dark-coloured tenacious clay resting upon the lias limestone,—the stiff red clay upon the soft red marl, extending to the red sandstone, where the soil became lighter, and more stony and dry; the rich alluvial soils found in the valleys and flat portions of that district, consisting of the detritus of a variety of rocks and decaying vegetable and animal substances conveyed there through the agency of water;—and lastly, the reddish yellow soil resting upon the magnesian limestone contiguous to the forest of Dean. He then referred to the work of Conybear and Phillips, on geology, for their agricultural characters, and appealed to the experience of his hearers, as to the correctness of their statements. He next directed their attention to the nature and varieties of the neighbouring limestone used for building and agricultural purposes, and pointing out the limes that contained iron and magnesia in large quantities, and those nearly free from the above substances. The forest limestone of a dirty reddish colour, contained a considerable quantity of iron and magnesia, as proved by the test of those bodies, and he stated that it was unfit for agricultural purposes, except in small quantities, for potatoes and such crops. The Longhope limestone of a bluish colour, and hard enough to scratch glass, contained iron but no magnesia, and was composed chiefly of lime and flint, and well suited for the stiff and red soils which coincided with the farmers' experience who had used it. The plump-hill limestone from the forest, near the Wilderness, of a light drab colour, and smooth upon its surface, but very hard, contained a trace of iron, and no magnesia; it was extensively used for agricultural purposes, and found to answer very well. The lias limestone, at Awre, of a dark blue colour, contained a little iron and no magnesia. He recommended the lime for dressing land, and a farmer present stated he had used it and found it much superior to the forest limestone. The Chaxhill limestone contained magnesia and iron, and farmers seldom used that lime upon their land. He then examined the red clays, pointed out their composition as being very productive, but from being wet, and requiring draining, there were large tracts of that land in the district nearly unproductive from the neglect of it. The first principle, upon stiff and wet lands, was draining, for by that means the soil would be rendered more porous, and would admit the air freely after rain, as rain-water contained ammonia, which, in passing through the soil, combined with it, and that was the chief cause why well-drained land so soon became productive. He then appealed to their experience,

that if cultivating land as wet as not to bear good pasture, ever remunerated them for their trouble and expense. Next to draining, he stated, the red soils required lime to render their iron inert, and their consistency more porous, by disturbing the equilibrium of the soil, and to set the potash which they contained free; not for the purpose of bringing humus and vegetable fibre in a soluble state, for most of the red soils were deficient in that respect, so that after liming, farm manure was necessary to make up that deficiency. He concluded by stating that many of the farmers used green manure upon their stiff lands, which he considered a good practice, as the ammonia of the dung combined with the soil, and its straw contributed to make it lighter.

Charles Rosser, Esq., inquired the best means of restoring land that had been injured by magnesia and limestone, to which Mr. B. suggested the manuring of it with diluted oil of vitriol, as gypsum would be formed, and the fixed air of the lime would unite with the magnesia, and render it soluble and useful in the soil. Another member inquired the best means of managing manure. Mr. B. recommended it to be turned over with mould, common salt, and diluted oil of vitriol, and to be well covered with earth, as the nitrates of potash, soda, and lime, would form rapidly in it, through the agency of the air; and of which substances were useful for the different crops.

Charles Rosser, Esq., then rose and proposed a vote of thanks to Mr. Bird, for his useful and interesting observations, and in the course of his remarks stated, that from what they had heard, he was certain that every farmer present would acknowledge that the pursuit of agriculture was not a simple practical art, but a science embracing a great variety of subjects, in order to carry it out successfully. Even under the present system, there was an urgent necessity for adopting the suggestions of science, and if a further repeal of the protective duties on agriculture took place, he feared not the result, as no nation could compete with British skill and industry.

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#### THE YORKSHIRE AGRICULTURAL SOCIETY.

*“Report of the Judges appointed to inspect the Farms entered for the Prize and Sweepstakes proposed by the Yorkshire Agricultural Society, 1843.”*

“Our next inspection was Mr. Coulman's farm at Wadworth. The arable land is of high quality and well adapted for the turnip four-course rotation, in which it is cultivated. As upon all well-managed farms, all the crops were deposited with the drill or presser. The quantity of seed used for wheat, three bushels; for barley, four bushels per acre; and for turnips, two pounds per acre. In the cultivation of these, seven carts of fold-yard manure, and twenty bushels of three-quarter-inch bones were given to the swedes; and

six carts of manure, and twenty bushels of bones to the white turnips. Six rows of turnips are drawn alternately for the consumption of cattle in the yard, which are liberally supplied at the same time with linseed-cake: the remainder of the turnips are consumed on the land by sheep, but no cake is given to them.

"The clover, whether for mowing or pasture, is manured the first winter, at the rate of six carts per acre. Nothing could exceed the luxuriance of both the red and white clover. Lucerne and tares are used freely for soiling. The liquid manure, carefully preserved in a tank, is applied with much advantage to the grass.

"Draining has been executed to the extent of forty-seven acres, with tiles laid sixteen inches in depth, and at the distance of six yards, at a cost of £5 15s. per acre, exclusive of carting.

"The next farm, Mr. Newham's of Edlington, afforded us great interest. As a tenant farmer, he is peculiarly liberal in his management, both by consuming linseed cake, to a great extent, and purchasing bones, as the following account, which he delivered to us, of his consumption of these articles for the last four years, will show:—

Year.	Tons of Oil-cake consumed	Bushels of Bones consumed.	Cost of Bones.		
			£	s.	d.
1839	12	1200	157	10	0
1840	16	1100	151	5	0
1841	22	1000	125	0	0
1842	28	1000	125	0	0
4	78	4300	558	15	0
Average.	19½	1075	139	13	9

"His sheep, from the period of weaning from the ewes, to the time of their sale when fat, whether on turnips or grass, have always a full supply of oil-cake, be the pasture good or closely eaten. His opinion is, that the extra produce of beef and mutton pays for the cake, and that he obtains the prodigious benefit of the superior manure without cost. Certainly the land gains much by the application of linseed-cake, as food for cattle, and we never met with an instance where so much is consumed on a farm of scarcely 300 acres. The bones used are sawings and filing from the button makers of Sheffield; and being cut with fine saws, they are in a state of powder nearly resembling oatmeal. The price this year was reduced from 2s. 6d. to 2s. per heaped bushel. For turnips, these are drilled with the seed at the rate of twenty bushels per acre, on ridges which have been previously manured. We saw one field of permanent grass, of very bad quality, which had been dressed with twenty bushels of these bone-sawings, per acre, and it exhibited prodigious improvement: they were sown from the hopper in February, 1840, and to try the experiment, parts were left unboned; on other parts, the dressing had been repeated the

following year, and they showed an equal ratio of improvement after a double dose.

"The greater part of this farm is land of high quality, on a limestone; but there are nearly 100 acres of inferior clay, which required draining. This has been effected to the extent of eighty-four acres,—ten acres with tiles alone, at £4 per acre, and seventy-four acres, with tiles covered with stone eighteen inches deep above the tiles, which were laid only four yards apart. The expense of this was great, £8 2s. 6d. per acre; but in the opinion of Mr. Newham, it will ultimately be the most profitable. As these stones are, however, brought to within two inches of the surface, it will render subsoiling a difficult operation. Soiling is carried on to a great extent; the draught-horses are maintained upon tares, clover, and dry food. This year, two acres of lucerne, and two acres of sainfoin, have been sown close to the farm-stead, for the purpose of soiling. Ten regular draught-horses are employed; the practice is to purchase, annually, two, of two years old, and sell out two, of seven years old,—thus keeping the stock always young. The ewes kept on the farm, on the average of the three last years, have been 122; lambs bred from them, 151, which are sold fat, when shearlings; and in addition to this stock, from 250 to 300 shearlings are bought each September, put upon turnips, and sold fat in the spring. Mr. Newham also fattens about twenty bullocks every winter in the yards, with linseed cake, holding besides about twenty cattle of various ages. It is chiefly from the vast supply of first-rate manure, made from these causes, and the liberal purchase of bones, that the high condition of Mr. Newham's farm has been obtained. He adopts the four course of turnips, corn, clover, and corn, varying the corn crops, but often taking two crops of wheat in a course, and sometimes substituting beans in the place of red clover. His mixture for one year's pasture is ten pounds of white clover, ten pounds of trefoil, four pounds of rib-grass, four pounds of parsley, and a quarter of a peck of rye-grass per acre.

"Mr. Snowden, of Marr, who has occupied his farm fifteen years, has also practised a course of cropping somewhat similar to that followed by Mr. Newham; but whilst the latter drills all his corn, Mr. Snowden sows a portion broad cast,—drills some, and occasionally dibbles both wheat and beans. He sows swedes twenty-two inches apart, allowing nine carts of well rotten farm-yard manure per acre for the rows, on which he also drills ten bushels of bones, six bushels of pigeon manure, eight gallons of whale-blubber, and ten bushels of ashes, all mixed together. Estimating the farm-manure at ten shillings a cart, the cost of manure, per acre, for the swedes is about £6. More than half this crop is carted to the farm-yard, for cattle, and not many are eaten on the grass land. The white turnips have twenty-four bushels of bones, and ten bushels of ashes drilled, with two pounds of seed; these turnips are seldom drawn. Mr. Snowden prefers the lime from Knottingly, as

much more efficacious than that on his own farm, which is chiefly on a limestone. He purchases manure to a considerable extent, from Doncaster. Rape-dust, nitrate of soda, guano, have all been used; but bones and whale-blubber seem to him the most valuable. He is trying the effect of schistus this year upon turnips; but the result is not yet known. The draught-horses are fed upon tares and sainfoin in the folds during the day, and a considerable quantity of linseed-cake is given to his cattle in the winter.

“Mr. Crowshaw, of Byram. This farm has been in the occupation of the late Sir John Ransden for many years, under the very judicious management of Mr. Crowshaw, though he has only been the tenant for the three last years. The soil is light, not naturally good, a moory sand, and much crowded with timber; but the arable lands have all been effectually under drained. The course of cropping is turnips, barley, seeds, manured and then pastured, oats, wheat. Much attention is requisite to keep the land clean for wheat, after oats, on this soil; but the purchase of manures, and careful cultivation, seemed fully hitherto to have effected it. Two quarters of rape-dust, per acre, are drilled with the seed wheat. The crops were great in every field, and the land remarkably free from weeds. The practical management appeared to us to be of the very first class.

“On some grass land, of very inferior quality, six quarters of bones mixed with three quarters of ashes, had been sown upon one acre in September, 1836. The effect was striking; a sheet of white clover, and valuable grasses, closely eaten, had displaced the coarse bent covering, which the remainder of the field exhibited.

“On the 3rd of June last, in a tolerably good grass field, an experiment was tried with guano, at the rate of 4 cwt. per acre, mixed with three quarters of charcoal ashes; the growth of grass, during the month that had elapsed, appeared to us to be more than doubled. Nearly adjoining this, a plot was staked out, on which bean-meal, at the ratio of 8 cwt. per acre, had been sown, but without ashes. The flush of grass seemed to be about one-half of that excited by the guano. Grass land, if properly drained, is always grateful for whatever manure may be given to it. Mr. Crowshaw's farm was a gratifying sight; the land very clean, and the crops very heavy.

“Mr. H. Skelton, of Bramley Grange, holds in his own occupation, a farm of 203 acres, situate on winmoor, five miles north from Leeds. This land is of a totally different nature from any which we had previously inspected. Naturally a cold, wet, strong clay, lightened only in some parts by a small mixture of moor incumbent on sandstone. Though very high it is yet inconveniently flat for draining. The whole has, however, been effectually drained to the depth of twenty-four inches, and shows the vast advantages which result from the adoption of that process upon tenacious clay soils. Mr. Skelton has not pursued any of those regular courses of

cultivation that are usually adopted. His system has been regulated with a view of taking the largest possible produce of hay and straw to Leeds market, and carting back manure. For the latter article, he has depended upon purchase, not upon production by animals,—his land not being suitable for turnips. His extent of pasture on seeds, is very small; the great object in sowing them is, to raise more hay. Such a course could only be pursued in the vicinity of a large town; but it has been done in this instance with good effect, and in an admirable manner. No expense has been spared, and yet nothing has been expended but with a view to ultimate profit, and the best means have been adopted to secure that profit. Originally this farm was a poor barren waste, of similar nature to the adjoining lands; but by proper enclosures, by planting, and careful management of fences, and cutting of drains, tapering down the adjacent lands to the bottom of them, where practicable, and thereby obtaining materials to raise the more distant hollow places, with which such land frequently abounds, he has been enabled to lay the whole dry; and by the judicious management of vast quantities of manure and composts, it may be almost said, he has made the whole rich. The adjoining lands are of a similar soil; but do not yield one-fourth of the value in produce.

“We desire the council to understand, that, in this report, *we make no classification* beyond that which we show, by awarding the sweepstakes and prize to Mr. T. C. Johnson, of Chevit, a tenant farmer, and the returned stake to Godfrey Wentworth, Esq., of Woolley Park. With these exceptions, we have reported upon the farms in the order of route on which we inspected them. We repeat, however, that every farm is cultivated with very superior skill and judgment;—that the main object of individual appeared to us to be, what a farmer's object ought to be,—raising the largest possible produce with the greatest profit. We have taken all due pains in the inspection, which fully occupied four days, and in making the award, we have exercised our most careful and deliberate judgment.

“In closing our report, we may perhaps be permitted to remark, that valuable as large agricultural meetings for the exhibition of stock and implements are, on account of the opportunities which they afford for obtaining a knowledge of the excellences to be aimed at by the breeder and the grazier; and the improvement of machinery, which these exhibitions have mainly encouraged, yet the minute inspection of well-cultivated farms, is not less worthy the attention of the arable farmer. We are of opinion, that the produce of grain would be much more than doubled, and that the profit of the cultivators would be greatly increased, if the praiseworthy examples set on the farms we inspected, were generally followed. An enquiring mind is necessary to form a perfect, or even a successful farmer. The best informed farmer would, on each of these seven farms, discern that he had something yet to learn, and would see

some practice from which to improve his own. We have received both pleasure and advantage from the trust with which you honoured us. We have long been proud of our short-horned cattle, Leicester sheep, our horses, and even of our pigs; and assuredly we do not feel less gratification in being able to state, that on seven farms, within so small a space, cultivation was pursued with such superior enterprise and skill.

“CHARLES HOWARD,  
“WILLIAM PICK,  
“ROBERT BROUGH.”

#### BROMSGROVE FARMERS' CLUB.

A numerous attended meeting of this club was held in the Town Hall, Bromsgrove, in the evening of Tuesday, April 2. G. F. Iddins, Esq., in the chair.

The minutes of the last meeting having been confirmed, Mr. H. F. Fardon read a second paper on the subject of manures. After briefly reviewing the contents of his former paper, he observed that nitrogen is contained in a small proportion in every part of a plant, and the application of a substance, ammonia for instance, capable of yielding it to the plant, seems to bring all the powers of vegetation into vigorous action. If other substances necessary for the nutrition of the plant be not present in a sufficient quantity in the soil to support this increased growth, we have a crop rank but inferior in quality. If present in abundance, the necessary support is afforded and the crop is good; hence the importance of a proper combination of manures. Farm-yard manure, when properly heated, affords ammonia and the other ingredients required. Guano, sulphate of ammonia, and soot, supply ammonia to plants, and seldom fail to produce a powerful effect. Guano also contains phosphate of lime, which is the chief material of bones, and a very valuable manure. Another class of manures supplies other inorganic ingredients to the soil. Potash, carbonate of soda, and common salt are of this description. The application of these will produce a striking effect if the soil is deficient in them. Common salt (he continued) has lately attracted much attention as a manure, and I believe that upon light soils it is a very valuable one. I have already recommended its application to fix the ammonia of the manure heap, and I now recommend it as a manure for the land. It is proper that I should begin my remarks by proving to you that salt does act as a manure, and then offer an opinion as to the mode in which it acts. I have received since our last meeting two letters addressed to me, as secretary of this club, on the use of salt as a manure. These letters contain the actual experience of two thoroughly practical agriculturists. The first I received from Mr. John Wilson, of Aston Claverly, near Wolverhampton; the second from Mr. Matthews, of Park Hall, near Kidderminster. The

following are the results of Mr. Wilson's experience of the use of salt:—

“I believe the use of salt as manure, generally speaking, to be little understood, otherwise I think it would be more extensively used. It has been tried or applied to all descriptions of land indiscriminately; hence its failure, and in many instances its condemnation. I have used salt for agricultural purposes many years with success, at first experimentally and very cautiously; and am so thoroughly convinced of its utility, that I use it very extensively. I am now applying it for barley on all my lightest soils containing any considerable portion of vegetable matter, at the rate of five to six cwt. per acre; also on my wheat of the autumnal sowing on the same description of soils, and at the same rate per acre. I did so last year with great success. I gave it, as in other years, a fair trial, by leaving a strip in each field without the salt, which in every case plainly showed itself in the months of May and June, particularly in the wheat. We consider our land to bear white wheat better than red, but in the latter end of May and the beginning of June it is very much more subject to the red rust, a disease very detrimental here, but it is completely obviated by the use of salt, and the sample is much finer, the yield better, and much freer from light or diseased grains when salt is applied. I last year salted a twenty-acre field for barley, at the rate of six cwt. per acre, leaving a strip the whole length of the field without; at harvest the greatest novice might have discovered the difference, the salted being very superior in sample and colour. I last week winnowed three hundred bushels of it without a single bushel of light—a circumstance which does not occur with us this year where salt was not used. This was grown on land which ten years ago was considered not worth cultivating, but wonderfully improved by the use of bones and salt, and now grows as good turnips and barley as any land I have. I think the Bromsgrove Club will approve of salt as recommended for trial in fixing the ammonia in manures. I use it for that purpose very satisfactorily. We are very subject to grow scutch, and many of us (to our shame) much more than we ought to do; but when we have it, we endeavour to make the best use of it, and I have now mine in a state of preparation for the land for turnips. I draw it in heaps in autumn, apply a considerable portion of salt to it in the winter; after which, and turning and mixing, I add fold-yard manure; this I again turn and mix, placing a layer of the scutch on the bottom of the heap, and also a layer on the top, over which I strew salt sufficient to keep the surface moist, and prevent the escape of the ammonia. In this state it remains until about three weeks of the time I want it for the turnips, when I again turn it; and when used it comes out an excellent manure, which it would not do without the application of salt. We also use it advantageously in heaps of vegetable compost for rough grass land of light or sandy texture; and I believe the greatest mistake in the use of salt is that of applying it to

cold strong arable land, when I think it worse than useless; but when judiciously used on light soils, containing vegetable matter, it will be found very valuable for nearly every description of crops."

Mr. Mathews, after complimenting Mr. Fardon on his previous observations on the subject of manures, which he characterises as judicious, and exhibiting a perfect acquaintance with chemistry and its application to agriculture, proceeds to say:—

"If salt were found only on the shores of South America, and imported here at the price of guano, I think it would be in more general use than it is at present. Its value no one attempts to question, but nevertheless its application is very limited. My experience of its effects is confined to light soils; and, upon such, I know of no article so greatly and so generally beneficial. Its copious use to every description of stock I regard as indispensable. For turnips, barley, clover, and wheat, it is equally beneficial, used either as a top-dressing, or worked into and incorporated with the soil. Nor is it of value only as regards an *increase* of produce, for I have always found the *quality* greatly improved where it has been used largely. The fold-yard should have an abundant supply: it should be applied at the least once in every week. Upon grass lands, whether upland pastures or watered meadows, I have found its use alike advantageous. I have generally applied it in the form of a compost with soils, but I do not consider this as necessary. Last spring I dressed a meadow of five acres with salt and soil, putting on about thirty cwt. per acre of salt; the effect was most convincing both in the hay crop and aftermath. The sheep and cattle I turned into it had access to an adjoining meadow, and their preference for that which had been salted was really ludicrous; they could not be induced to leave it when it was as bare as a common, while the other meadow had abundance of grass upon it. Make what use you please of these remarks, and in the continuation of your paper pray do the community the good service of urging the more general use of salt, especially in the Ryeland districts, and I am satisfied that every man whom you can prevail upon to adopt its use largely will ultimately thank you for the good you confer upon him."

The lecturer then continued—"These letters afford practical evidence of the value of salt, and I hope farmers on light lands will try it. I intend to do so, and will report to the club the result of any experiments I may make. Salt may probably act in various ways. It may operate in fixing ammonia, by converting the volatile carbonate of ammonia into a fixed muriate, being converted itself into carbonate of soda, a valuable constituent of manure. Salt may also benefit light, dry soils by its attraction for water, and it has the effect of rendering herbage more palatable for stock. Gypsum is another manure of known value, especially to the clover crop which contains it. A third class of manures act by improving the mechanical texture of the soil, and of

this lime is the principal. This may be applied either in a compost or directly to the land. To decompose animal or vegetable matter it should be used immediately after slacking. The heat of the kiln drives off carbonic acid from the limestone and leaves quick lime, which will unite with water, heat being evolved. If it is afterwards left exposed to the air it will absorb carbonic acid, or if mixed with substances in a state of decay giving off carbonic acid it will absorb it, and thus promote decomposition. In the form of a carbonate it will not do this. If applied directly to the soil for the purpose of improving its texture it may be used in the form of a carbonate, though in its newly slacked state the benefit of the chemical action would be secured. Soaper's ashes are valuable chiefly on account of the different salts of lime they contain and their mechanical action. This paper is intended to explain the leading principles which determine the value of different manures rather than to enter into detail. The object of manuring is to supply the soil with ingredients of which plants exhaust it, and to improve its mechanical texture. The value of a manure depends upon the extent to which it fulfils one or both of these ends."

The reading of the paper was followed by a long discussion, chiefly on the use of salt as a fixer of ammonia and as a manure. In reply to an inquiry made by Mr. Wright, Mr. Elliott stated that when common salt and carbonate of ammonia are brought together in solution a double decomposition takes place. Mr. Maund quoted Mr. Solly to the effect that such action would only take place in a concentrated solution, and that consequently salt would not be likely to fix ammonia in a manure heap. Mr. Elliott replied that the action took place in a strong solution, but it was out of the power of any chemist to ascertain whether it had taken place in a weak solution or not. Mr. Elliott considered that the chief merit of salt as a manure consisted in affording a supply of soda to plants rather than fixing ammonia. He considered that plants had the power of decomposing common salt and obtaining the soda, but this was merely a supposition which he intended to bring to the test of experiment. Surprise was expressed at the statement of Mr. Mathews, that he had used salt at the rate of thirty cwt. per acre. It was considered that such a quantity would generally prove highly injurious, and that five to six hundred weight per acre was the outside that should be used. A letter addressed to the editor of the *West Briton*, detailing experiments in the use of salt, was handed to the secretary and read. Ultimately Mr. Maund proposed that experiments should be tried by some members of the club in the use of salt as a top-dressing for wheat, and offered to prepare blank forms for the purpose of recording the results for the use of the club. Messrs. Iddens, Wright, Creswell, Becke, and Heynes, consented to join in the trials. It is proposed to try different quantities up to five or six hundred weight per acre.

Mr. H. F. Fardon was requested to continue

the subject at the next meeting, and Mr. Maund consented to read a paper on the turnip fly. It is expected that valuable information on the origin of this insect and the means of preventing its ravages will be brought forward by Mr. Maund and others.

### ON THE FERTILIZERS OF COMMERCE, AND THE BEST MODE OF DETECTING THEIR IMPURITIES.

TO THE FARMERS' CLUBS OF THE WEST OF  
ENGLAND.

GENTLEMEN,—To the farmer who reflects that all increase in his crops beyond the average which covers its cost of cultivation, &c., is clear profit to himself, any mode by which such increase is likely to be effected should be matter of serious consideration. Attention has lately been called to the very extraordinary returns from some of the manures of commerce; from the many which have been published I shall content myself with citing the following instances:—

From nitrate of soda, applied to wheat, the increase has frequently been great. Mr. Bubb, in the report of the Gloucester Farmers' Club for 1842, shews a profit of 19s. 5½d. per acre; for the last year he has informed us of still greater, and this upon a considerable scale. Mr. E. Solly, in the third volume of the Transactions of the Horticultural Society, second series, reports an increase of more than ten bushels per acre; and on certain trials, which I reported in the second

volume of the Royal Agricultural Society, I netted £2 17s. per acre.

In the Transactions of the Highland Society for July, 1843, in the report of some experiments (for which the Society awarded a premium of £20), made by Mr. Maclean, of Braidwood, on the increase of hay, by the use of some of these manures, we find, among others, these results:—

Manure applied.	Value of increase, after deducting cost of application.
Rape Dust . . . . .	£1 6 0
Guano . . . . .	£3 18 0
Saltpetre . . . . .	£4 15 0
Nitrate of Soda ..	£5 0 10

Mr. Hannam, also, from near Weatherby, in Yorkshire, in his elaborate series of experiments, for which the Highland Society awarded a premium of £50. (V. Highland Society Transactions, No. 4, New Series), gives, among a great variety of other interesting results, the following:—

#### ON TURNIPS.

Manure applied.	Quantity used per acre.	Increase per acre.		
		ton	cwt.	stone
Bones crushed .	16 bushel.	8	7	4
— burnt . . .	16 ditto.	9	16	4
Bones and } ...	12 ditto. }	10	7	6
Guano } ...	1 cwt. }			
Bones and } ..	12 bushel. }	10	14	5
Rape dust } ..	6 ditto. }			
Guano, drilled..	2½ cwt.	6	17	0
Guano, sown...	2½ cwt.	14	19	5

#### ON OTHER CROPS.

Manure applied.	POTATOES.		BARLEY.		HAY.	
	Quantity applied.	Increase per acre.	Quantity applied.	Increase per acre.	Quantity applied.	Increase per acre.
		Bushels.		Bushels.		st. lbs.
Guano . . . . .	5 cwt.	59.6	2 cwt.	15.54	2 cwt.	52 0
Nitrate of Soda..	1½ cwt.	76.9	1½ cwt.	14.22	1 cwt.	72 12
Nitrate of Potash			1 cwt.	11.16	1 cwt.	25 10

I have selected the above examples from amongst the most successful merely to show, when they do succeed, how great the profit may be to the farmer. But it by no means follows that there is not another side of the question; doubtless there is—failures perhaps are even more numerous. These manures are very often most uncertain and capricious in their effects—and I would strongly advise that no one should embark in them largely without first ascertaining by trial on a small scale the probability of their success, both as regards the crop and soil, to which he thinks of applying them afterwards.

Presuming, then, that this is ascertained in the affirmative, these manures would seem to be of the greatest importance to the farmer; especially in those districts like our Cotswold hills, where

farm-yard or town manure is seldom to be obtained in sufficient quantities. The introduction of a substance which could be purchased at any market town, as for instance guano, at £11 or £12 per ton, from two to four cwt. of which per acre would go as far as a fair dressing of common dung, would be no inconsiderable boon to the farmer. Now this is all very promising—but it is not all gold that glitters. There are other drawbacks against which due caution must be exercised. When we have ascertained one year that the manure in question is likely to succeed on a given crop, we are by no means sure the next year of getting the genuine article; thus a serious loss to the purchaser may be incurred, not only in the article itself, but still greater on the year's crop, which, under different treatment,

might have given very profitable returns. Let us see how the case stands in figures. Mr. Potter, in a little pamphlet entitled "A word or two on the use of Guano," tells us that it is sometimes found to contain forty or fifty per cent. of inert sand. I have heard of some said to contain 65 per cent. Dr. Madden states, in one of his lectures "On the advantages of extended Chemical Analysis to practical Agriculture," that samples of nitrate of soda have been analysed and found to contain as much as 26 per cent. of

common salt. I have seen a specimen which has also been analysed and contains more than 30 per cent. of foreign matter. Mr. J. B. Hawes, who, as a manufacturer of super phosphate of lime from bones, consumes two tons of bones a day, and is therefore a competent witness, states in the *Agricultural Gazette* that bone dust is sold containing about one-third of lime. Suppose a farmer about to manure 20 acres with these impure substances, what would be his loss?

Manure.	Price per ton.	Impurity per cent.	Quantity used per acre.	Loss to Buyer on 20 Acres.
Guano . . . . .	£11	50 Sand. . .	About 3 cwt.	£. s. d. 16 10 0
Nitrate of Soda ..	£19	25 Salt. . . .	1 cwt.	4 15 0
Nitrate of Potash..	£25	25 (27) Salt.	1 cwt.	6 5 0
Rape Cake . . . . .	£8	15 (27)	8 cwt.	6 8 0
	per Quarter			
Bones. . . . .	£1	33 of Lime.	20 bushels	16 10 0

Thus a farmer purchasing guano or bones for 20 acres of land would be a loser, first of £16 10s. on the article itself—and would only have half a crop on the land to which it was applied. Any one using 20 tons of Foreign rape cake for food for cattle, which is said to be sometimes mixed with sand, if it contained only 10 per cent., would be a loser of £16, to say nothing of the injury which his cattle might sustain. It is by no means intended that these instances of impurity are altogether the result of adulteration. Indeed, it is known that most of these manures in their natural state are found mixed with large and varying proportions of foreign matter, and, if adulterated, that it is done before it reaches the hands of the merchant in this country; still the loss to the consumer is the same, no matter how it happens. But even this is not the worst feature of the case; a few instances of disappointment will bring the genuine article into disrepute, from which it will not easily recover, and the advantages which might have arisen be lost to the country for years to come.

*The question then is, how to prevent it?*

The Scotch have formed a society for the purpose of employing a chemist at a salary of, I think, £600 a year, who is to analyze for its members, at the reduced charge of a few shillings for each analysis, substances interesting to farmers; amongst others especially these manures of commerce, so as to give at once their agricultural and commercial value. Thus a member of the association who is desirous of testing any of them has only to enclose a very small sample by post to the chemist with the amount of charge for having any particular question answered, from 3s. to 6s., or thereabouts, and in a few days he will receive an answer, which will probably save him from all the losses and disappointment before alluded to—and instead of paying for the articles some 25 or 50 per cent. beyond its real value on a large order, he would be sure of his money's

worth. Moreover the chance of an impure article being ever sent into the country where a chemist is appointed, would be greatly diminished by the knowledge that it was likely to be analysed on its arrival. I am not about to propose to you to enter on any scheme so great as that of the Association of Scotland; but in a much smaller way it has struck me that results equally useful to the practical agriculturist may be obtained. I have applied to my neighbour, Mr. Gyde, who, as an analytic chemist, from the variety of delicate and elaborate analyses in agricultural chemistry which to my knowledge he has performed, I believe to be as competent to the task as any one, at least in this neighbourhood, to know whether it would not be worth his while to offer his services to the Farmers' Clubs in this neighbourhood on such terms as would come within their means, and I am happy to say that he consents, upon being appointed chemist to any Farmers' Club, with an annual retaining fee of £5 5s. from each club, to analyze for its members on terms similar to those of the Scotch chemist. I am aware that the subscriptions to Farmers' Clubs are very small, but I think when the important objects above-named are considered there will be no difficulty in raising such a sum yearly by a subscription for the express purpose from the richer members, if necessary. For further particulars I refer you to the letter of Mr. Gyde; and if any Club think it worth while to encourage the scheme, I will thank their Secretary to signify the same to me, or to Mr. Gyde. I have the honor to remain,

Gentlemen,  
Your most obedient Servant,  
W. H. HYETT.

*Painswick House, March 26, 1844.*

TO THE FARMERS' CLUBS AND AGRICULTURAL SOCIETIES

*In Gloucestershire and the adjoining Counties.*  
It having been suggested to me by Mr. Hyett,

of Painswick, that it would be desirable to place within the reach of the farmers, upon reasonable terms, the means of obtaining the analysis of the various manures of commerce now coming into use, so as to estimate their commercial and agricultural value, I have determined to offer my services to the several Farmers' Clubs within my neighbourhood, upon the following terms, viz.: that upon being appointed Chemist to any Club, with an annual fee of £5 5s., I will analyze for their members, at the undermentioned reduced charges, viz:—

1. *Manures*.—Testing saline manures, such as guano, the nitrates of soda or potash, bone-dust, rape-dust, &c., for adulterations, for each sample 3s. Examining, with a view to its commercial and agricultural value, any of these manures, so as to detect the quantities of impurity, or estimating the amount of phosphates, or animal matter, contained in any sample of bones, or of organic or inorganic matter in any mixed manures, 6s.

2. *Soils*.—For estimating in a soil the amount of soluble saline matter, or of lime, clay, silex, phosphates, gypsum, organic matter (humus), &c., or the power of retention of water by a soil or subsoil, as indicating the necessity of draining, for the estimation of one ingredient, 5s., and 2s. 6d. for each additional one.

3. *Earths*.—Examining limestones, marls, &c., to ascertain the proportion of lime, and presence of magnesia, alumina, or silex, 5s.; ascertaining the proportions also of either of the latter, or any other ingredient, 2s. 6d. extra for each.

4. *Products of Vegetation*.—Examining the ashes of a plant, to determine the proportion of one ingredient, 5s.; the proportion of every other, 2s. 6d. additional for each; and for examining, to determine the quantity of water, starch, sugar, gluten, vegetable albumen, or woody fibre in turnips, potatoes, mangold wurtzel, wheat, &c., 5s. for the first, and 2s. 6d. for each additional ingredient; and for determining the quantity of oil or fat, and of other proximate principles, requiring expensive re-agents, in any agricultural crop, 5s. each.

5. *Dairy Produce*.—Estimating the amount of casein, fat, sugar, or salts, contained in milk or cheese, with a view to comparing the produce of two or more breeds of cows, or of different modes of feeding, for each ingredient 5s.

6. A lecture on any agricultural subject £3 to £5.

7. For chemical advice generally, on agricultural subjects, the charge must be regulated by circumstances.

8. Water or liquid manure examined, with respect to its fitness for irrigation.

I am, gentlemen, yours most obediently,

Painswick, March 26.

A GYDE.

## ANNIVERSARY DINNER OF THE LEOMINSTER FARMERS' CLUB.

The third annual meeting of this Society was held at the Royal Oak Inn, on Friday the 29th of March, on which occasion upwards of forty of the most intelligent and practical agriculturists of the neighbourhood and friends of the institution were present. The chairman for the past year, Mr. Bennett, of Stretford, presided, and Mr. J. Thomas, of Cholstrey, the late Vice-chairman, acted as Vice-president.

The usual loyal and complimentary toasts were then drunk.

The CHAIRMAN called upon the secretary to read the report.

Mr. MASON accordingly rose and read the following report:—

“Gentlemen,—It again (at the end of the third year) devolves upon your committee to give you an account of the last year's proceedings of the club, the present state of its funds, its future prospects, together with a few remarks upon the agricultural affairs of the neighbourhood. It is with regret that your committee have to notice the loss of your late able and talented secretary, Mr. Revis, whose researches in the cause of agriculture were extensive and valuable, and to whom this institution is deeply indebted for his gratuitous exertions in its behalf.

“It is with pleasure your committee have to announce that during the present year the following gentlemen have become life members of our club:—Sir John, V. B. Johnstone, Bart., Kedgwin Hoskins, Esq. M.P., Robert Lane, Esq., and Gilbert East, Esq.—The following gentlemen have also become annual subscribers:—Mr. Charles Andrews, Rev. Mr. Foxton, Mr. E. Goode, Mr. P. Davies, Mr. Morris, Mr. Probert, Mr. Taylor.

“The receipts for the present year will be sufficient to meet the expenditure, a balance-sheet of which will shortly be published with the report.

“The subjects discussed during the concluding year were,—the best and cheapest method of Draining; on the cultivation of Wheat, the best varieties and its diseases; on rearing and after-management of Apple Trees; on breeding and rearing Cart Colts; and on breeding, rearing, and general management of Hack Colts.

“Having been part of the year without a secretary, the discussions reported are not so numerous as formerly, but your committee nevertheless hope they will be found not altogether devoid of interest. It has been remarked, ‘that there is always something for the intelligent agriculturist to learn from his neighbour, and your committee think it will be allowed that no institutions are so well adapted for farmers to impart and to receive knowledge as farmer's clubs; the monthly meetings furnish them with the practical experience of neighbouring agriculturists, while through occasional lectures and by the use of the library, they have the means of acquiring the knowledge furnished by the various researches of scientific men.

"It is with great pleasure that your committee allude to the late lecture of Mr. Rudge, for which they, in common with the club, feel particularly obliged to him, convinced as they are of the importance to agriculture of being acquainted with the cause from which events spring, not only with regard to the diseases of wheat, but in every thing relating to the economy of the farm. Mr. Rudge has very kindly complied with the earnest desire of your committee to again favour them with a lecture on the diseases of Turnips some time in May next.

"Your committee wish to call the attention of the members to the library, which though at present but small, still contains several valuable works which we earnestly recommend to the perusal of every farmer—more particularly Morton on Soils; Johnstone's Elements of Agricultural Chemistry; Youatt on the Horse, Cattle, and Sheep; Liebig's Organic Chemistry; Sinclair on Grapes; the Journals of the Royal Agricultural Society, and the Farmer's Magazine. All which are works that will tend much to promote improvement in the agricultural knowledge of the kingdom, and consequently tend to promote the welfare of the nation at large.

"The want of uniformity in the weights as well as in the measures of the kingdom, is productive of much inconvenience to both buyer and seller; as an instance, we have only to notice that the weight of a bushel of wheat in four of our nearest markets, of Hereford, Leominster, Ludlow, and Worcester, are each different. As wheat is the most important grain sold by the farmer, the evil is so much the more felt, more particularly as it is always, or nearly so, sold by weight.

"Your committee would therefore earnestly recommend that the agriculturists of the neighbourhood do petition parliament to adopt such measures as will insure uniformity in the weights as well as in the measures of the kingdom, and that her Majesty's officers of excise be instructed to enforce such law.

"Your committee, ever anxious to promote the welfare of Leominster and its neighbourhood, and being aware of the loss sustained upon a recent occasion by the want of a fire-engine properly mounted to travel, have appointed a committee to obtain the funds necessary to purchase one, fixed upon a carriage fit for fast travelling; and they confidently hope in the course of a short time to be able to complete the purchase, through the assistance of the gentlemen of this town and neighbourhood, and take this opportunity to express their gratitude to those who have already generously promised their assistance. A yearly tenant has not sufficient security, should he lay out capital in improving his farm, that he shall reap the fruits of his labour. Perhaps it may be objected that the landlords of this district are gentlemen of honour, who would not upon any account take an advantage of a tenant who had improved his estate. We believe them to be such; but still life is uncertain, and numerous other causes prevent the occupier from feeling that se-

curity necessary before he will lay out much in improvements, of which he is doubtful who may be benefited by them.

"Your committee, with fear and the utmost anxiety, now beg to draw your attention to a subject which for a considerable period has engrossed their attention—namely, the depressed state of agriculture and its causes; a depression by which not the tenant farmer alone is affected, but the landlord and labourer also, convinced, as we are, that their interests are so inseparably connected together, that their prosperity will and must be mutual.

"Your committee consider the cause of this distress in a great measure to arise from the almost universal custom now prevailing of letting farms from year to year, and the want of a perfect drainage. Professor Johnson says, 'In truth, if we calmly reflect on the risks which the yearly tenant runs, we cannot fail to be satisfied that they are really serious drawbacks against the permanent outlay of his capital upon the soil.' He may unintentionally offend his landlord, or his landlord's agent, and be summarily dismissed; or his landlord may die, and a new system under the heir may unsettle his position; or, while his improvements are in progress, a new survey may take place, and his rent may be unexpectedly augmented; or his experiments may be unusually slow in repaying themselves, and he may himself die before he has recovered his capital from the land for the use of his family.

"Your committee are of opinion, that the present forms of leases in this neighbourhood are ill calculated to promote improvement, and contain many useless restrictive clauses. Leases for this district, to be of the real value of which they are capable, should be for at least twenty years: the rent to be guided by the average price of corn for the three preceding years; the average to be taken from the government returns, or in some cases one half of it may be regulated by the average price of meat, which could be taken from the average price in Smithfield market of the preceding year. The principal objection to a meat as well as a corn rent is, that the average price of meat is not so easily ascertained. The benefits resulting from perfect drainage are so universally allowed, that many remarks upon it would be superfluous. It is in vain for the occupier to attempt in a great measure the improved systems of agriculture with a wet, undrained soil. The manures he applies are in a great measure lost from the very wet state of the land during part of the year; and the extreme hardness of the soil during the hot, dry months of summer, renders it difficult to cultivate, and not so well adapted to produce a crop. It is found from experience that a pair of horses worked double will cultivate as much land that is thoroughly drained, as three in a line could do before, besides being able to work it much sooner after rain; thus saving one-third of the expense of keep, with a great improvement on the crops obtained. The land in the course of two years, when perfectly drained, becomes much more friable and mellow, ploughs much easier, does

not become so hard in the summer, and consequently produces better crops at a less expense; all which advantages, and numerous others, result from perfect drainage. It is with pain that your committee observe so much of the draining that is done to be executed so very imperfectly: a general error is in the drains being at too great a distance from each other, and imperfectly laid out. They also think a great advantage would arise, and in many instances a saving also, if scientific men were employed to lay out and inspect the draining.

"Hedge-row timber upon many farms very much injures the occupier, many of the fences being filled with timber of a very trifling value at present, and never likely to be otherwise. A person unacquainted with the details of farming operations would have no idea of the loss occasioned thereby, it not being merely the loss of produce, but also the additional expense incurred in keeping the fences in repair. A greater quantity of timber may be grown than is at present, without injuring the tenant, by making plantations to shelter exposed pasture land, open sheds, and home-steads.

"In conclusion, your committee wish to express their firm belief, that nothing will tend so much to promote the improvement of trade in general as long leases, subject to a corn or to a corn and meat rent, with perfect drainage. The establishment of agricultural schools and farmers' clubs, in different parts of the kingdom, will undoubtedly tend also to the advancement of the same desirable object; and your committee earnestly hope that in the ensuing year the members will attend with more regularity than in the past; by doing so, they will much promote the usefulness of this institution."

Mr. WATLING, after the report had been read, proposed the health of the worthy chairman, Mr. Bennett. (*Great applause.*)

Mr. BENNETT said, that he felt a want of words to express how deeply he appreciated the kind manner in which they had honoured him. During the three years in which he had been president, he had received much assistance in his duties from his worthy friend, the vice-chairman, and the other office bearers; and the manner in which the members had carried on the discussions reflected great credit upon themselves; and if the club did not continue to flourish, it would have no one to blame but the members, as the landlords had been most prompt in affording them pecuniary assistance. Farmers' clubs, since the formation of this society, had extended to almost every town in the kingdom, and in some instances villages also, which he considered as a most convincing proof of their usefulness. He must say, that if the farmers of the neighbourhood would only give that support it was their interest to do, they would be doubly repaid by the increase of produce that would be obtained from a more extended knowledge of the best methods of preparing the soil, and the nature of the plants cultivated. To render farmers' clubs as efficient as they were really capable of being, the president

should be a good practical farmer; the gentleman he was about to propose as president for the ensuing year was well known to them all as a practical farmer of high reputation; he alluded to his friend Mr. Hodges, of Wharton, and would propose his health as president elect.

Mr. HODGES felt much surprised at his being proposed as president, but would to the best of his abilities fill the office, though he laboured under the disadvantage of succeeding so scientific and practical a farmer as Mr. Bennett.

Mr. NEWMAN proposed "the Leominster Agricultural Society." (*Great cheering.*)

Mr. CONNOR responded, and thanked them for the kind and handsome manner in which they had honoured the society over which he had had the pleasure to preside.

Mr. GOODE then, in a very complimentary speech, proposed the health of the secretary, Mr. R. Mason. (*Applause.*)

Mr. MASON said that, after the very flattering manner in which they had honoured him, it was with extreme diffidence he rose to return thanks. He could assure them that, if his humble services were of the least assistance to the advancement of agriculture, he should ever be happy to render them. He felt convinced that farmers' clubs, if well supported, were eminently calculated to improve agricultural science, and hoped that in the ensuing year the members would be more punctual in their attendance. He had no doubt but that at the meetings of the club the most experienced agriculturist would not only have great pleasure in imparting his mite towards the improvement of agriculture, but would also in return acquire information of which he was before unacquainted, or perhaps he would be reminded of that which he might have forgotten. A man to be a perfect farmer should be well versed in most of the sciences. Geology, chemistry, and some knowledge of botany and veterinary medicine, were much required by the agriculturist; so that a man, even after spending years of his life in the pursuit of the knowledge necessary for the farmer, would still have many things to learn.

Many other toasts and sentiments were given, and the company separated, after spending an evening characterised by the most unanimous and neighbourly feeling.

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#### FOURTH MONTHLY MEETING OF THE STEWPONEY FARMERS' CLUB.

The monthly meeting of this club, held on Monday, April the 1st., was numerously attended, a very large and respectable company being present. Mr. John Robins in the chair. Among those present were J. H. H. Foley, Esq., Prestwood, Mr. Matthews, Park Hall, Mr. John Maughan, Dudley, Mr. Stokes, of Shipley, the Rev. G. Wharton, Kinver, Mr. Parrish, Envile, Mr. Birch, Churchill, Mr. Perry, of Lloyd House, Mr. J. Banton, Mr. D. Banton, Mr. Windle, Mr. Corbett, Preston, Mr. Beddard, Mr. Samuel

Berry, Mr. Shutt, Mr. Collis, solicitor, Stourbridge, Mr. Knowles, Mr. B. Southall, Mr. G. Hill, Mr. Nock, Kinver, Mr. Brindley, Mr. T. Bate, Compton, Mr. John Oakley, Mr. Stokes, Mr. Thompson, of Prestwood, Mr. W. Griffiths, of Whittingdon, and Mr. G. Burgess, of Check-hill. An able and interesting paper, on the cultivation of turnips, was introduced by Mr. John Wilson of Aston.

Subjects to be considered:—The time of sowing; the manner; whether ridged, drilled, or broadcast; the quantity and quality of manures applied; the mode of treating the young plants, whether by scuffling, hoeing, and setting out; the proper distance apart; the number of hoeings; the time for cleaning the fallows, whether in autumn or spring; the probable difference of expense of each method of treatment, and the average weight of the crop to be grown per acre.

MR. WILSON then read the following explanatory paper, which, with the exception of the introductory observations, omitted for want of space, we give entire, as it will be found interesting to our agricultural reader:—

*Time of sowing.*—I find the first thing I am required to notice is the time of sowing. This depends on so great a variety of circumstances that it may be difficult to fix any particular period as the best. Some land is so much better adapted for the growth of the turnip plant than other land equally and advantageously situate as to climate; the particular qualities or component parts of which I need not here point out, as they are well known, and duly appreciated by farmers in this district. The various manures now used for turnips are almost as different in their operation and effects as they are numerous, some powerfully acting on the vegetative properties of the seed, accelerating the growth of the young plant, and forcing it rapidly through its early stages; amongst which manures I would class guano, night soil and ashes, kiln dust, burnt soil peat ashes, well fermented stable manure and such like; others, such as unfermented fold-yard manure, bones, lime, and salt; the two latter of which I believe to be useless for turnips, except on land recently broken up from pasture, or otherwise containing a considerable portion of vegetable matter, in which case they are both valuable manures: but none of these have the like effect on the young plant as those first enumerated. Therefore, the time of sowing should, in some degree, be regulated according to the peculiarities of the soil, the different manures applied, and the favourable state of the land and the weather, for it frequently happens, in the summer months, that we have heavy and tempestuous rains, rendering the land unfit to receive the seed, in which case I would always avoid sowing or drilling until the soil has become sufficiently dry to work kindly, as it will invariably be found that turnips sown when the land is too wet will not be ready for the hoe so soon as those sown many days later, with the

land in a proper state, and they rarely ever become so good a crop.

There are many other circumstances which should regulate the farmer in sowing his turnips.

In this district, composed principally of arable land, and in which so large a breadth of turnips is grown, it is very desirable that we should have a supply of them during as great a portion of the year as possible, consequently we must have them early in the autumn, and late in the spring. It is therefore necessary that some should be sown early; and, as regards late ones, there is no fear but a sufficient quantity will always be sown, without even a hint from me. I should, however, as a general rule (as far as a rule is applicable) in this district, sow swedes between the 20th of May and the 15th of June, and would not recommend sowing them later. Although it was stated at our last meeting by Mr. Banton, that his best swedes were sown on the 23rd and 24th of June, and that they did not come up until a fortnight afterwards, yet it does not follow, nor does this at all prove, that late sowing is the best, for it should be borne in mind that there were heavy rains up to nearly the time of sowing these, consequently those sown earlier had the disadvantage I have before alluded to, which, in some degree, accounts for the late sown ones being the best. Early sowing, particularly for swedes, possesses many advantages, and is generally the best and most certain to produce a good crop, and the only disadvantage or drawback is that of mildew, to which some land is very subject, consequently, on such land it may not be advisable to sow so early as on land where the plant would be less liable to this disease. As regards common turnips, I have before stated it to be desirable to have them sown early in the autumn; and my usual practice has been to sow some for early feed during the first week of June, which frequently are as heavy a crop as those sown later, but certainly adapted for early feed only. I think, however, that the best time to sow the common sorts, for general purposes, (subject to the foregoing remarks), is between the 10th of June and the 10th of July, by which time all turnips should be sown, unless after vetches, or other bush crops.

*The manner of sowing.*—In respect to the manner of sowing, I am decidedly of opinion that the ridge system for swedes is the best, from the facility it affords of properly depositing a sufficiency of manure (particularly if it be farm-yard manure) in such a situation as to afford the requisite nourishment to the plant in all its stages, and also the advantage it gives of using repeatedly the horse hoe, an implement duly appreciated by those (and those only) who ridge their turnips. I also think that where farm-yard manure is used for common turnips, that they should be on the ridge, and more particularly when sown moderately early, or intended for drawing off, as I am not aware of any other method whereby this description of manure can be so effectually covered and properly applied, not only for the benefit of the plant, but for the land also. But I

would not be understood as recommending the ridge system at all times, on all lands, and on all occasions; for I think that quite as heavy crops of common turnips are grown on the flat as on the ridge, particularly where drilled with bones, or other short manures, a plan I have adopted for many years—some seasons using scarcely any fold-yard manure for turnips, except in cases where it was my intention to draw them off; and from the introduction of guano additional facility is given for obtaining these descriptions of manures, so suitable for the turnip crop, which will enable the farmer to husband his farm-yard manure for other purposes or uses on his farm. But with the manner of planting, as with the time, the weather should be in some degree the farmer's guide; it therefore becomes necessary that he should vary his system as the variation in the weather may dictate. It sometimes happens that it is so dry and hot when we are ridging our light land for turnips that there is not sufficient moisture in the ridge to vegetate the seed; in that case it becomes necessary to change the system of planting, where practicable, and to drill on the flat, whereby the vegetation of the seed is secured, which might, if drilled on the ridge, remain dormant there until the season is too far advanced to obtain a crop. Hence the industry, diligence, and hourly personal attention of the farmer requisite in the turnip seedness, which, of all seasons in the year, is the most important on a turnip farm (harvest not excepted).

I am of opinion that, whatever system of sowing is adopted, it is very desirable to place the manure in such a manner that the plant may early benefit by it; and this is best accomplished by placing it underneath the seed, for it is found that guano, soot, and salt, effectually destroy the vegetation thereof when brought in immediate contact with it, if used to any considerable extent; and the effect would be nearly the same if the seed was deposited under either of these manures. On the ridge, the seed is easily deposited, as I have described; so also it is with the manure and seed drill, if used with due care. On the flat, when the manure is ploughed in, my plan is to sow the seed broadcast (and in very hot and dry weather) immediately after the plough, and before harrowing, by which means the greater portion falls between the furrows, and thereby has the benefit of the manure, whatever the description of that manure may be.

*The Sorts.*—I will here, with your permission, deviate a little from the rule laid down for my guidance, by noticing the *sorts* of turnips I have found to answer best, and the necessity of obtaining new and genuine *seed*, both of which I consider worthy of notice, although not mentioned as a subject for discussion.

I believe the best sorts of swedes (at present generally known) to be "Skirving's improved," and the great top Swede; and I draw my conclusion from having, when I have used the double ridge drill, applied to one box one or other of these sorts, and to the other box seed of another variety—thus placing them in juxtaposition,

whereby I have fully satisfied myself as to the superiority of these sorts over any other I have tried. As regards the common kinds of turnip, I prefer the Green Globe, the Norfolk White, or the Pomeranian, which latter, I believe, to be hardier than either of the former; but originally, no other than the Norfolk White suffered occasionally to go to seed without transplanting, whereby it has, in some degree, degenerated, and become more full in the top, and thereby obtained a new name.

The turnip known here as the Tankard Swede is a very useful one for drawing off, and will stand dry weather and also shade better than any other—consequently, it is the best turnip to plant under trees, or on headlands, in Swede fields, where a full crop of Swedes can seldom be obtained. I do not particularly recommend any of the Hybrids or other turnips, as I believe few of them to be adapted for light soils generally. I have tried many sorts, but they have gone out of fashion, which would not have been the case had I found any better than those I have enumerated.

*Seed.*—I would recommend every farmer to grow his own turnip seed, or otherwise to obtain it from those on whom he can depend, for unless the seed is good and genuine, disappointment, and often great loss, ensue; and unless the land be cool and moist, I would sow no seed but of the last year's growth, as new seed not only vegetates much quicker and more vigorously than the old, but grows much faster in the early stages, consequently, is not so liable to be taken or injured by the fly, and other enemies to which the young plant is liable.

*Manures.*—The next portion of the subject is manures. These I have before stated to be very numerous, but as it is my intention to confine myself to the results of my own experience and observation, I shall name those only which I consider to be of standard value, or of real and practical utility, leaving theorists the gratification of introducing their own discoveries and speculation, as to them may seem fit—believing, as I do, that it is not every article introduced under the title of this or that highly valuable manure which will suit the purpose of the agriculturist, however much they may be recommended by chemical, philosophical, and scientific men. But I will forbear enlarging on this topic, lest I may be ranked with those who are considered prejudiced against the introduction of new discoveries; such, however, I will not admit to be my case, for I believe that much good will arise from the application of science to agriculture; but having tried many experiments with manures (or articles so called) on a scale sufficient to prove their efficacy, and having been a pretty general observer of the experiments of others, I am justified in making the remarks I have, and shall prefer recommending those manures only which I know to be good, or at least, deserving the name.

I believe all practical farmers will admit that properly fermented and well reduced farm manure, and by this, I do not mean heaps of straw or haum thrown from the thrashing floor and

suffered to remain in such heaps until it becomes decayed or rotten, I say I do not call this properly reduced manure, but such manure as is, or may be made on farm yards where a sufficient number of cattle are kept, and more particularly, when kept on the most nutritious kind of food, and a little daily care and trouble bestowed in leveling and duly mixing it. This farm-yard manure, I repeat, all practical farmers will admit to be good for turnips, in fact, one of the best, particularly where it is the intention to draw the crop from the land, as in this case a more permanent and strong manure is more requisite than when turnips are consumed thereon. The quantity, of course, to be regulated by circumstances, as whether the land is good or indifferent, in high or low condition previous to its application; for land, like horses, requires to be kept in good condition, and then, like them, its capabilities are great; also, whether it is intended to sow Swedes or common turnips—Swedes requiring more manure, even on the best land, than the various varieties of the common turnip; then again, the quality of the manure must be considered, for although it may all be taken from the same yard, it will not, without greater care than usually is bestowed upon it, be of the same quality, or alike; therefore no rule can be laid down as to a proper quantity to be applied indiscriminately and upon all lands. It will, however, be found that from twelve to eighteen tons per acre will be sufficient according to the circumstances before stated.

I will now notice what, in the absence of a sufficiency of farm-yard and other manures produced on the premises, or, in the event of those manures being required for other purposes than the growth of turnips, what I conceive to be the best, most permanent, and, consequently, the cheapest manure for land laying at any considerable distance from populous districts—I mean bones.

I have used bones to a considerable extent, upwards of twenty years, without even a failure, and have never yet had occasion to regret laying out the money I have in bone manure. The requisite quantity per acre, without the addition of other manures, will be from three to five quarters; but as I have before stated that bones have not that immediate action on the young plant which is desirable, I have usually mixed them with ashes and applied them so mixed with a manure and seed drill (which plan I believe to be the best), and in this case I reduce the quantity of bones according to the quantity and quality of the ashes. The price of bones varies very frequently, according to the demand for them by the porcelain and other manufactures, by which it is regulated, more than by the demand for agricultural purposes, and it is at least 20 per cent higher at this time than it was twenty-five years ago—although vast quantities are imported principally of the description used as manure; it is now about 18s. to 20s. per quarter.

I have before stated that I should take occasion to speak more fully on the subject of tenures or holdings in this district and neigh-

bourhood, but as this is a subject selected for another member of the club, better qualified than myself to elucidate it, and who I hope to have the honour and satisfaction of listening to in December next, I will not intrude on the ground marked out for him further than is necessary for the illustration of the general application of bone and other permanent manures.

I believe that the present tenures of occupation, or the condition on which farms are held for a considerable distance around this place, exclude the general introduction of bones, and effectually check the progress of improvements which, under more favourable circumstances, would take place; of course I am speaking of tenures as they are generally, and not in allusion to any particularly or individually, for I am aware that there are improvements going on in this neighbourhood, on some estates, at almost a railroad pace; but that is the exception rather than the rule, and I cannot refrain from expressing my regret that a better system, or, if I may be allowed the term, a more equitable one, of letting land does not generally exist, and I do hope (and not for my own sake, for with my tenure I am perfectly satisfied, otherwise I should not have used bone manure to the extent I have)—I say I do hope that some legislative enactment may speedily take place, or private arrangements become more general, whereby a tenant, being compelled to quit a farm, may obtain compensation for permanent improvements made thereon by him; and then proprietors and landlords generally may expect to see, and will see, their estates manured with bone and other permanent manures, which will greatly increase the produce and improve the land; but without some such enactment or arrangement where tenants be found reckless and imprudent, enough to invest their fortune in the improvement of another person's property, when, at the expiration of six months' notice to quit, they may be compelled to bid adieu to their farms, together with the capital expended upon them; the law and custom, as it now stands, not allowing a tenant to claim any compensation for improvements, but compelling him to make good any dilapidations or waste he has committed? If this be justice, it must be admitted to be of a very partial kind.

In many districts of England an outgoing tenant, having used bone manure, claims and obtains compensation for that portion of it which it is considered he has not had the benefit of, or that portion which his successor may be considered to benefit by, even if it has been applied several years before quitting. This, of itself, I consider to be sufficient evidence of the permanency of bones as manure, and of the estimation in which they are held in some districts; but I am not aware of any such custom of compensation existing here; and in the event of a tenant using bones, at the expense of four or five pounds per acre, at the turnip seedness preceding quitting (of which it must be evident to every one he can have but little benefit), I should be glad to be informed how, and from whom, he could legally

claim and obtain compensation for his outlay, to which, I think, all will admit he is entitled. I would here suggest, as this club consists of landlords, professional gentleman, and tenant farmers, that a little time may be usefully spent in discussing this point, as it may be the means of elucidating, if not settling, a question of importance to both landlords and tenants.

Under the circumstances I have mentioned, it is manifest that it may be imprudent to use bones; and thus it is that I account for the small proportion of bone manure used in this district, where a great portion of the soil is of the exact description for which it is best adapted; and I believe I am correct when I state that there is no other manure so well qualified to permanently improve light land; at all events, if there be any such, I am unacquainted with it.

I will next notice what I believe will prove to be a great acquisition to the English agriculturist, as a manure or stimulant, that is guano. Of this I cannot speak so positively as of bones, not having used it for more than two years; but, from the experience I have had, I feel very sanguine as to its success, and particularly so when applied for turnips. I, last year, used it on about 22 acres in three fields, on the greater portion of which it was put on at the rate of  $2\frac{1}{2}$  cwt., or at an expense of 30s. per acre; with one waggon load of town-ashes, costing me, with carriage, about 20s. more; at this rate I used it for Swedes and common turnips, spreading the bulk of the ashes, and sowing the guano mixed with the remainder, on the surface, and immediately ridging the land and drilling the seed. In each field, I left a strip of about eight ridges without the guano, using the ashes only. On the whole of the land where the guano was applied I had as good a crop, both Swedes and common turnips, as I desire to grow; but on each strip without guano they were very indifferent, shewing—and that very clearly—a difference in value of at least 2l. per acre in favour of guano. Therefore, if it be useful only for one crop, it amply repaid me for its application. And it has, in every instance which I used it, answered my expectation; therefore I rank it amongst our best manures for turnips. I have tried it for grain, but not with the like success. There are several other useful manures for turnips, such as night-soil and ashes, burnt soil, composts of various descriptions, rotten or fermented scutch, and such like; but as most of these should be used merely as auxiliaries, unless in districts where easily obtainable, I do not think it necessary to otherwise recommend them.

*The mode of Hoeing, &c.*—I am next required to state the mode of treating the young plants—this, as well as the remaining portion of the subject, I shall do more briefly, not because they are the least important, but because I find I have occupied more time already than I intended.

If turnips are sown on the ridge, the horse hoe, or scuffle, should be introduced as early as possible after the plants are up, or as soon as they put forth the rough leaf, and the hand hoe should

follow as quick as practicable, which will be found to be about three or four days afterwards, according to circumstances. If Swedes, or early-sown common turnips, I would prefer a nine-inch hoe, carefully used, with a girl or a boy to follow each hoe as a picker or singler, whereby one plant, and one only, may be left in every ten inches on the ridge or drill; but if late in the season, I would use a shorter hoe for common turnips. I think it more frequently happens that the crop is injured by being left too thick than by being taken out too thin, particularly Swedes. The width of the ridge usually recommended is 27 inches, this I think is too wide; and the only reason why that width is recommended, appears to be merely because the wheels of the manure-cart at that width do not injure or displace the ridges—a matter of little consequence; and I am firmly of opinion that a heavier crop will be grown when ridged at twenty-four inches than any greater distance; and at a less width the manure is rarely, if ever, properly covered, unless it be very short, in which 22 inches or even less may be sufficient.

*The number of Hoings.*—The number of hoings by hand depends on the manner in which they are performed, and on the clean or unclean state of the land; it will, however, be necessary to hoe Swedes twice, and sometimes oftener, together with a frequent use of the horse-hoe: but common turnips on the ridge may do well with one hoeing by hand, if very carefully and skilfully performed, particularly should the weather be favourable; but when drilled on the flat, or sown broadcast, a second hoeing will usually be found requisite.

I will now notice the time of cleaning the fallows, whether in autumn or spring:—

On this subject my opinion has materially altered, or, I may say, changed within the last ten years; for I must confess that ten years ago much prejudice did exist in my mind against autumnal working turnip fallows, or rather that system of working them which I now believe to be the best. I then thought that using a scuffle on stubble ground immediately after harvest, was the act of an inexperienced or unskilful farmer, supposing the effect would be that of dividing and subdividing the squitch in such a manner as to render it impossible to exterminate it. This, I candidly admit, was my opinion, and I now own it to be an erroneous one; for I find that by adopting the precise system I then condemned, I am able, with the same strength of horses, to sow my turnips a fortnight earlier than before, and that on fallows quite as clean and free from squitch, and much freer from other weeds, than on my old system of working my fallows; and moreover, the land when worked in the autumn, is cooler, and in a much better state to receive and vegetate the seed than when repeatedly ploughed and worked in the spring and summer. I do, therefore, consider the system of autumnal working turnip fallows a great improvement, and particularly on light land.

*The difference in Expense.*—As regards the expense, I think there is very little difference; for,

although the labour in autumnal working may be as great, the expense may be less; for, if performed with proper implements (the principle one of which must be a good scuffle), and the work be commenced as soon as the crops are off the land, I then think the expense will be less than the old system of ploughing, inasmuch as the labour is performed at a time when it is not so valuable as in the spring and summer months; but, should it prove equally expensive, the advantage it gives of early sowing is more than an equivalent for this, or even a greater expense.

*The weight of Crop.*—I now come to the last part of our subject, namely, the weight of the crop to be grown per acre. This I believe to be not so great as is generally supposed. We frequently hear of extraordinarily heavy crops—for instance, thirty, thirty-five, and even forty tons per acre. These, I believe, are rarely, if ever, grown here; and I think it would be much more satisfactory if persons reporting these weights would also state the contents of the acre on which they are grown; for I am satisfied that the imperial or statute acre does not produce them.

I am aware they are principally reported as having been grown in Scotland, where the acre is about one-fifth larger than here; but, with this allowance, their land, or their management, must be very superior to ours; and I am more inclined to attribute it to the former than to the latter cause, as I have seen Scotch management in England, but never attended with this extraordinary success.

A few years ago, two of my neighbours, both occupying good turnip land, undertook for a wager to grow Swedes—the one growing the greatest weight per acre to be the winner. No restrictions as to management or manure were imposed, each being permitted to use what quantity, quality, and description he chose. The season was favourable, great pains were bestowed, and each had an excellent crop, which, on being very carefully weighed, proved to be under thirty tons per acre—being nearly of equal weight. These Swedes, I believe to be some of the best I ever saw.

At our last meeting, we heard from Mr. Banton (who, undoubtedly, is one of our best turnip growers), that his heaviest crop was under eighteen tons per acre; and, on looking through his summary, I find his whole crop to average less than thirteen tons per acre, and he stated it to be a satisfactory one, and I can testify, from having personally inspected them that they are a full average crop for this season.

The conclusion I come to is, that twenty tons of Swedes per imperial acre is an excellent crop, and considerably above an average one.

Gentlemen, if, in my foregoing remarks, I have omitted any matter or thing requiring to be noticed by me, or, if on any point I have not explicitly or sufficiently explained my meaning, I shall now be happy to endeavour to remedy the defect, or to answer any enquiries you may be pleased to make.

An animated discussion then took place on the

use of bone manures in light soils, and it appeared to be the general opinion of the members that it was one of the best *permanent* manures that could be used, and great regret was expressed that tenants were not afforded greater encouragement to make use of it, by being allowed, when leaving their farms, just compensation for their outlay.

J. H. H. FOLEY, Esq., then proposed, that the thanks of the meeting should be given to Mr. Wilson, for his valuable and practical observations on the cultivation of turnips. This was seconded by Mr. WINDLE, and carried unanimously.

The REV. G. WHARTON rose to propose, and Mr. J. MATTHEWS seconded, the following resolution:—"That the members fully coincide with Mr. Wilson in his opinion, that the best time for beginning to clean turnip ground was the autumn, and that the best plan was by scuffling it; that Swedes ought to be sown between the 20th of May and the 10th of June, upon ridges twenty-four inches apart—the quantity of seed per acre not being less than two pounds; that for early use, common turnips might be sown the first week in June, but that the best time for sowing the general crop was between the 10th of June and the 10th of July, after which time none ought to be sown; that as soon as the Swedes begin to put forth the rough leaf, the horse-hoe should be freely used, and that the plants should be immediately set out by a *nine*-inch hoe, the hoer being followed by a person to single them, and that, in all cases, Swedes ought to be hoed at least twice; that common turnips, unless early sown, ought to be set out at a less distance; that, with regard to the question, whether sowing on the ridge or on the flat was preferable, much depended on the state of the weather, as, on light soils in dry seasons, there was frequently not sufficient moisture in the land, when ridged to cause the seed to germinate."

Mr. J. MATTHEWS stated that he had at present, in daily use upon his farm, a double plough, for ploughing turnip lands for barley, capable of ploughing daily, with a pair of horses, three acres of land, not less than six inches deep. The plough, he stated, was made by Barrett, Exhall, and Andrews, of Reading; and that he should be glad if any of the members would call upon him to see it at work, as he considered it a great acquisition on light soils.

These meetings are daily increasing in importance. Our neighbours of Bromsgrove, upon nearly the same arrangements, are progressing, and thus have the soils of England been taught to speak, as it were. One district freely communicates with another as to the nature of its difficulties, its local advantages; with experimental hints upon overcoming the one, and improving the other.

Upon the next occasion, J. H. H. Foley, Esq., the indefatigable and energetic supporter, and founder of the club, will introduce a paper on the management of grass lands, and the best rotation of green crops.

A BILL INTITULED AN ACT TO AMEND  
THE LAW RELATING TO LANDLORD AND  
TENANT.

Whereas it is expedient that provision should in certain cases be made for securing compensation to tenants who shall make permanent improvements on the lands they occupy: be it therefore enacted by the Queen's most excellent majesty, by and with the advice and consent of the lords spiritual and temporal, and commons, in this present parliament assembled, and by the authority of the same, that from and after the first day of January, one thousand eight hundred and forty-five, it shall be lawful for any tenant of any farm or lands, holding the same from his landlord with or without any lease or agreement in writing respecting the same who shall intend to make any permanent improvements thereon, to give notice in writing to his landlord, or to the agent of such landlord, of his intention, with a specification in detail of the nature of such intended improvements.

II. And be it enacted, that in case such landlord, or his agent, shall not, within the space of three months then next following, signify in writing, to be given to the said tenant or left for him on the premises occupied by him as aforesaid, his dissent thereto, it shall, for the purposes herein mentioned, be considered that the landlord assents to such proposed improvement.

III. And be it enacted, that in case such improvement shall have been made, and such tenant shall be compelled by notice from his landlord to quit the said premises, or at the expiration of the term of his lease shall cease to occupy the said premises, before he shall have been remunerated for the expenses of such improvement, the said tenant, or his executors or administrators, shall be entitled to claim compensation of his landlord for the amount of loss incurred by quitting the said premises so improved; and in case of disagreement as to the value of such improvement, or the amount of compensation to be made to the said tenant, his executors or administrators, the same shall be settled and determined by two arbitrators, one to be appointed by the said landlord, and the other by the said tenant; and in case the said landlord, or his agents, shall not appoint an arbitrator within the space of six weeks after the notice of the appointment of the arbitrator on the part of the said tenant, it shall and may be lawful for any two justices at a petty sessions held for the division of the county in which the said premises or the greater part of them may be situate, and they are hereby required, on the application of the said tenant, to appoint an arbitrator on the part of the said landlord; and if the said arbitrators cannot agree, then the value of such improvement or amount of compensation shall be determined by an umpire to be appointed by such arbitrators; and the award or umpirage so made as aforesaid shall be made in writing, and shall be binding and conclusive on all parties, and the performance thereof may be enforced by action in any of her Majesty's superior courts of record.

IV. And be it enacted, that all the powers and provisions contained in a certain act made and passed in the third and fourth years of the reign of her present Majesty Queen Victoria, intituled *an act to enable the owners of settled estates to defray the expense of draining the same by way of mortgage*, shall extend and apply to this act, and the charging of any estate for the payment of the compensation for the improvements under the provisions of this act.

V. And be it enacted, that the word "landlord" shall extend as well to any person or persons, body politic, corporate, or collegiate, or other body of persons entitled to receive any rent out of any farm or lands, as to persons usually or legally designated by such word; and that the word "tenant" shall extend as well to any person or persons, body politic, corporate, or collegiate, or other body of persons who shall be bound to pay any rents out of any farms or lands, as to persons usually or legally designated by such word; and the word "agent" shall be understood to mean any person with whom the tenant is authorized by his landlord to settle the account of his rent.

THE ANTI-CORN-LAW LEAGUE AND  
THEIR DEMAND OF A TOTAL,  
IMMEDIATE, AND UNCONDITIONAL  
REPEAL OF THE CORN-LAWS.

LETTER II.

EMBRACING A PROPOSAL FOR GRADUALLY ESTABLISHING A MODIFIED FREE TRADE UPON PRINCIPLES OF RECIPROCITY, WITHOUT INJURY OR DANGER TO ANY EXISTING INTEREST.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—Although I repudiate most indignantly and unequivocally the demand of "an *immediate and unconditional* repeal of the Corn Laws," or of any other existing law enacted for the protection of British industry, I am not insensible of the benefits which would result to this country, in relation to her foreign trade, from a *perfectly reciprocal* interchange with other countries, unshackled by protective duties. But such a system must be introduced *gradually, and be preceded by certain arrangements* (which I shall presently explain), and must be so qualified as still to defend, by means of protective duties, our native industry from free competition with foreign labour—that is, as against those foreign products which do not, by mutual exchange, call into reciprocal action the industry of our own country.

The plan upon which I think a free trade of reciprocity may be safely, conveniently, and advantageously opened, is as follows:—In every case of exportation of British produce or manufactures the party exporting should be at liberty to import or clear out of bond free of duty (at least free of all duty, excepting, perhaps, a moderate *ad valorem* duty for revenue only) an equivalent amount of foreign merchandise of *any* description, the existing duties being still chargeable in all other cases. It is evident that this system would preserve intact our policy of protection in favour of British industry; because, while there would exist as perfect a balance as could be attained between foreign commodities imported free and home products exported in return, our native industry would still command the same protection as at present against an *excess* of importations.

The proposed system would afford a powerful inducement to foreign countries to take our products in return, seeing that in the absence of such reciprocity our protective duties would be a positive burden upon their trade with us, and under such circumstances we might hold ourselves perfectly independent of "treaties of reciprocity" which, commercially, would be unnecessary and unimportant.

It appears to me that the respective value of goods reciprocally exported and imported free from duty should be ascertained exclusive of the cost of exportation and importation. The value of a cargo of foreign goods might be taken at the amount of market prices in this country, less the expense of importation; and the value of British goods would be taken at current prices in the home market.

The system suggested would not necessarily cramp or embarrass the operations of our foreign trade. In most cases British merchants importing the produce of other countries would have connections in those countries with whom they would carry on a regular reciprocal trade. Probably in some instances merchants would import from countries when either might not require or would not receive an equal amount of British merchandize. In that case the merchant importing into this country would get admitted free so much of his cargo as was equivalent to his exports, and he might clear the remainder; or, if he had not himself exported any British commodities, he might clear the whole of his importations through any other merchant or merchants exporting to a sufficient amount. Upon such an arrangement the exporting merchant would be in a situation to exact a pecuniary consideration for thus transferring his right of exemption from import duties. So, also, a merchant carrying on trade with several foreign countries would be entitled to set off any balance in his favour upon his exports to any one or more of such countries in opposition to any balance against him upon his imports from the others. The principle of transfer and set-off here stated being understood, all apprehension of difficulty and complication will immediately disappear upon my stating (as follows) the system of procedure which that principle would naturally give rise to. Every party exporting British commodities would receive from the Custom House at the port of exportation a certificate expressing their amount in value, which certificate upon production at the same or any other Custom House would entitle the holder (whether an original party or an indorsee) to bring in or clear out of bond an equivalent amount of foreign merchandize. Then, if the foreign merchandize to be freed from duty should not amount to so much as the sum expressed in the certificate of exportation produced, the Custom House might either cancel the certificate and deliver to the holder a fresh certificate for the difference, or indorse upon the original certificate the amount of goods exported by the holder, leaving it operative in his or his indorsee's hands for the residue. Such certificates would acquire a marked value and become a common subject of sale and transfer in the commercial world; they would be numbered seriatim, and counterparts of them would be preserved at the Custom House, which would enable a party to verify a certificate before he purchased it, and thereby protect himself against forgery.

It is evident that the proposed system would carry the bulk of our trade into those channels which were least obstructed by foreign restrictions, and, as to the residue, would throw the burden of our protective duties upon the foreign producer, and so indemnify the industrious classes of this country.

I intimated at the outset that this system of "Reciprocal Free Trade" ought to be introduced gradually, and be preceded by certain arrangements.

The effect of that system would be a reduction of prices and wages in this country, whereby money with us would acquire an increased proportionate value. The arrangement by means of which, I conceive, this consequence might be prevented from operating injuriously and unjustly, is briefly developed in the 5th and

last of my letters to Sir Robert Peel, now in course of publication in your journal. The arrangement is analogous to that of the Tith Commutation; that is, of varying annual payments according to a septennial or other agreed average of prices. The average governing the tith commutation embraces only corn; but I apprehend that it would be proper to include our native minerals and other staple commodities for the purpose of working out a general average which should govern contracts in general. The average upon those ingredients for seven years would be the financial regulator for the year next ensuing, at the close of which the particular average of the first year of the series would be dismissed, and that of the year then ended would be added, and so on at the expiration of every successive year.

Now suppose the reciprocal free trade proposed should commence on the 1st of January, 1845, a table of averages for the seven years next preceding 1844 should be constructed, and until the close of that year all salaries, pensions, and allowances from the public treasury, all dividends upon the public funds, all rents, annuities, and other payments under time contracts would be paid according to present stipulated amounts. Then, at the expiration of 1844, the particular averages of the first of the preceding seven years (that is, of 1837) would be excluded, and the particular averages of 1844 would be added, and thereupon the general septennial average would be struck as the financial regulator for 1845.

We will now suppose that the general average operating for 1845 should fall below the preceding general average in the proportion of 1 to 120; then, during the year 1845, a reduction of 2d. per pound sterling would be made from all such payments as I have instanced above. Thus, the Lord Chancellor, who receives 14,500*l.* per annum out of the taxes, would be docted 2d. in the pound, and be paid 14,379*l.* 3s. 4d.; the holder of 100*l.* three per cent. stock would be paid 2*l.* 19s. 6d.; a tenant holding at an annual rent of 200*l.* would pay 198*l.* 6s. 8d., and so forth.

Now, if the reciprocal free trade suggested were brought about by a *gradual* reduction of existing duties, so as to become wholly abolished, or reduced to mere taxation for revenue, in six or seven years, the proposed general averages would also fall in due gradation from year to year by the introduction at the expiration of every successive year of a particular average upon reduced prices in the place of a particular average upon the higher original prices. By any other than such *gradual* means it would be impossible to regulate the payments from the public treasury, and those under-time contracts generally (as above referred to), so that they should bear a just ratio to the fall of prices and wages.

If it should be deemed necessary, for the purpose of revenue, to retain any part of existing duties upon foreign commodities after the reciprocal system of free trade should have been brought into full operation, the reduced duties ought, I conceive, to be commuted into one uniform ad valorem duty, at the lowest possible rate, upon all articles imported under the free reciprocity system.

Having now concluded my exposition of the proposed system of "Reciprocal Free Trade," with its incidental arrangements, I will submit the few additional statements and observations which I have to make with reference to the doctrines and doings of that one-sided body or faction, the "Anti-Corn-Law League."

The first item is a statement of the annual produce

of our native industry in 1839, with an estimate of the respective portions thereof consumed at home and exported; and this statement and estimate I introduce in order to shew how vastly superior in importance is our home market over all that is afforded to our industry by the wide world beyond. I have taken the year 1839 because I have not sufficient materials for any other period; but that year appears rather unfavourable than otherwise to my comparison, as I find that the exportation of British products during the eight years ended 1835, averaged one fifth less than in 1839.

	Home Con-	Exported.
	sumption.	
	£.	£.
Produce of the land in cultivation, at 6 <i>l.</i> per acre (the chief manufacture) . . . . .	279137820	
Produce of the Mines . . . . .	7264747	6211468
Cottons . . . . .	35500000	24661179
Woollens . . . . .	14000000	5747462
Paper, Furniture, Books, &c. . . . .	14000000	506048
Leather . . . . .	13000000	412127
Hardware, Cutlery, and Metallic Manufactures . . . . .	11000000	5652517
Linens . . . . .	8000000	4124742
Silks . . . . .	6000000	790435
Pottery and Glass . . . . .	4000000	991126
Jewellery, Plate, &c. . . . .	3000000	204192
Miscellaneous . . . . .	25000000	4167938
Total . . . . .	419902567	53469234

The maxim—"Buy in the cheapest market, and sell in the dearest"—eagerly caught from the lips of the prime minister, and applied by the leaguers without reserve or qualification, bears a very plausible sound; but it is a maxim which, if applied "unconditionally" in our transactions with other countries, will inevitably prejudice the industrious classes of this kingdom (as I have already demonstrated), although people of independent incomes, and those deriving their resources from the profits of capital, or from professional pursuits, may be thereby benefited. Of course the immediate interest of every merchant leads him to send his commodities to those markets where he can obtain most for them, and to import from those where prices are lowest; but, clearly, the industrious classes of this country have a direct interest in excluding free importation from those markets which do not receive in return the products of our native industry. By such exclusion the industrious of this country secure to themselves a dearer market for *their* particular commodities, labour, and skill (and everybody knows that these are already cheap enough) than they would possess if we received and consumed *freely and without condition* the products of foreign industry. Put a simple case from which to deduce the inference; and then, let the matter be complicated in any manner with the sophistry and speculative statistics of the League, the actual result will remain the same. Suppose then, that 1,684,940 qrs. of corn, wheat, barley, and oats—the average annual quantity imported between 1829 and 1840—were admitted yearly free of duty, and without an equivalent exportation of British products, and a subsidiary arrangement with respect to the currency; then, as the labour of one man on an average is required throughout the year for the production of sixty qrs. of grain, upwards of 28,000 foreign labourers would be brought into constant and equal competition with our labouring population, who are burthened with

a large amount of indirect taxation; and even if that burthen were removed, such competition would still be prejudicial to the industrious classes of this country, although the "*monied interest*" might gain proportionably. But we have it upon the high word of the Leaguers, that free importation of *corn* (they keep free trade in calicoes, woollens, &c., snugly in the back ground) would be more than fully reciprocated by a most abundant exportation of British products. Is this great nation, with its dense population, its gigantic interests, and its complicated relations, to throw itself implicitly upon the sagacity (to say nothing of the honesty) of a mere voluntary association, the prime movers amongst whom have a direct personal interest in bringing about the revolution which they are "agitating" to accomplish, and whose methods for advancing that purpose, savour of the vulgar and fraudulent expedients of "Electioneering?" They have deluged the country with tracts, compounded of wood cuts, rhymes, and texts of scripture; and the recent report of the League (smacking of the political economy of its authors) estimates the wonder-working influence of the Association by the *number of tons weight* of the trash thus circulated. Their notion of carrying their object by a sort of electric shock is demonstrated by their spending the Marquis of Westminster's subscription in plastering the walls throughout the country with an announcement of that subscription, as "another great fact!"—foolishly publishing, in their blind haste and confidence, the noble Marquis's letter to the League, in which his lordship glances at "the monied concerns of the country," the labourer's "solid pudding," (which foreign hands will very readily and kindly assist him in compounding), and "the public credit," in such terms as to prove that his lordship has given publicity to his sentiments before he has duly digested the subject matter, or obtained a clear, precise, and comprehensive view of its relation and incidents. I trust that it is scarcely necessary for me to observe that I do not at all question the honesty or sincerity of his lordship's opinions; but I cannot but entertain a belief that they will, upon mature reflection, become considerably modified; and, in that event, his lordship's noble disposition will, of course, impel him to an immediate recantation, as public as his previous declaration. There are many other noble, generous, and benevolent minds which have been trepanned by insidious arts and sinister influences into the current delusion, and which will inevitably relax in their zealous support of this destructive "agitation" according as time shall afford them the opportunity of mature consideration.

The preceding is a mere *illustration* of the effect of non-protection upon our native industry; for, with respect to a total and unconditional repeal of the corn laws, the argument must, of course, be applied to the *entire* annual consumption of grain in the United Kingdom, which amounts, according to all the authorities I have met with, to about 50,000,000 qrs. Total and unconditional repeal would, therefore, place upwards of 830,000 full grown and able bodied foreign labourers, in free and constant competition with our working population; and that competition would affect the labouring class not only in agriculture, but in every branch of native industry, for any material alteration in the rate of wages in one branch (especially in that which is larger than all the others together) would produce a corresponding alteration in every other. Now, we may learn from the report of the Factory Commissioners how terrible that competition would be to our labouring population. According to the report referred to, the following were the respective

rates of wages per week of Factory operatives in England, and the undermentioned European States:—

	Wages.	Hours.
England . . . . .	11s. 0d.	69
France . . . . .	5s. 8d.	72 to 84
Switzerland . . . . .	4s. 5d.	78 to 84
Tyrol . . . . .	4s.	72 to 80
Saxony . . . . .	3s. 6d.	72
Prussia . . . . .	2s. 6d.	94

I am, Sir,

Your most obedient servant,

Bristol, Jan. 24, 1844.

R. I.

## ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A weekly Council was held at the Society's House in Hanover-square, on Wednesday, the 27th of March: present—Thomas Raymond Barker, Esq., in the chair; Colonel Henderson (Mayor of Southampton); R. Westbrook Baker, Esq.; John Raymond Barker, Esq.; John Benett, Esq., M.P.; W. R. Browne, Esq.; F. Burke, Esq.; J. W. Bury, Esq.; F. C. Cherry, Esq.; Layton Cooke, Esq.; Capel Cure, Esq.; E. D. Davenport, Esq.; A. E. Fuller, Esq., M.P.; B. Gibbs, Esq.; Townshend Mainwaring, Esq., M.P.; R. A. Slaney, Esq.; Professor Sewell; and J. Spencer Stanhope, Esq.

*Tussac Grass.*—Sir William Jackson Hooker, K.H., Director of the Royal Botanic Gardens at Kew, in reply to an application which had been made to him on the part of Members of the Society, who in consequence of the publication in the *Journal* (vol. iv., part 1, page 17) of an extract from Governor Moody's Despatches to Lord Stanley, having reference to the *Dactylis cespitosa*, or Tussac grass, growing on peat bogs in the Falkland Islands, were desirous of obtaining small portions of the seed for trial, favoured the Council with the following communication on the subject:—"I should be but too happy, were it in my power, to send you seeds or plants of the Tussac grass. Some of the latter were living on their arrival in England; but they soon sickened and died. The seed, to a great extent, has been given away and sown in the Royal Gardens in all kinds of situations—but not a single grain has germinated any where. Indeed, I have reason to believe, that in such a climate as that of the Falklands, and with a great disposition to increase by the roots, the Tussac seldom produces perfect seeds: not always, certainly; because, while my son was with the Governor there, he raised seeds in the Government garden. I do not despair yet of introducing it. I have a "Ward's plant-case" now in the Falklands, and have given instructions to have good tufts of the grass with roots planted in this case and established before the box is sent home. Should I be successful, you may rely upon it, I shall not forget the Royal Agricultural Society." The Council ordered

their best thanks to the communication. to Sir William Hooker for this communication.

*Bone Sawdust.*—Messrs. G. W. Lees and Co., of 47, Fleet-street, transmitted to the Council a box of sawdust obtained from bone by means of the lathe in the ordinary process of button-making. The soundness of the material necessarily employed for that purpose, and the favourable state of division into which it was reduced by the operation of turning, led them to infer that a greater uniformity would attend the application of bones as a manure under these conditions, and a greater produce result from their action, than when employed in their impure or imperfectly reduced state; and they, accordingly, had received from members of the society, residing in Hampshire and Hertfordshire, comparative results of experiments which fully corroborated their opinion. Mr. Fowlie, agent of Sir William Heathcote, Bart., M.P., of Hursley Park, near Winchester, had found the bone sawdust applied to turnips far superior to any other manure he had made use of for that purpose; and Mr. Heard, of St. Margaret's, near Ware, states—"Two tons and a half of the bone sawdust were applied upon ten acres for turnips. The crop was excellent. The rest part of the field, 15 acres, was manured in the usual way, with farm-yard manure, and the crop was an entire failure, after sowing even a third time. The fly did not attack the part done with the bone sawdust, but totally destroyed the plant where the farm-yard manure was used."

*Bones, Guano, and Ashes.*—Mr. Slaney, of Walford Manor, near Shrewsbury, communicated to the Council the results obtained by Mr. T. C. Eytton, a member of the Society, residing at Donerville, in the county of Salop, in his experiments on artificial manures, especially on bones dissolved in sulphuric acid, embodied in a lecture delivered by that gentleman to the members of the Wellington Farmers' Club, and at their request printed and published, at a small nominal price, by Simpkin, Marshall, and Co., London. Mr. Eytton, having detailed various experiments made by other parties, proceeds to those instituted by himself, and which are of a very interesting character. "The manures and mixtures of manures I tried," says Mr. Eytton, "are calculated per acre. The turnips, which were Skirving's Swedes, were mildewed, or, probably, the crops would have been larger. The largest crop is that raised upon guano and wood-ashes, at an expense of about two pounds four shillings per acre, or at three half-pence for each bushel of turnips; the cheapest, that raised upon bone-dust dissolved in sulphuric acid, at an expense of eight shillings and five-pence half-penny per acre. Both guano and muriate of ammonia were tried by themselves, and also mixed with gypsum, at the rate of 220lbs. to the acre; where the gypsum was applied with muriate of ammonia, the crop was worse than where the muriate of ammonia was applied alone; where gypsum was applied with guano, the crop was only better by six cwt. in the acre than where none was applied, which may have been caused by the vicinity of a drain. We may, therefore, I think, fairly conclude, that gypsum is no manure for turnips, whatever it may be for clover and other crops. I confess, I am much puzzled by this result, as from an analysis of the subsoil of the field, by the Messrs. Blunt, of Shrewsbury, it appears that it contains merely a trace of sulphate of lime, or gypsum; from which I should, until these experiments were tried, have supposed that gypsum would have had a powerful effect. Muriate of ammonia does not appear to answer well in the quantity

used, and if larger quantities were applied it would be too expensive for the farmer.

No. of Exp.	Description of Manure.	Cost per acre.	Weight of crop		Cost per bush.
			per acre.	per acre.	
		£ s. d.	tons cwt.	bushels.	d.
I.	{ 165lbs. of muriate of ammonia. . . . . 220lbs. of gypsum	1 10 11	7 1½	154	2½
II.	{ 330lbs. of guano. . . . . 165lbs. of muriate of ammonia. . . . .	1 13 0	15 1	308	1½
III.	{ 330lbs. of guano. . . . . 220lbs. of gypsum	1 6 6	8 16	192½	1¾
IV.	{ 330lbs. of guano. . . . . 11 bushels of wood ashes, at 1s. per bushel . . . . .	1 17 5	15 14¾	340½	1½
V.	{ 330lbs. of guano. . . . . 165lbs. of muriate of ammonia. . . . .	2 4 0	17 7½	429½	1½
VI.	{ 11 bushels of wood ashes. . . . . 1,322 gallons of liquid manure (consisting of urine and soap-suds). . . . .	1 17 6	14 19¾	385	1½
VII.	{ 60lbs. of bones. . . . . 8½ qrs. or 33lbs. of sulphuric acid. . . . . 550 gallons of water. . . . .	0 8 5½	14 6	346½	1¾
VIII.	{ 494lbs. of bone-dust . . . . .	1 1 7½	14 19¾	308	0¾

"In the above calculation, fractional parts are not included. The following is an analysis of the subsoil. I was told by a former tenant of the field that it would not grow turnips; it was, however, drained shortly before the turnips were sown.

"One hundred parts of the soil were found to contain—

Water . . . . .	11 parts.
Silica (or sand) . . . . .	70 "
Alumina (or clay) . . . . .	15 "
Red oxide of iron . . . . .	1½ "
Carbonate of lime . . . . .	1½ "
(Loss) . . . . .	1 "
A trace of sulphate of lime, in weight not appreciable . . . . .	...

100

The proportion of Silica is that yielded by the soil after the largest stones or pebbles had been removed from it. The seed was sown on the 17th of May, 1843, and the turnips pulled and weighed on the 22nd of November. The plants all came up together; nor was there any perceptible difference in their appearance on the 27th of May. On the 14th of June, No. II. appeared to take the lead, I., VII., VIII., looking the worst, and being more backward than the others; on the 20th of June they were horse and hand-hoed, Nos. IX., X., VIII., IV., V., were equal in appearance to No. II.; on the 21st of July No. V. looked best, and No. I. worst of all." Mr. Slaney then proceeded to call the attention of the Council to the comparative cost of the different manures tried by Mr. Eyton, and stated in the table just read to them; from which it appeared that the Bones and Sulphuric acid cost only one farthing per bushel on the turnips grown, whilst the other manures cost from three to ten times as much. The soil on which they were raised was a tolerably light loam, and, as Mr. Eyton had stated, had been recently drained. The bones used were ground into powder, and were the fine siftings from collections of bones. This bone powder being put into an earthenware vessel, a small quantity of water was first poured over it, and the sulphuric acid then added; when the whole mixture was stirred with a stick until the bone-powder was

entirely dissolved, and the solution being diluted with more water was ready for use. It was applied to the land as liquid manure, either by means of a common watering-pan, or the distributing-trough of a liquid manure-cart, care being taken that the liquid should fall on the rows of turnips just sown. This process, Mr. Slaney understood, was repeated after the plants came up; and in submitting this brief statement of Mr. Eyton's experiments to the Council, he trusted that the interesting results obtained might stimulate other Members of the Society to extend the inquiry to other artificial manures with a view to the determination of their economical application and practical value. Mr. Davenport, of Capesthorpe, near Congleton, Cheshire, fully corroborated the statement made by Mr. Slaney, in reference to the mode in which the mixture of sulphuric acid and bone-dust should be conducted; and as some danger to the inexperienced operator was to be apprehended from a different mode of proceeding, it was desirable that great care should be taken not only to effect the solution of the bones, but also to add the sulphuric acid in so cautious a manner as to prevent its accidental ejection from the vessel in consequence of the violence of chemical action. With regard to the abstract value of sulphuric acid and bones as a manure, he adduced the opinion of Mr. Burness, of Manchester, a pupil of Professor Liebig, and who had been delivering a lecture or two in Cheshire on agricultural chemistry, as unfavourable to its exclusive use; for although it was no doubt a powerful and excellent restorer of land, it could not be considered as a permanent and efficient manure for rotation of crops, unless combined with other substances. Mr. Davenport preferred bone manure in a dry, concrete form, to its being in the state of liquid solution; and had found a mixture of half a ton of bone powder and two hundred weight of guano answer extremely well. The African guano just imported was offered at 3*l.* per ton less in price than the Peruvian, but he understood that it contained a correspondingly greater amount of water in its composition. Mr. Townshend Mainwaring, M. P., of Marchiviel Hall, near Wrexham, Denbighshire, stated, that with him the application of the sulphuric acid and bones had been attended with decided injury rather than advantage to his crops: a result, he had since learned, occasioned probably by the bones employed being left in fragments of too large a size, and consequently not in a state to be at once subject to the chemical action of the sulphuric acid as their solvent; his land having thus not only lost the advantage of the nutriment contained in the bones, but received on the contrary the injury of a strong, corrosive, and unneutralized acid. Mr. John Raymond Barker, of Fairford Park, Gloucestershire, communicated the results of two experiments he tried last year on the effects of ashes, both singly and mixed with guano, on the growth of Swedish turnips. The first experiment was made by applying a mixture of 40 bushels of coal ashes and 20 bushels of wood ashes, per acre, to a bad piece of heavy land, sown with Skirving's purple-top Swede, drilled in rows 18 inches apart. The turnips on being cleared of their tops and tails were weighed, and found to give an average of 39 tons 15 cwt. to the acre. The other experiment was made in a field of good light land, manured with 25 bushels of coal-ashes and one cwt. of guano per acre, and sown with Skirving's purple-top, in rows 27 inches apart. In this experiment the turnips were much larger than in the former, and Mr. Barker expressed his regret that the result had not been weighed, as the crop was, without exception, the finest he had ever witnessed, the turnips being of excellent quality and of immense size.

*Destruction of Insects.*—Mr. Read, of Regent Circus, Piccadilly, had leave given him to submit to the inspection of the Council his garden syringes for throwing currents of aqueous vapour or narcotic fumes over the surfaces of trees and plants infested with noxious insects, without the slightest injury to their bloom or foliage. By an ingenious arrangement of the nozzles of the syringes, the currents could be directed to any given point, without inconvenience to the operator; and water being introduced into the syringe in its liquid state, passed out through the nozzle as vapour or mist, settling on the plants as the gentlest dew. Mr. Read had the thanks of the Council for the favour of this inspection.

*Southampton Meeting.*—Colonel Henderson, Mayor of Southampton, laid before the Council copies of the various engagements entered into by the Local Committee of the town and neighbourhood of Southampton with the owners and occupiers of the various sites selected for the purposes of the meeting; along with a surveyor's plan of the ground on which it is intended to erect the Pavilion. These documents were received with thanks, and referred to the General Southampton Committee.

*Prizes for Essays.*—Mr. Burke gave notice, that he should move, at the next monthly Council, "That silver medals should be granted to the authors of essays not entitled to a first prize, but which are yet thought by the Judges to be worthy of commendation: all such essays to remain the exclusive property of the Society, and to be made use of in such manner as the Society may think proper."

The Agricultural and Commercial Society of British Guiana transmitted a copy of their proposed Laws and Regulations; Mr. Sproule, of Dublin, copies of his Essay on the Growth and Management of Flax in Ireland; and Mr. C. M. Willich, a copy of the Annual Supplement to his Tith Commutation Tables: for all which thanks were ordered.

The Council then adjourned to Wednesday, the 3rd of April.

A monthly Council was held, at the Society's house in Hanover-square, on Wednesday, the 3rd of April, present—the Right Hon. Earl Spencer, President, in the chair; Hon. Captain Spencer, Hon. Robert Henry Clive, M.P., Thomas Raymond Barker, Esq., Samuel Bennett, Esq., Thomas William Bramston, Esq., M.P., W. R. Browne, Esq., Edward Buller, Esq., M.P., French Burke, Esq., Henry Colman, Esq., F. C. Cherry, Esq., E. D. Davenport, Esq., Humphrey Gibbs, Esq., Brandreth Gibbs, Esq., Stephen Grantham, Esq., W. Goodenough Hayter, Esq., M.P., W. Fisher Hobbs, Esq., John Hudson, Esq., Sir John V. B. Johnstone, Bart., M.P., Samuel Jonas, Esq., Rev. C. E. Keene, George Kimberley, Esq., John Kinder, Esq., Sir Francis Lawley, Bart., William Miles, Esq., M.P., Philip Pusey, Esq., M.P., Francis Pym, Esq., Professor Sewell, William Shaw, Esq., J. Villiers Shelley, Esq., and Charles Stokes, Esq.

*Finances.*—Mr. Raymond Barker, Chairman of the Finance Committee, presented the monthly Report of the state of the Funds of the Society; from which it appeared that the invested capital amounted to 7,700*l.*, and the current cash balance in the hands of the bankers, on the 31st March, to 1,742*l.*

*Discrimination of Soils.*—Mr. Pusey, M.P., Chairman of the Journal Committee, reported the adjudication of the Society's prize of 50*l.* for the best essay on the indications which are practical guides in judging of the Fertility or Barrenness of Soils, to Mr. John

Bravender, land-surveyor, Cirencester, Gloucestershire. Many attempts having been made to explain the productiveness of the soil by chemical or physical causes, without any decided result, it appeared desirable to the Society, in selecting this subject for one of their prizes, that the researches of natural philosophers should be assisted by making them acquainted with those obvious signs, whether of colour, consistence, or vegetation, by which surveyors and farmers are enabled to give at once a practical opinion upon the probable nature of land which they inspect.—Mr. Pusey further reported that the judges had highly commended four of the remaining essays in that class, namely, those bearing respectively the following mottos: "Truth needs no embellishment," "H.A.P.," "Then cold and hot, and moist and dry, in order to their stations leap," and "Speed the plough;" and the writers were requested accordingly to communicate their names to the Secretary.—He felt much satisfaction in communicating to the Council the great improvement this year in all the essays sent in to compete for the various subjects of the Society's prizes. The essays were not only more numerous, but more clearly expressed, and above all of a more practical character; they were working better and better every year: a result highly gratifying to the Journal Committee, as indicative of the great interest taken by the members of the Society in advancing its important objects.

*Prognostics of Weather.*—In reference to the Prize of the Society's Gold Medal, for the best account or record of the Prognostics or Natural Signs of Changes in the Weather, Mr. Pusey reported that the two essays selected by the judges in 1842, for a twelvemonth's trial of the practical value of the rules they respectively contained, had been placed as recommended by the Council in the hands of Mr. J. C. Morton, of the Whitfield Example Farm, for that purpose; and Mr. Morton had informed him of the completion of the trial on a very extensive scale of observation; the results, however, being too numerous to admit of immediate reduction to a common standard of comparison. On the motion of Mr. Pusey, the Council resolved, that their best thanks should be given to Mr. Morton and to each of those gentlemen who had so kindly undertaken to assist him in carrying out the objects of the Society in this inquiry.

*Essays for 1845.*—Mr. Pusey laid before the Council the Schedule of the Subjects, and Amount of Prizes, proposed by the Journal Committee, for the Essays of next year, namely:—

- 10*l.* On the advantages of one-horse carts.
- 10*l.* On the best method of fattening cattle.
- 20*l.* On the best method of reclaiming heath-land.
- 50*l.* On the agriculture of Nottinghamshire.
- 50*l.* On the agriculture of Cornwall.
- 50*l.* On the agriculture of Kent.
- 20*l.* On the cheapest mode of establishing a tile-yard.
- 20*l.* On catch-meadows.
- 50*l.* On the Dutch method of curing butter.
- 20*l.* On fences.
- 20*l.* For the best experiment in agriculture.

The special conditions annexed to each of the prizes, in reference to the general mode of treating the subject, and the distinct information required to be given on particular points, would be announced in the appendix of the ensuing Part of the Society's Journal; the Essays themselves being required to be sent to the Secretary on or before the 1st of March, 1845.

*Odessa Wheat.*—The Hon. Sidney Herbert, M.P., Secretary of the Admiralty, communicated, through Mr. Pusey, the wishes of the Agricultural Society at Odessa to enter into correspondence with the Society,

and receive its Journals; when the Council unanimously resolved, That the Imperial Agronomical Society at Odessa should be placed on the list of Corresponding Societies, and have the Journals in future transmitted to it from time to time as published.

The Hon. R. H. Clive, M.P., took that opportunity of calling the attention of the Council to the peculiar merits of the Odessa Wheat, and the importance of introducing and establishing its cultivation in this country. His brother, the Earl of Powis, had once possessed the variety in question, but by some unfortunate accident had, to his regret, again lost it. He regarded it as one of the most extraordinary wheats ever grown, being a white soft wheat of gigantic size and most beautiful colour. It was known at Odessa as the Taganrog Wheat, imported, he believed, into Taganrog, on the northern coast of the Sea of Azov, from the surrounding agricultural districts, and shipped as an article of general commerce from Odessa, on the shores of the Black Sea, for western Europe.

Mr. John Hudson stated that large quantities of this variety of Wheat were to be obtained at Mark-lane; but being, as Mr. Gibbs remarked, kiln-dried before its exportation from Odessa, its vegetative powers were of course destroyed, and its employment for the purpose of seed-wheat rendered useless. Mr. Miles, M.P., hoped that, by means of the new communication thus opened with the Agricultural Society at Odessa, a supply of the genuine Taganrog Wheat, in its natural state and fit for seed, might be obtained in sufficient quantity to enable thirty or forty members of the Society to cultivate an acre each, and report their results to the Council.—It was then resolved to refer the question to the Journal Committee.

*Southampton Meeting.*—Colonel Challoner, Vice-Chairman of the General Southampton Committee, transmitted to the Council the final Report of the Committee on the subject of the arrangements for the Pavilion and Show-yards at the ensuing Country Meeting in July. The Pavilion to be erected at Fairfield, at an estimated expense of 620*l.*, and the Show-yard, at Portwood, at that of 1,523*l.*, exclusively of the enclosures required by the Stewards of the Trial of Implements, to effect their arrangements in the most advantageous manner. This Report was received and adopted by the Council.

*Heavy-land Implements.*—The Hon. M. W. B. Nugent, of Higham Grange, near Hinckley, Leicestershire, suggested to the Council, as the result of his close and constant attention in effecting the cultivation of 400 acres of some of the stiffest and most unworkable soil in that county, that the land at Southampton upon which the ploughs for working the stiff-clay are to be experimented should, as soon as possible, be ploughed in preparation for the trial, and not again interfered with, but allowed in that state to retain its moisture, until the ploughs to contend for the stiff-clay prizes shall be brought to plough it, *across*, upon the day of such trial. A clean furrow-slice, under these circumstances, upon stiff, retentive clay, previously ploughed and suffered to keep all the damp in it, being, in Mr. Nugent's opinion, the criterion of a perfect plough for land of that character; so that it may be worked early in the spring, and prepared for green-cropping, by such a plough as will not gather the stiff soil before the mould-board, and run it before the mouth of the plough in large lumps; every single plough, he added, hitherto constructed, being guilty of this greatest of faults in working stiff, cold, retentive clay in a condition midway between wet and dry. The Council referred this suggestion to the Stewards of the Trial of Implements.

*Annual Country Meetings.*—On the motion of Mr. Miles, M.P., it was resolved—"That in future the place of holding the Annual Country Meeting shall not be decided upon until a Committee, of which at least three Members shall have acted as the Director or Stewards of the Yard (three to be a quorum, one of which shall have acted as Director or Steward), shall have visited and inspected such towns and their localities as the Council shall think fit, and have reported upon their respective suitableness for the purposes of the Society."

The Council then proceeded to the nomination of the following gentlemen to form such Committee:—

Mr. Miles, M.P.	Mr. Dean
Hon. Captain Spencer	Mr. H. Gibbs
Colonel Austen	Mr. B. Gibbs
Mr. Barclay, M.P.	Mr. Fielder King
Mr. Childers, M.P.	Mr. Shaw
Colonel Challoner	Mr. Shelley

*Occupation of Sites.*—On the motion of Mr. Miles, it was also decided, that in future the period during which the Society would require the land intended for the sites respectively of the Pavilion and Show-yards would be "three months" instead of "six weeks," as stated in the queries decided upon by the Council in 1841, to be answered by the authorities of any town prior to its being qualified to compete for selection as the locality of the Country Meeting of any particular year: such occupation of the ground, however, by the Society's contractor of works, not being understood to interfere with any right of pasturage up to the actual time of the meeting.

*Country Meeting of 1845.*—Viscount Hill, on the part of the town of Shrewsbury, and Mr. Brittain, Jun. (Hon. Secretary of the Chester Agricultural Society), on that of the City of Chester, transmitted to the Council documents in favour of those places respectively, as sites for holding the Country Meeting of 1845.

#### I. Shrewsbury.

1. Memorial from the Mayor and Corporation of Shrewsbury, under the great seal of the borough, and signed by the Town Clerk.
2. Memorial of the Nobility, Gentry, Agriculturists, and inhabitants generally of the county and town of Salop; signed by Viscount Hill, chairman of the public meeting held in the Shire Hall.
3. Memorial from the inhabitants of the town of Shrewsbury; signed by Edward Haycock, Esq., Mayor, and 95 of the principal inhabitants.
4. Memorial of the Shropshire Practical Farmers' Society; signed by Viscount Hill, president.
5. Answers to the official queries of the Society; signed by J. S. Peele, Esq., town clerk of Shrewsbury.
6. General plan of Shrewsbury, with the show-ground, trial-ground, approaches, public rooms, and site for pavilion, marked thereon.
7. Special plans of the race-course, and a room capable of accommodating 1,200 persons at dinner.

#### II. Chester.

1. Memorial from the city of Chester; signed by Henry Kelsall, Esq., Mayor.
2. Memorials from the South Cheshire, Denbighshire and Flintshire, Anglesey, Holywell, Daresbury, Hawarden, Chester, and Wirral Agricultural Associations; signed by their respective officers.
3. Statement of the mode in which the requirements of the Council are proposed to be met in Chester.
4. Plan of the Marquis of Westminster's schools.
5. General plan of the city, and indications of the

various points proposed in reference to the meeting.

6. Small plans of the city, shewing the various lines of railway connected therewith.
7. Table of distances of the various market-towns from Chester.

The whole of these documents having been read to the Council, it was moved by Mr. Miles, and resolved unanimously, "That a meeting of the committee appointed to consider the sites offered for holding the country meeting in 1845, be summoned for Wednesday, the 17th of April, at eleven o'clock; to which the plans and papers now submitted and read to the Council be referred."

*Appointment of Seedsmen.*—Mr. Miles then brought forward the motion of which he had given notice, for the official appointment of Messrs. Thomas Gibbs and Co. as the recognised seedsmen of the Society. He stated to the Council the peculiar claims of the Messrs. Gibbs on the honorary appointment now proposed to be bestowed upon them by the Council; the intimate connection of Mr. Thomas Gibbs with the late Board of Agriculture, and the essential services he had rendered to its members; the kindness, utility, and gratuitous services of his sons to the present Society on so many occasions, and especially in reference to the business of the Country Meetings; the notoriety of the firm for the excellence of their seeds; and the circumstance especially that the Society had always applied to them both for the uniform and requisite supply of seeds in model experiments, and for the test of cultivation or information required in the case of new seeds or plants of any kind transmitted to the Society: and concluded by remarking, that as the Society had already made the honorary appointments of a consulting Chemist and Engineer, he did not think that the Council could pay a better compliment to those gentlemen than by appointing them to the honorary office in question. The President having borne testimony, on the part of the Smithfield Club, to the services gratuitously rendered by the Messrs. Gibbs to that body, Mr. Shaw seconded the motion, which, on being put from the chair, was carried unanimously, and Messrs. Thomas Gibbs and Co., of Half-moon Street, Piccadilly, declared to be duly appointed Seedsmen to the Society.

*Glass Milk-Pans.*—Captain Stanley Carr, of Tüschbeck, near Lübeck, transmitted to the Society, through Sir John W. Lubbock, Bart., and at the request of Mr. Handley, a specimen of the glass milk-pans employed so successfully in his German dairy, and referred to in his paper on the Rural Economy of Schleswig, Holstein, and Lauenburg, in the first volume of the Society's Journal (page 380). "The milk," says Captain Carr, "when brought to the dairy, is immediately strained through a horse-hair sieve into the vessels, whether of wood, earthenware, copper tinned, zinc, cast-iron (lined with a china-like composition), or glass, placed in rows on the floor. All these different kinds of utensils have been tried with various success, in the hope of discovering how, in hot weather, more especially when a thunder-storm is gathering, the milk can be guarded against a too early acidity; for, as it is a fixed and invariable rule that the cream must be removed from the milk before the latter gets at all sour, and an equally established fact, that all the oily particles cannot be obtained in a shorter period than 36 hours, vessels in which, during sultry, and especially damp weather, the milk could be kept the due time, are a great desideratum. As yet, however, there reigns much diversity of opinion on the subject, and shallow wooden vessels, as nearly as

possible equally wide at top and bottom, containing, when full, about eight quarts, but in which, during summer, seldom more than six quarts are poured, are in most general use. They have, however, some disadvantages, of which the chief is the great difficulty and the consequent labour and close attention requisite to remove all acidity (which, in some states of the atmosphere, is almost unavoidable), and which, penetrating the pores of the wood, sometimes resists all the patient scrubbing; first, with hot water and small birch scrubbers, and secondly, with boiling water and a hard round brush made of pigs' bristles (with which every hair's breadth is carefully polished over), so that the despairing dairymaid is compelled to resort to washing in a ley of wood-ashes, or boiling, or even scorching over lighted chips, followed by countless rinsings in pure spring water. To diminish, in some measure, this labour, the plan of painting the milk pails and dishes with a preparation of cinnabar, linseed-oil, and litharge has been adopted by the milk vendors in towns, and in some country dairies: not only, however, is the expense considerable, as the vessels must be finished off with peculiar care, and require to get three coats of the composition at first, and one yearly afterwards, but the milk, for some days after they are brought into use, has a perceptible taste of paint. The tinned copper milk pans are very costly, and must be carefully watched lest they should require re-tinning. The zinc are, as yet, little known, and the assertion of their effect in better severing the cream from the milk not sufficiently proved. The cast-iron lined with enamel, though assuredly durable and very clean, seem too expensive; and the glass have many opponents on account of their brittleness, and the vague notions respecting glass and electricity inducing the idea that if the electric fluid get into the milk it cannot get out again! whereas, as it is ascertained that it always attaches itself to a conductor, and, in the absence of anything more attractive, runs along the surface, it is more likely that the milk should be protected in glass, which is a non-conductor, than in any other substance. In my dairy, which contains upwards of 180 cows, the glass vessels have been used for more than four years; and I give them a decided preference over all others. Their form is good, being sixteen inches broad at the top, and twelve at the bottom: the glass is dark bottle-green, transparent, and perfectly smooth, about one-eighth of an inch thick, and provided with a rounded rim at the upper edge, which makes it easy to retain a safe hold of them, even when full. They contain eight quarts, but never receive more than six. They cost 8d. a piece, and their durability may be estimated by the fact, that to encourage carefulness, each dairymaid is allowed one dollar per annum extra, as *pan-money*, being bound at the same time to pay 10d. for each one she breaks; yet hitherto, no girl has broken to the extent of her dollar. It is self-evident that acidity cannot be communicated to glass, and the ease and rapidity with which they are cleaned, requiring merely to be first washed with lukewarm water, then rinsed in cold water and placed in a rack to dry, effect such a saving in fuel and labour (diminishing the number of our dairymaids by at least two), that the less quantity of butter obtained, supposing (which I by no means concede) that the milk, during a few weeks in summer, does sour sooner, and consequent throws up less cream in glass than in wood, is more than compensated by the lessened expense of the establishment, not to mention the great advantage of attaining the indispensable cleanliness and purity of the vessels with more certainty, because at a less expenditure of time and trouble. Although it is an ascertained and undeniable fact that

the quality of the butter depends much upon the nature of the pasture, the locality of the dairy, the universally prevailing cleanliness of the whole management, and *very* essentially on the purity of the water employed, still I ascribe much of the reputation which our butter has of late years enjoyed (and which is verified by our obtaining at all seasons one penny per pound above the market-price in our neighbourhood) to the beneficial introduction of glass milk-dishes."—At the suggestion of Mr. Hayter, M. P., it has been ascertained from Mr. Apsley Pellatt, of the Falcon Glass Works, Blackfriars, that in consequence of the heavy duty and restrictions of the Excise on manufactured glass articles in this country, glass milk-pans of a size and shape similar to those of Captain Carr, but of white flint glass and stronger mould, could not be made for sale in England for less than 7s. 6d. each; but should that price, under the restrictive circumstances of the case, obtain purchasers, there would be no difficulty in manufacturing a superior and serviceable article of the kind to any extent that might be required. The milk-pan presented by Captain Carr to the Society is of the common dark-green bottle-glass, and weighs 6½ lbs. It is round in shape, and nearly 4 inches deep, measuring 17 inches across the outside of the top, and 11 inches across that of the bottom.

*Siberian Cow-Parsnip*.—Captain Carr's communication contained also the following agricultural references:—"There is nothing new here: except that spring is unusually long delayed, the ground still frozen up and likely to continue so, until we get a heavy gale with rain from the southward. The grain-crops of last year, especially wheat, make the worst "yield" I ever remember. A new plant, *Heracleum Sibiricum*, has been successfully introduced here, as yet in a small way, from Russia, giving a *very early* and *abundant* food for sheep; but it is probably already known and valued in England: if not, I should have pleasure in sending you some seed. The last *Journals* have been most interesting."

Mr. Gibbs informed the Council, that the plant in question was a very early green crop, although perhaps not quite so much so as the Prickly Comfrey: if allowed, however, to remain uncut for some time, it became at last the heavier crop of the two. He stated that the seeds should be sown in a bed, and the plants, when sufficiently large, planted out at least 3 feet apart, if in a soil likely to bring them to a large size. He believed the leaf constituted the only edible portion of the plant. Messrs. Thomas Gibbs and Co. having planted a small piece of ground, consisting of loam upon gravel, with the *Heracleum Sibiricum*, they found the leaves to be very succulent, and to attain the great height of from 7 to 8 feet; and as the plant had not yet been extensively cultivated, they placed at the disposal of the Council, for distribution among such Members as felt an interest in the cultivation of this plant, the whole stock of seed they had obtained from their experiment, in the hope that so extensive a trial as would probably be thus made of the qualities of the plant would procure satisfactory results in reference to its further cultivation.

*Pollen of Wheat*.—Mr. Groom (Florist to the Queen), of Clapham Rise, Surrey, favoured the Society with the following communication:—"In reference to the effects I have observed from the use of Bone Sawdust, of which a sample was presented to the Council at its last meeting, I feel no hesitation in saying that I have experienced the most beneficial results from its use. I have now tried it two seasons, and think, if possible, it has answered better this season than the last. It has produced a most luxuriant

growth, with a beautiful dark healthy green, and a robustness of habit in the plants equal to the summer growth; the plants also retain their lower leaves much longer, which is most essential with plants cultivated in pots. There is another point of importance, which is, that I do not think any injury will arise should the Bone Sawdust be used in what may be termed excess, as I have tried a very large quantity in the soil without the plants appearing in any way affected, except in luxuriance of growth. There is also a most important result in an agricultural point of view, which I have no doubt will be found to take place from the free use of the Bone Sawdust, and that is, the increased fertilizing power of the *pollen*, which will, in a great measure, do away with the light and defective ears in the grain crops, as I believe a great part of the failure arises from the want of vitality in the pollen." It is perhaps worthy of remark, that chemists have found in their analyses of the pollen of plants a predominance of those elementary principles of which bone is constituted; and that the purity of the bones employed as a manure, and the state of division into which they are reduced, has a considerable influence on the results obtained by their action, is strikingly exemplified in the following statement of Mr. Miles, M.P., in reference to his experiments on the growth of Swedes, in the Society's Journal, Vol. III., page 426:—"A curious fact, however, came out in the application of different descriptions of bones used at the distance of 27 inches. In the one case, the bones were procured as they came from the kennels, with the usual quantity of animal matter adhering to them, and crushed at home; in the other, they were brought as refuse from a large button manufactory, after having been thoroughly cleansed for the purpose of manufacture. The respective proceed was—

	Tons. Cwts.
Turnips on Bones crushed at home . . . . .	11 8
Ditto on ditto from button manufactory . . . . .	16 10

*African Guano*.—Mr. Forbes, of No. 2, Great St. Helen's, presented to the Society three specimens of Guano, collected on different islands in the Bay of Angra Peguena, on the Western coast of Africa. "We have as yet," says Mr. Forbes, "no arrivals of this Guano into the Port of London, but some cargoes are daily expected, when I shall take the liberty of submitting fresh samples." Mr. Miles stated that the African Guano had reached Bristol; and having received from Mr. Greening, of Nelson-street, in that city, the analysis of it, made by Professor Herapath, he had the pleasure of then submitting it to the inspection of the Council. "I have analysed Mr. Greening's sample of African Guano, and find that it is quite equal to that of Peru of good quality. The results are below: but I have not particularized those matters contained in it, which agriculturists do not yet know the value of: all those which are known to be beneficial are—

	Parts.
Phosphate of Lime . . . . .	21
Soluble Phosphates, with a little common Salt	8
The elements of Ammonia . . . . .	11
Other matters, almost entirely organic . . . . .	60

100  
(Signed) "WILLIAM HERAPATH."

*Adjournment of Council*.—Mr. Shelley gave notice that he should move at the next monthly Council, "That the Council at its rising, on the first Wednesday in July next, do adjourn over the period of the country Meeting in that month, until the first Wednesday in August."

Mr. Colman announced his intention of presenting

to the Society three American Ploughs, for trial at the Southampton Meeting. Mr. Murray, of Albemarle-street, presented a copy of the last number of the *Quarterly Review*, as containing a review of the Journal of the Society, under the head of "British Agriculture." Mr. Longbottom, Secretary to the Royal Polytechnic Institution, presented a specimen of Holloway's Farmer's Compound (Manure). Mr. Donaldson, a copy of his new Edition of "Bayldon on Rents and Tillages." And the Royal Society of Agriculture at Caen, a copy of their last notice of proceedings. For which, and the other presents and communications received, the best thanks of the Council were ordered.

The Council then adjourned, over the Easter recess, to Wednesday, the 17th of April.

A weekly Council was held at the Society's House in Hanover Square, on Wednesday, the 17th of April, present, David Barclay, Esq., M.P., in the Chair; Thos. Raymond Barker, Esq.; John Raymond Barker, Esq.; W. R. Browne, Esq.; Colonel Chaloner; Capel Cure, Esq.; James Dean, Esq.; A. E. Fuller, Esq., M.P.; Humphrey Gibbs, Esq.; Brandreth Gibbs, Esq.; C. Hillyard, Esq.; Fielder King, Esq.; James Marmont, Esq.; Townshend Mainwaring, Esq., M.P.; William Miles, Esq., M.P.; Alexander Ogilvie, Esq.; Henry Putland, Esq.; John Read, Esq.; Joshua Rodwell, Esq.; William Shaw, Esq.; Professor Sewell; Richard Trench, Esq.; Thomas Turner, Esq.; Thomas Tweed, Esq.; and Henry Wilson, Esq.

*Prize Essays.*—Mr. Pusey, M.P., Chairman of the Journal Committee, reported the adjudication of the Society's Prize of £50 for the best Report on the Agriculture of Wiltshire, to Mr. Edward Little, of Lower Sheldon Farm, near Chippenham, Wiltshire; and the adjudication of the Society's Prize of £50 for the best Report on the agriculture of Norfolk, to Mr. R. N. Bacon, of Norwich:—these reports containing a statement of the ordinary course of cropping adopted in the different soils of each county respectively; the breeds of cattle, sheep, and pigs, most generally bred or fed within them; the state of their drainage; the implements used; the number of horses or other cattle employed in the different operations of husbandry; the tenure on which the farms are generally held; the wages of labour; the average amount of the poor's rate; and whether any and what alterations and improvements have been made in the system of agriculture pursued within the county of Wilts since the Report made to the Board of Agriculture by Thomas Davis, and published in the year 1811; and within the County of Norfolk since the Report made to the Board of Agriculture by Nathaniel Kent, published in 1796, and by Arthur Young in 1804.

Mr. William Stace, of Berwick, near Lewes, in Sussex, announced himself as the author of one of the four Essays on the Discrimination of Soils, which had been "highly commended" by the Judges; and expressed the satisfaction it gave him to place his Essay in the hands of the Council, for any use to which the Journal Committee might consider it as available in promoting the objects of the Society, "thinking that any essay on that subject might contain some fact or description of appearances, that might be found of service to the chemical inquirer, and assured that every assistance ought to be rendered to the scientific man that the practical man could possibly afford." The Council ordered their best thanks to be returned to Mr. Stace for the permission he had granted, and his letter to be referred to the Journal Committee.

*Seedsmen.*—Messrs. Thomas Gibbs and Co., of Halfmoon Street, Piccadilly, addressed a letter to the Council, in acknowledgment of their official appointment as the Seedsmen of the Society; assuring the Council that the mark of confidence the Society had conferred upon them in that appointment, would stimulate them to persevere in their endeavours, not only to promote the interests of agriculture in general, but to introduce all such seeds as appeared to them most likely to be useful, and to supply those only in every branch of their stock which they could guarantee to be of the purest and most genuine description.

*Natural Manure.*—Mr. W. R. Churchill, of Collyton, near Dorchester, Dorset, transmitted to the Council a specimen of soil, which on exposure to the air had become changed into a powerful manure for grass land, with the following account of its occurrence:—"I took the specimen now forwarded to the Council from a very high Bank thrown up about six years since, in a strong, sour, kimmeridge clay soil, producing a coarse sedgy grass and English furze, not worth more than five shillings a year rent. This bank was formed by a very deep ditch, used for a drain, as well as a protection to a hedge planted upon it. The substance in question appeared at a distance similar to white stone; and, on inquiry, I found had not existed in the bank when originally thrown up: there was a stratum of it about the middle of the bank in different stages of formation, extending more than four hundred yards. The bailiff, in removing a bank in similar soil, but of better quality, found a large quantity of this substance, and on putting it over some good meadow land, of a loamy soil on a clay bottom, he found it produce wonderful fertility, far superior to other manures. How this substance is formed is a mystery yet to be solved; at all events, it is not an original product of the soil, but is in a progressive state of formation. It is full of hairy filaments, with a cinereous, white, soapy marl. It does not effervesce in sulphuric acid, and is of a fatty nature; not tasting of saltpetre, although generated by exposure to the atmosphere. The great question would be to ascertain whether any artificial process would expedite its formation; for, if by throwing up heaps of this poor soil such a manure could be generated, the surrounding barren land might be greatly meliorated, and become worth cultivation: it is within three miles of Weymouth, far removed from the chalk formation."

*Artificial Manures.*—Mr. Miles, M. P., called the attention of the Council to the desirableness of including in the model experiment, proposed to be tried this year, by various members of the Society, and which would be brought before the Council for final consideration and adjustment of detail at their next meeting, a comparative trial of the respective merits of the South American and African Guanos, applied in equal quantities to the land.—An interesting discussion then took place on the facility with which artificial manures of every kind may be adulterated, the various modes in which is practice was systematically conducted in that Metropolis and elsewhere, the importance of the strictest scrutiny into the quality of such manures, and if possible the application of some simple and efficient test by which the amount of adulteration in the sample of each of the different manures intended to be purchased may at once be estimated.

*Swedish Turnips.*—Mr. Alexander Ogilvie informed the Council that during the nineteen years he had lived as agent with the late P. L. Brooke, Esq., of Mere Hall, Cheshire, he had experienced very great and uniform success in the management of his turnip crops, a result which he attributed to the quality and amount

of manure he had employed, and the early growth he had given to the plant by sowing the seed in immediate contact with it while in a state of active fermentation. One of his fields, from which in 1840 he had obtained no less an amount of Swedish turnips (cleared of tops and bottoms) than forty-three tons per statute acre, was a clayey loam with a retentive subsoil, effectually drained with tiles some years ago by cutting the drains not more than from five to six yards apart. In 1839 it was broken up from pasture for oats, the crop being good, and as soon as the oats were cut and removed from the field, he had the stubble skim ploughed from three to four inches deep; in that state he allowed the field to remain a month or five weeks, and then had it ploughed from 16 to 18 in. deep, with Smith's subsoil plough. After this operation, the field was not again disturbed until the spring of 1840, when he had it harrowed as soon as it was sufficiently dry. Between the end of March and the third week of May, he had it ploughed and harrowed three different times. From the subsoil ploughing in the autumn, the ground was very mellow in the spring, and after it was three different times ploughed and harrowed, the soil was very fine. The next operation was forming the drills, which were about thirty inches apart. While this was going on, he had the dung, in a moist state, carted out, and spread in the hollow between the drills, with some bone-dust sown over it and covered in *immediately* (to prevent evaporation) by having the drills split out over them. The quantity of dung per statute acre applied, was from 26 to 28 tons; and *over* this dung, he had sown with the hand about half a ton of the best raw bone-dust per statute acre. After the dung and bone-dust were covered in, from two to three inches from the surface by the splitting of the drills, he immediately, while the dung and ground were *moist*, had the seed sown by a machine, at the rate of 3 lbs. weight per statute acre, taking care that it was deposited *in the dung*; and thus, by being so deposited, it vegetated immediately, and grew out of the way of the fly in the course of eight or ten days. The moisture of the dung and soil, and the heat occasioned by their admixture with the bone-dust, forced the plants for the first fortnight as favourably as if placed in a hot-bed. At the end of this period, the plants were almost ready for singling out, which, as soon as they would bear the operation, he had done with the hand-hoe from 14 to 16 inches apart. Mr. Ogilvie stated, that this was the method he had adopted in Cheshire, during a period of 18 years, and had never once missed a crop. He believed the lightest crop he ever had during the whole of that period exceeded 36 tons per statute acre. He never sowed later than the last week in May; and whenever weight of crop was wanted, he thought it absolutely necessary to sow during that month. The seed was obtained of Mr. Skirving, of Liverpool. The plants were twice horse-hoed, and once hand-hoed after singling. In the previous season all the crop was removed from the ground by the latter end of October; it was ploughed and sown with wheat during the first week of November: and it was in reference to this grain crop that the unusual amount of manure applied to the turnips was found, in the result of produce in both cases, to be both advantageous and economical.

**Draining Level.**—Mr. W. B. Webster, of Hounslow, near Southampton, presented to the society one of his newly-invented levels for the purposes of draining. This level is formed of an oaken, rectangular rod, turning upon an axis placed at the middle of its lower surface, and by means of a plate and screw secured firmly at a horizontal level, or any given incli-

nation. On its upper surface, immediately above this centre of motion, is placed a small spirit-level; and at each end of the rod an upright plate of brass, containing the cross-wires. At the end nearest to the observer is placed an additional sight, moveable by means of a screw within a graduated groove, which indicates by the value of its divisions not only the line of horizontal level, but the rise and fall of distant objects above or below the place of observation. Mr. Webster claims for this instrument the advantages of cheapness, great simplicity, and its requiring no second person for its use; in addition to its capability of giving by inspection the rise and fall of land intended to be drained.

**Horse Wheat-Hoe.**—Mr. John Bowers, of Westdean House, near Chichester, expressed his intention of exhibiting, at the ensuing Southampton Meeting in July, an instrument invented by the Rev. L. Vernon Harcourt, for hoeing the drilled wheat on his own farm, which had been found practically useful for that purpose; and Mr. Bowers had no doubt, from the experience he had himself had in the employment of the implement in question, that it would be found of great use, being very simple in its construction and different in principle from all implements hitherto invented for the purpose of hoeing.

**Small Farmers.**—Mr. Nicholls, as one of H.M. Poor-law Commissioners, having become extensively acquainted with the condition of the small farmers of Ireland, during his official connection with that part of the kingdom, and convinced of the great advantage they might derive from the cheap circulation among them of a compilation on farming topics adapted to their comprehension, requirements, and actual condition, undertook the task of preparing a work of that character, under the title of "The Farmers' Guide," which had passed through two large editions. The success of that publication, compiled with the view of imparting useful information to the small Irish farmer, and stimulating him to the adoption of improved methods of cultivating his land, had induced Mr. Nicholls to undertake, with the same disinterested motives, a work which might prove advantageous to the same class of farmers in England, exceeding in number, and he believed in extent of occupancy, the larger and more intelligent class of farmers, taking the country from end to end. In this compilation, Mr. Nicholls had endeavoured to form a compendium of all information essentially necessary in a practical sense to the parties for whom it was intended, excluding everything of a speculative or dissertational character, and recommending to their notice those points and details only which had stood the test of experience; having been careful to be as brief, simple, and clear as possible on every topic. As he had given the copyright of the work to Mr. Charles Knight, he had no further interest in its distribution than a desire that the small farmers, for whose use it was compiled, might be enabled to reap whatever benefit it was calculated to confer; and in order to render its publication as cheap as possible, Mr. Knight had included the work under the title of the Farmer in his series of Guides to Trade, Service, &c.; circumstances which he hoped would facilitate its circulation, and induce landed proprietors to purchase it for distribution among their tenantry, as had been done to some considerable extent in Ireland with Mr. Nicholls's previous publication. Mr. Nicholls concluded his communication by hoping, that as the efforts of the Royal Agricultural Society of England were unceasingly directed to the promotion of improvements in every shape, they would grant him the

satisfaction of finding, that his little work, intended within its own sphere, to accomplish the same object, would not be considered altogether unworthy of their approbation.

The Rev. John Barlow, Secretary of the Royal Institution, communicated to the Council a general invitation to the Members to accept a free admission to Professor Solly's Lecture in the Theatre of that establishment, on the ensuing Friday evening, the 19th of April, on the Chemistry of Vegetation, and its general application to agriculture. Mr. Ermen, of Manchester, addressed a letter to the Council on the subject of the prevalent disease in Potatoes; Mr. Shaw communicated a letter from the Viscomte de Secqueville, on the subject of a monument intended to be erected in honour of M. Dombasle; Sir Charles Morgan presented copies of the Prize Sheet of his Show at Courty-Bella, on Dec. 18th next; Mr. Hutchinson presented a copy of his work on the Practical Drainage of Land; Messrs. Gibbs and Myers, copies of their collection of results in the trials of Guano by their correspondents; Mr. Purchas, copies of the Reports of the Monmouth Farmers' Club; Professor Bernays, copies of his Lectures on the Theory of Agriculture; and the Statistical Society, Labourers' Friend Society, and Guernsey Agricultural Society, copies of their proceedings; and Mr. Nowell, a copy of his work on Self-Supporting Schools of Industry and Mental Discipline; for all which, and other communications, the best thanks of the Council were ordered.

The Council then adjourned to Wednesday, the 24th of April.

### NEW MEMBERS.

Beardmore, John, Uplands, Fareham, Hants  
 Bent, Major John, Wexham Lodge, Slough, Bucks  
 Black, John, Marske, Guisborough, Yorkshire  
 Bottomley, Joseph, King's Villa, Pontefract, Yorks.  
 Brown, John, 7, St. James's Street, London  
 Chalcraft, William, Bramshot House, Liphook, Hants  
 Child, William, Vernham Manor, Andover, Hants  
 Clutterbuck, Rev. James Charles, Long-Wittenham, Abingdon, Berks  
 Cotton, Charles Robert, Broughton Hall, Worthenbury, Malpas, Cheshire  
 Coupland, J., Southampton  
 Fifield, Job, Hill Park, Romsey, Hants  
 Fletcher, Alexander, Milbrook, Southampton  
 Frampton, John, Cerne-Abbas, Dorchester, Dorset  
 Gray, Rev. James, Rector of Dibden, Southampton  
 Hall, Joseph, Callington, Bromyard, Herefordshire  
 Hankey, J. Barnard, Fetcham, Leatherhead, Surrey  
 Holloway, Horatio, Marchwood, Southampton  
 Hussey, Edward, Scotney Castle, Lamberhurst, Kent  
 Kerrison, Edward Clarence, Stanhope-street, Mayfair  
 Kitson, Rev. Robt., Dean Vicarage, Ashburton, Devon  
 Lloyd, J. A., Leaton-Knolls, Shrewsbury  
 Lindley, Urban, Radmantlwaite House, Mansfield, Notts  
 M'Niven, Charles, Perrysfield, Oxted, Surrey  
 Martin, William, Paul's Grove, near Portsmouth  
 Mathias, William, Lambent, Fishguard, Pembroke-shire  
 Milner, William, Nunappton, Tadcaster, Yorkshire  
 Mountain, Rev. Thomas, Beighton Vicarage, Chesterfield, Derbyshire  
 Napier, Peach, Mousehole Foundry, Millbrook, Southampton  
 Newbery, Charles, Godstone, Surrey  
 Perry, John Watlington, Moor Hall, Harlow, Essex  
 Perry, Richard, 18, Chester-terrace, Regent's-park  
 Pitfield, John, Symonds-bury, Bridport, Dorset.

Plenty, Edward, Newbury, Berkshire  
 Pocock, Henry, Sowley, Beaulieu, near Southampton  
 Porquet, M. Fenwick de, Iron Foundry, Hornchurch, Romford, Essex  
 Rawlence, James, Heale, Woodford, near Salisbury  
 Robbins, Colonel Thos. William, Castle-Malwood, Stoney-Cross, Hants  
 Smith, Rev. Alfred, Old Park, Devizes, Wilts  
 Spear, William, Totton, Southampton  
 Spearing, John B., Chilton, Hungerford, Berks  
 Stacey, George, Uxbridge, Middlesex  
 Tichborne, Sir Henry, Bart., Tichborne, Alresford, Hants  
 Wheable, Thomas, Mitchelmersh, Romsey, Hants.  
 Wight, James Lane, Ledstone Court, Bromyard, Herefordshire  
 Worthy, Samuel, Temple-Coombe, Wincanton, Somerset.

### AGRICULTURAL MECHANICS.

TO THE EDITOR OF THE MARK LANE EXPRESS.

RESPECTED FRIEND,—In last week's paper is the conclusion of G. Cottam's lecture on the application of mechanics to agriculture, in which are some errors that appear to be in part typographical; but they are so calculated to give false impressions that I may perhaps beg a little space to correct them.

In speaking of scarifiers, the lecturer gives a short account of the various inventors, and states that Lord Ducie thought Biddell's too heavy, and therefore invented a lighter one; that Biddell's weighed 24lbs. to the inch, and Lord Ducie's only 5lbs.

In the volume on the "Implements of Agriculture," recently published by my partner, J. Allen Ransome, the subject of scarifiers is treated of pretty largely, and I extract the following therefrom:—

"As to comparative clumsiness—

<p>"Biddell's scarifier having 9 times, and covering a breadth of 5 ft. 6½ in. weighs 9 cwt. 2 qrs. 5 lbs., equivalent to about 15¼ lbs. for every inch in width."</p>	<p>"Lord Ducie's cultivator having 5 times, covering a breadth of 2 ft. 11½ in., weighs 7 cwt. 0 qrs. 19 lbs., equivalent to about 23 lbs. for every inch in width."</p>
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I wish to correct this error, merely because it is an error, and not at all with a view to advocate the principle that a light implement is consequently a better one; so far from it, that in many cases the weight is an absolute benefit, if judicious use is made of it, to produce stiffness and strength in the machine. And when we consider that even a Biddell's scarifier weighs less than an empty dung-cart, and yet that in strong ground it will *economically* employ the strength of four horses, there will appear but little to be gained if the *whole* weight could be done away with. The idea that it is desirable to attain great lightness in implements, in order to reduce the draught, has had far more importance attached to it than it deserves. In Handley's experiments on the draught of ploughs (which were performed under my eye), it was found that doubling the weight produced only about one-sixth more draught.

In speaking of thrashing machines, the lecturer states that at the Cambridge meeting 61¼ bushels of wheat were thrashed in one hour, but that the horses were "quite exhausted." As the machine which performed this quantity was made by our firm (J. R. and A. Ransome), I must beg leave to say that the lecturer

must have been misinformed, or have mistaken some other horses for ours. I admit freely that they were driven beyond the ordinary rate, and in a midsummer day (and a very hot day too it was) they were likely to be thoroughly sweated, but the pace was considerably within three miles per hour. With similar wheat, and a machine on exactly the same construction, I have known 55 quarters thrashed out in 10 hours, without any stimulus of competition.

stating the average at from 30 to 50 quarters, instead of bushels per hour; and next in computing the revolutions at 1,000 per hour instead of that number per minute, which is the fact. The number of beaters is more commonly four than six. I am sure, my friend Cottam will excuse these corrections of inaccuracies likely enough to occur to reporters not perhaps very conversant with the subject.

Two other errors occur, purely typographical, in

Ipswich, Thine, respectfully,  
4th month 6th, 1844. CHARLES MAY.

AFRICAN AND PERUVIAN GUANO.

SIR,—Guano, from the coast of Africa, has of late attracted much attention in England, and although large sales have been made, yet we are led to suppose that its qualities and value are but imperfectly known. We have endeavoured carefully to investigate the subject, and now beg to submit the same to your notice.

Average result of various Analyses made by Dr. Ure, gives of available matter ..	88 parts in 100.
"    Mr. Huson's Analysis .. .. .	86½ do.
Average .. .. .	77½ do.
"    Dr. Ure's Analysis .. .. .	76 do.
The one may be compared to the other as .. .. .	7 1/2 to 8 do.
or in money .. .. .	£8 15s. to £10 do.
The weight is .. .. .	8 to 9 do.

being a drawback to Ichaboe, as the Consumer would be put to about 40 per cent. extra charges on carriage, labour, &c., to obtain equal quantity of available matter, consequently allowing the consumer 5s. per ton .. .. . £8 10s. to £10

How does the case stand at present? We will take, for instance, a sale from the ship's side			
of 100 tons 0 cwt Genuine Peruvian Guano, at £10 ..	£1000		
Charges on do. to consumer, say ..	50	£1050	Available matter. 800
142 tons 17 cwt. Ichaboe Guano, at £7 .. .. .	£999 19		
Charges on do to consumer, say ..	70 0	£1069 19	Available matter. 999
		£20 0	199

showing clearly, under existing circumstances, that Ichaboe Guano, to the consumer, is 23 per cent. cheaper than Peruvian.

That sufficient grounds exist to calculate a rise in price of this class would appear reasonable when its relative value becomes generally known, and more especially as 1,500 or 2,000 tons of the Peruvian to arrive are already sold, as also the sale of this class being solely in the hands of one or two firms, the price is likely to be sustained.

It may be stated on the other hand that the number of vessels now loading, and many on their way, will keep prices down, which may for a time prove the case; so much the more favourable for such parties who might be inclined to invest money in the article, by buying, to arrive, at a low figure, that from Ichaboe, with, if possible, the option of sending the vessels to discharge at any port in the United Kingdom.

The following calculations will show the relative value to the agriculturist of the different qualities of Guano hitherto brought to this country, and will also enable the shipowner to see at a glance the description that will answer best to import :—

Description.	Compa- rative weight.	Available matter.	Tons, Cwt., &c.	At per ton.	Amount.	Contains Available matter.	Supposed labour and charges.		Total cost.		Extra cost for labour per ton.	Say,	Conse- quente- relative value.
							£. s. d.	£. s. d.	£. s. d.	s. d.			
Genuine Peruvian	930	88	100 0 0	10 0 0	1000	8800	£. s. d.	£. s. d.	£. s. d.	s. d.	s. d.	£. s. d.	
Ichaboe .....	800	77	114 5 2 24	8 15 0	"	"	114 5 9	1114 5 9	2 10	3 0	8 12 6		
Angra Pequena..	999	69	127 10 2 26	7 18 9	"	"	127 10 9	1127 10 9	5 6	5 9	7 11 6		
Possession Island.	1090	61	144 5 1 0	6 18 7	"	"	144 5 8	1144 5 8	8 19	9 1	6 9 0		
Puerto Cabello ..	870	57	154 7 2 24	6 9 6	"	"	154 7 9	1154 7 9	10 10	11 0	5 18 0		

Guano is now in such extensive use, and daily getting more and more so, that we should not be surprised before two years are over that the shipping interest of the country will have received almost equal advantage from that source as the agricultural.

Before, however, dismissing the subject, we would direct the attention of all parties to the undermentioned places, at some of which we are fully aware that Guano is to be met with :—

- The Bird Islands, St. Lawrence Gulf,
- "    Labrador and Newfoundland Coasts,
- "    Islands of Aves, Sombrero, and Tobago, West Indies,
- "    Islands of Ascension, and rocks of St. Paul near the Line,
- "    East Coast of South America, parallel with the West, from whence it is brought.

We are, Gentlemen, yours, very respectfully,  
CARSON and KILGOUR, Brokers,  
7, Exchange Buildings.

Liverpool, April 3rd.

CLOVERSEED.

(FROM A CORRESPONDENT.)

According to the official returns the quantity of cloverseed imported into the United Kingdom and the quantity cleared for consumption in the last nine years is as follows:—

	Imported. cwt.	Duty paid. cwt.
1835 ..	86,972	68,571
1836 ..	95,447	78,752
1837 ..	103,142	124,964
1838 ..	96,987	95,883
1839 ..	114,927	93,774
1840 ..	136,057	141,364
1841 ..	121,702	81,259
1842 ..	109,533	160,423
1843 ..	76,253	70,643

As, however, the trade in this article does not commence before October, and ceases generally in May, the clearances of any one season fall necessarily into two years; in order, therefore, to ascertain the quantity upon which duty has been paid for the use of any one season, we must take the quantity upon which duty has been paid from the 1st October in the one to the 1st October in the following year: this, by the official returns, shows the following result:—

Season.	Cwt.
1835-6 ....	81,488
1836-7 ....	124,619
1837-8 ....	90,082
1838-9 ....	95,553
1839-40 ....	146,820
1840-41 ....	75,093
1841-42 ....	164,169
1842-43 ....	69,207

As to the quantity of English and duty-paid Foreign Cloverseed remaining in the hands of farmers and dealers it is impossible to obtain any correct information, but the quantity remaining in bond, Liverpool and Hull, amounted—

On the 1st Oct., 1841, to	29,125 cwt.
1st Oct., 1842, to	25,979
1st Oct., 1843, to	20,498

The quantity imported into the United Kingdom exceeds that received in the above-named ports by about 20 per cent.; we may therefore estimate the stock in the same proportion, which would show the quantity remaining in bond at the commencement of the present season (1st Oct., 1843), to be about 25,600 cwt.

The foregoing tables show, that England requires a supply of foreign seed every year; this question, therefore arises, What is the consumption of the country, and what quantity can she produce in a favourable season? The last two seasons give us the best clue to solve these questions—1841-2 was notoriously an almost total failure, whilst 1842-3 was an abundant crop; if, therefore, we take the difference in the quantity cleared for consumption between the two seasons, it appears a fair estimate of the quantity Great Britain can produce under favourable circumstances:

In 1841-2 ..	164,169 cwt. were cleared for consumption.
1842-3 ..	69,207 do. do.
	94,962 cwt.; probable quantity which can be produced under favourable circumstances.
	Duty having been paid in 1841-2 upon 164,169 cwt.,

it appears within the mark if we estimate the consumption of the United Kingdom at 170,000 cwt. Let us now consider what prospects we have to obtain an adequate supply. As shown above, we estimate our stock of foreign seed in bond on the 1st October, 1843, at .. .. . 25,600 cwt.

Farmers and dealers may probably hold a surplus stock of old English and duty-paid Foreign of .. .. .	10,000
If the crop in the United Kingdom produces really only one-third of the average quantity, and we take the produce as estimated above, we should have a crop of about .. .. .	31,700
	<hr/>
	67,300 cwt.

and, consequently, require foreign supplies to the extent of .. .. . 102,700 cwt.

to complete the quantity of .. .. . 170,000 cwt. which we estimate the consumption of the country.

From the 1st Oct. to the 31st Dec. 1843, we have received in the United Kingdom .. .. . 26,761 cwt.

From 1st Jan. to the 24th Feb. in London, Liverpool, and Hull 19,672 cwt.

Add 20 per cent. addition in other ports .. .. .	3,935	23,607
		<hr/>
		50,368 cwt.

which would leave the quantity which we have still to receive, in order to complete the 170,000 cwt. required for consumption .. .. . 52,400 cwt.

London, Feb. 26, 1844.

IMPORTANT TO DAIRYMEN.—HEREFORDS AND SHORT-HORNS.—A gentleman in Leicestershire, who keeps a large dairy of short-horn cows, wishing to make a comparison between them and the Herefords, bought a Hereford cow at the Rev. J. R. Smythies's sale in 1839. He soon found that the Hereford gave less milk than many of his short-horns, but, as she was a fine-looking cow and a good breeder, he continued to use her in his dairy. In the spring of 1843, he determined upon making a more exact comparison as to the quantity and quality of the milk given by the respective breeds. For this purpose a short-horn cow was selected of the same age, and which calved within two days of the same time as the Hereford. The milk of each was carefully measured; the short-horn was found to give nine, and the Hereford six quarts at a meal. The milk was set up and churned separately; that from the Hereford produced nine pounds, and the short-horn not quite five pounds of butter per week. They stood in the same stall, were fed on the same description of food, and had been kept alike previous to calving. It has also been proved that two quarts of milk from a Hereford will produce as much curd as three from a short-horn cow. The gentleman is now crossing his short-horn cows with a Hereford bull, with a view of improving the quality of his milk.—*Hereford Times*.

## AGRICULTURAL QUERIES.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—Having on my farm (and in a situation which it would be very desirable to have permanently dry), a piece of land subject to upright land springs, and which no common system of drainage, as practised in our neighbourhood, seems competent to cure, I should be glad if any of the numerous readers of your magazine could inform me if there is any known method by which the water from these springs could be drawn away so as to leave the land dry, and how it is effected. I am Sir, yours &c.,

March 11th, 1844.

A SUBSCRIBER.

SIR—I should feel obliged if any of the correspondents of your valuable magazine would give their opinion relative to the value of hay salted for milking cows: I have a stock of about 20, and wish to know if the salted hay will increase the quantity of milk or have the contrary effect of reducing the quantity. I have no doubt on my mind but a little salt improves the value of hay; but what effect will it have upon the milk, or the improvement of the cows' condition?

The writer also wishes to know the comparative value of Swede turnips and mangel wurzel as winter food for milch cows, and which of the two are the most likely to produce the greatest quantity of milk along with salted hay. I hope that some of your numerous correspondents will be kind enough to give me the information required, soon, which will confer a great obligation upon one of your very old subscribers.

S. W.

Sabden, April 10, 1844.

TO THE EDITOR OF THE MARK-LANE EXPRESS.

SIR,—I am fearful my ewes are shewing symptoms of the rot, and that fear is strengthened on account of my having had them at *marsh* for about six weeks at Michaelmas-time, the latter four weeks of which was extremely wet. You, or any of your friends, will greatly oblige me by stating the first symptoms of the disease; and if I find them diseased, the best mode of treatment either to cure or rid them with the least sacrifice, and the time most likely for them to live and thrive, supposing I give them oilcake and other good keeping for the purpose of grazing. I should add, they have all lambed, and done middling well, having lost only one sheep to forty ewes set; and about thirty lambs died, or cast dead. An early answer will greatly oblige,

Yours, truly,

April 6.

A YOUNG FARMER.

SIR,—Seeing in your valuable paper an account of a report to the Royal Agricultural Society on burning clay for manure, will you allow me, as a young farmer of stiff clay lands, to inquire the process of burning the clay, the seasons, and whether procured from the subsoil or not, and if ignited by lime? Also to reply to "H." respecting the goss for cattle, having seen it used. Cut at one year old, and bruised in an excellent machine manufactured by Messrs. Barrett, Exall, and Andrewes, of Katesgrove Iron-works, Reading; given to cows of Lord Calthorp's, producing finer flavoured butter than any other food.—I am, Mr. Editor, yours respectfully,

R. S.

Crondece, near Farnham, Surrey.

## TO CUTHBERT W. JOHNSON, ESQ.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—As you, in a communication to the "Mark Lane Express," some time back, kindly promised to answer chemical enquiries, if not proposed anonymously, I venture to request you, either through the columns of the above-named paper, or directly to me at your convenience, to give the most effectual manner of fixing the ammonia in liquid manure.

I house-feed my milk cows, and in each of my houses there is a tank for their urine. In the winter the tanks are emptied, and put over the midden. I will thank you to state which is the best of the following ingredients, and the manner and quantity of using it, to fix the ammonia in the urine in the tank, before it is emptied—sulphuric acid, calcined pulverized gypsum, uncalcined pulverised gypsum, or common salt.

I intend in summer, immediately after the clover is cut for soiling, to sow over the newly cut land powdered gypsum, and then take the urine from the cows' tanks in a water-cart, and spread it over the gypsum. Will you also be so kind as to say if the urine will require any water to dilute it; if the gypsum should be burnt before powdering; and if the urine in the tank should have its ammonia fixed before taking out as in the winter, or will the gypsum not require it? Your attention to this will oblige yours, very respectfully,

RICH. NICKLIN.

Glenville, Douglas, Isle of Man, March 12.

SIR,—The best practical mode of preventing the escape of ammonia, is to mix with the decomposing matters finely divided gypsum. This is perhaps in the best state for combining with the ammonia when previously calcined. Mr. Nicklin will find it advisable to spread the urine very thinly over his grass, and I should advise the addition to the urine of a portion of the gypsum when in the tank. The expense is very trifling.—I am, Sir, yours,

C. W. JOHNSON.

14, Gray's-Inn-square, March 26.

TO THE EDITOR OF THE FARMER'S MAGAZINE.—Having sown, last year, my Swede turnip seed, to my great regret the plant was eaten off by the fly as fast as it appeared. Thinking it too late to sow it again, I wrote to Messrs. Thos. Gibbs and Co., Half-moon Street, Piccadilly, London, for some of their hybrid green top turnip seed; and I must say, in justice to them, that it is the best turnip, next to Swede, I ever grew. Any farmer trying it this season I think will not regret doing so.—Yours &c., C. W. SMITH, Slade Farm, Salcombe, Devonshire. 13th April, 1844.

ON WEEDING.—The most proper time for weeding is before the corn takes what is termed "the second growth"—the weeds are then sufficiently strong to be easily got hold of, while their roots are not too firmly fixed in the earth to cause injury to the corn by their being pulled out, nor is the corn plant at that age hurt by being trod upon. When the weeds are removed at that juncture, the grain crops get such a start of any under growth that may have been left in the ground that it soon overtops all kinds of weed for the rest of the season, and, what is of much importance, prevents them coming to seed.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR APRIL.

On a comparison of seasons, we consider we are perfectly justified in stating that the weather of this month, taken as a whole, has been the most propitious to farming in general, as well as to the growing crops, ever remembered. Throughout our grain districts, the greatest activity has been observed both in ploughing and sowing. The former operation was concluded about the middle, the latter about the end of the month; and, notwithstanding the quantity of rain that fell during March, the ground has been found in the most admirable order.

The accounts which have reached us from all parts of the country concur in stating that the appearance of the autumn and Lent-sown wheats is in the highest degree satisfactory. We do not mean to assert that they are luxuriant; but that they are strong, and denote future abundance. The same remarks may be equally applied to those of barley, oats, beans, and peas.

The accounts from Scotland are very favourable, as respects the progress of agriculture. Those out-door farm labours so necessary at this season are all well in their place; and we have the best authority for stating that the growing crops never looked finer or more healthy than at present. The corn trade, as with us, has ruled inactive, at, in some instances, drooping figures.

Throughout Ireland all has gone on favourably. The young grain plants are looking remarkably well, not only in the highland, but also in the lowland districts; but the stocks of wheat of last year are represented as extremely small for the time of year. The shipments of oats to London and Liverpool have been good; but those of all other kinds of grain have been small.

The principal feature in agricultural politics, since our last, has been the publication of a most ably written pamphlet—on the part of the Protection Society, in London—by E. S. Cayley, Esq., M.P., and in which the cause of the farmers of England is laid down in clear and explicit terms. This temperate address—so unlike the unseemly and disgraceful attacks which have been made through the organs of free trade upon the farming interest—should be in the possession of every farmer in the country, and widely distributed amongst the labouring population, wherever residing; for sure we are, that a better medium for stemming the torrent of free trade principles—save that of the press—cannot be found.

We are truly glad to find that the ravages of the epidemic, as well as of the foot-rot, have not been to a serious extent. Numerous cases have been observed, but, generally speaking, the losses have been by no means severe ones in any part of England.

With the exception of barrelled and other provisions, the imports under the new tariff have not been by any means large during the month. As to those of beasts, we find they have consisted of

only about 20 from Spain, and 30 from Holland; while the importations of sheep have been small indeed, viz., about 17.

The following is our usual monthly statement of the supplies and prices of fat stock exhibited and sold in Smithfield Cattle Market. The former have been as under:—

Beasts .....	12,800
Sheep and Lambs ..	120,400
Calves .....	1,200
Pigs .....	1,590

The above shows a considerable falling off, compared with the supplies offering during the corresponding periods of 1842 and 1843; yet they have, owing to the receipts of country-killed meat proving extensive, been quite equal to meet the wants of the trade, who have succeeded in depressing the general value quite 2d. per slbs. The demand, however, for the best kinds of beef, mutton, and lamb has ruled tolerably steady. As to prices, they have ruled as follow:—

	Per Slbs.			
	s.	d.	s.	d.
Beef .....	2	2	to	4 0
Mutton ....	2	4		4 4
Lamb .....	5	0		6 8
Veal .....	3	4		4 6
Pork .....	3	0		4 4

As is almost invariably the case at this season, the principal portion of the supplies of beasts has come to hand from Norfolk, the number from that county having amounted to about 5,800 head, in, for the most part, excellent condition. From Scotland, about 1,700 horned and polled Scots have been received, the remainder of the bullock supplies coming to hand from various parts of England.

A STATEMENT and COMPARISON of the SUPPLIES and PRICES of FAT STOCK, exhibited and sold in SMITHFIELD CATTLE MARKET, on Monday, April 24, 1843, and Monday, April 22, 1844.

	Per Slbs. to sink the offals.			
	April 24, 1843.		April 22, 1844.	
	s.	d.	s.	d.
Coarse and inferior Beasts.....	2	6 to 2	8 ..	2 4 to 2 8
Second quality do.....	2	10	3 2 ..	2 10 3 2
Prime large Oxen.....	3	4	3 6 ..	3 4 3 8
Prime Scots, &c.....	3	8	4 0 ..	3 10 4 0
Coarse and Inferior Sheep.....	2	10	3 0 ..	2 8 3 2
Second quality do.....	3	2	3 4 ..	3 4 3 6
Prime coarse woolled do.....	3	4	3 6 ..	3 6 3 8
Prime Southdown do.....	3	8	4 0 ..	3 10 4 4
Lambs .....	5	0	0 0 ..	5 0 6 4
Large coarse Calves.....	3	6	4 0 ..	3 4 4 0
Prime small do.....	4	2	4 6 ..	4 2 4 6
Large Hogs .....	3	0	3 6 ..	3 0 3 8
Neat small Porkers.....	3	8	4 0 ..	3 10 4 4

SUPPLIES.

	April 24, 1843.	April 22, 1844.
Beasts .....	3,022	2,642
Sheep & Lambs .....	34,089	26,730
Calves.....	67	73
Pigs.....	427	381

Up to Newgate and Leadenhall (in which markets the demand has ruled tolerably active) a large quantity of slaughtered meat—or nearly 20,000 carcasses of beef, mutton, lamb, veal, and pork—has come to hand; still fair clearances have been

effected, at but little alteration in prices. Beef, from 2s. 2d. to 3s. 4d.; mutton, 2s. 4d. to 3s. 8d.; lamb, 5s. to 6s. 4d.; veal, 3s. 4d. to 4s. 6d.; and pork, 2s. 4d. to 4s. 2d. per 8lbs. by the carcass.

#### AGRICULTURAL REPORT FOR APRIL.

The weather is, and has been, of the most splendid character ever since our last: a month indeed of sunshine, with only two exceptions—one of a gentle rain on the 12th, and again on the 16th, when there was a local shower—has passed, and during that period the barometer has ranged above 30 inches. A more glorious *wheat season* has seldom been witnessed; but barley would benefit by a change: some, indeed, is only just sown, in ground so hard, dry, and cloddy, that the farmers predict a ground malting.

We certainly anticipate a change in May, for that month has been of late years most ungenial.

At this time last year, all the mischief that frost could effect upon the previously most luxuriant young wheat had been inflicted. Now—what a contrast!—every thing is just as we could desire; a little rain and mild weather, in lieu of the cold deluges which paralysed the vegetation of last May, would be the precursor of crops so abundant as to astonish the speculator. But as we cannot command the weather, it would be worse than useless to prognosticate.

The farmer should hasten his potato sowing, because the tubers would germinate strongly after the first copious shower. We talk and read much about *ammonia* of late; now, if a salt of ammonia be so essential, where can it be found in a condition so excellent, so truly fixed, as it is in coal soot? There is no substance known, which can surpass it, if judiciously applied. Soot contains abundance of ammonia, so concealed as not to be discoverable, unless by a chemical re-agent (as lime, potass, soda,) and combined with carbon, the particles of which are impalpable. We wonder it is so little sought after, especially by those who may have been so fortunate as to peruse Mr. Morton's able article upon Stinchcomb Farm in Gloucestershire.

To recur again to Mr. Campbell's materials for steeping corn, it is evident that the Highland Society has been impressed with the force of the facts and specimens he adduced, because it urges the necessity of experimenting upon the substances alluded to by him. English farmers are slow and indolent: they plod on, and are willing to do so rather than to throw overboard all *causes* of complaint. In Scotland they are energetic, liberal, yet equally plodding; but then this latter is the result of a calculating economy: everything is made the best of; and we have been positively assured, not a month since, by an authority which few would doubt or mistrust, that there are no existing complaints among the agriculturists of Scotland. Labouring against difficulties, with fewer and inferior availabilities, an inferior soil, and less sun—acuteness, industry, and economy, with rigid temperance, have

effected the noblest improvements, and insured content.

Thus Mr. Campbell's agents are now under extensive trials. His statements have been so candid and modest, that liberal men have determined to work out his facts; and, if they be established, one-half the seed will be economized, and the product at least rendered two-fold; if they fail, some other truth will be elicited, and thus a certain, though unforeseen, benefit derived.

We cannot add more now, time being limited; but the subject must be further urged preparatory to the next wheat season.—April 25.

#### ESSEX.

We have now about come to the conclusion of as fine a time for spring sowing as we ever remember; and though the land that has been ploughed has turned up anything but friable, and in a very sorry condition, all surface tillage has been performed in a highly satisfactory manner. Spring has come on lately with rapid strides, and all vegetation is bursting with the promise of much abundance. It may be said of every description of corn and grasses, that the plant was never better or the appearance more cheering. Wheats are generally every thing that can be desired. Barley and oats have shot through their seed-beds as if by magic. Beans and peas are excellent. Clover-leys full of herbage. Tares and grasses equally good. Lands intended for mangel wurzel partially sown in fine condition; potatoes going into beds well prepared for their reception; turnip-lands in so advanced a stage as even now, in some instances, to be ready for seeding, and so plentiful has feed been this spring, that mangel has been selling at 10s. to 14s. per ton; and white turnips have gone so rapidly to top, that some considerable breadth must go to seed or be ploughed up. Hay and fodder of every description has suffered little or no waste, and much will remain over for the consumption of the ensuing year. Beasts and sheep have gone on well; and had markets been better, we should have had no cause of complaint. We hear of cases of a complaint attacking the lungs of beasts, and terminating generally fatally; but the common epidemic has been by no means so troublesome as in former years, though here and there flocks of sheep and lambs are still seen suffering under it. We by no means qualify or alter the expression of opinion given ever since last harvest, that wheat was deficient: our own experience too fully confirms it; every inquiry as to the growth of others strengthens it; and we shall be astonished if the months previous to harvest do not prove it also. Were we to express an interested wish, it would be that there might be found a sufficiency of our own, to the exclusion of the foreigner. Incendiarism continues to disgrace our county; and it is worthy of remark, that of all the perpetrators that have been discovered, not one has had the plea of poverty to urge in extenuation of his crime. So much for the infamous assertion made the other day by a contemporary, "that the lurid flame lit up by the incendiary was the only method the poor man had to convince the rich that there was poverty in the land." Amidst the sufferings of those engaged in agriculture, it excites surprise in our minds how they have so well employed the labourers as has been the case; and we doubt not that many a family is now suffering privation rather than discharge the honest and industrious labourer who, having toiled for them in the days of comparative prosperity, seems to have a lien on them, though now in the depths of adversity.

## YORKSHIRE.

The weather, during the past month, has been everything that the farmer could wish for. The dry March, the freedom from frost, the absence of the cold piercing winds which so often occur, and the natural state of the temperature, have been just sufficient to keep vegetation in its proper limits; we have, therefore, a seasonable spring; and a most valuable change from the somewhat wet February, which had rather retarded agricultural operations. Every farmer has set busily to work. Barley and oat sowing commenced almost simultaneously, and certainly never was soil in a more auspicious state for receiving the seed than it has been

this spring. Very much spring wheat has also been put in, which caused the demand for seed barley to be somewhat slow. The wheat crops revived very amazingly during the change of weather. In all cases there appears to be plenty of plant, and the general aspect is, so far as anything at this period of the year can indicate, extremely favourable to the prospects of the crop. The barley roots are coming up very vigorous; and, though the clover leys are rather backward, the pastures are more forward. Many farmers are, this spring, sowing guano as a top-dressing; and, from several favourable trials which have been made of it, we anticipate its use to become very general, and partially to supersede the use of bones.

## CALENDAR OF HORTICULTURE.—MAY.

*Retrospect.*—To the present period of April, when this article is commenced, the weather has been a phenomenon of beauty. March was rough, justifying its characteristic—"many weather" completely till the 26th, when, as the *northern* prognostic of the equinox had indicated, the weather became settled, the wind stationary, and the mercury steadily on the advance. A few riny nights have comprised all the rigour of this most charming season, which has caused vegetation to progress, in garden and field, steadily, and in great health. The damage which had been sustained by the evergreens, and most of the families of *brassica*, was irreparable; hence the paucity of the latter, and the parched appearance of the former; but otherwise not any check has been experienced; and we now have only to express our desire that the rain, which in reason may be expected after 25 days of continuous sun, will soon fall, and perfect the work of this most glorious and promising spring.—(April 22).

## NATURAL AGENTS.

To resume the subject of *manures*, it is essential to follow up the remark (at page 475, April) concerning the exhalation of ammonia from the dung heap. Whenever masses of substances containing nitrogen ferment, a disturbance of the elements of water and of the putrescent bodies collected together takes place, and many of those elements combine at the moment of their extrication, and produce new compound arrangements; among these are hydrogen and nitrogen, which unite by natural attraction (for this union cannot be effected by art), and produce ammoniacal vapour, to which we must ascribe the pungent odour of close stables. If a bottle containing spirits of salt (muriatic acid) be opened, in any place where such an odour, however slight, is perceptible, a volume of white fumes is immediately discerned. These consist of small particles of the salt called sal ammoniac, formed at the moment by an union of the alkaline vapour of the ammonia and the acid vapour of the muriatic acid.

Now, in order to retain this ammonia in the mass, it might suffice to sprinkle it with weak muriatic acid: but the salt so fixed is itself volatile in heat; therefore, we invariably recommend as more available, and also as being cheaper, the

sulphuric acid, which will answer every purpose. This remark leads to the treatment of night-soil, to which the more delicate term of *cloacine* has been very correctly applied. It forms the basis of several of the disinfected manures, and as such when reduced by age, and drying to a pulverised condition, is very fertilising. It is mixed with saw-dust, gas, lime, and other ingredients, for sale, and, we hear, is used largely by the gardeners as top dressing, among drilled crops, for asparagus, and also for geraniums, mixed with loam and sand. Cloacine is readily disinfected by being mixed in the first instance with two or three parts of soft loam, then sprinkled with diluted sulphuric acid, covered with a foot layer of pure loamy soil, and kept for two years: a deep excavation over a clay bottom is the best reservoir, unless there be brick tanks on the premises. A bushel of the dry, powdered cloacine, mixed with its own bulk of vegetable earth, would top-dress eight poles of land.

## WEEKLY OPERATIONS IN THE KITCHEN-GARDEN.

First and third week.—*Kidney-beans*, dwarfs and runners. It would be well to place the seed under cover, in a vessel of dryish earth, just to germinate, and then to plant them in drills, two inches deep, the plot manured with leaf-soil. Peas are treated in the same way, and if the weather be dry, the ground and drills ought to be profusely soaked; a little guano, or finely powdered bones, about a quart to 10 yards, might prove a stimulant, if sprinkled along the drill. Of peas the tall marrow and Knight's green marrow are excellent. *Broad-beans* are again sown in the like manner.

*Potatoes* ought to be in soon, and two-eyed sets of some mealy variety should be chosen. Dress the ground with leafy compost, and a gallon of soot to the barrow; dig and plant as the work proceeds, and cover carefully. The sets may stand five inches asunder; the rows two to three feet apart. Plant *Artichoke* suckers in the first showery weather.

Second week.—Sow plants of the brassica families. *Broccoli* for autumn, and the best hardier varieties for spring. *Savoys*—kale, Borecole, and Brussel's sprouts.

Fourth week.—Again renew the sowing.

## FRUIT DEPARTMENT.

*Currant* and *Gooseberry* bushes require some thinning of supernumerary and water shoots, also of suckers which would rob the trees and spoil their figure; every plot ought to be weeded by the Dutch hoe.

*Peach* and *Nectarine* trees should be disbudded of every supernumerary shoot; retaining the bearers, and also one at or near the base to serve as succession. Remove the breast-wood of plums, cherries, and apricots, so as to keep the wood and spurs close as possible to the wall. If green-fly abound, syringe freely; it is said that an infusion of camomile is a safe and effectual wash, better and safer than tobacco. Mildewed shoots ought to be cut back, dusting the trees with flowers of sulphur. The same remarks will apply to forced trees, which even require greater care to remove superfluous shoots, to thin the fruit, and to keep the leaves perfectly clean. Syringing is of consequence; after which the sashes should be closed before sunset, to bring up a warm vapour that tends to swell the fruit.

*Strawberries* promise to be abundant and early, unless the weather become unpropitious; every weed should be removed, and short grass, if possible, laid about the plants; strings properly applied to keep up the trusses, are favourable to the fruit.

*Vines* are extremely forward, but from this very cause are liable to suffer. The bearing wood must be timely stopped; but there is no need of that rigorous pruning which some practise: the full exposure of a compact covering of fine leaves to the sun is essential to health and strength.

*Vines* under glass must be treated according to the condition of the fruit: if forward and colouring, vapour is inimical; and, indeed, that great steam kept up by many is, at all times of doubtful utility, though it is doubtless inimical to the spider. Syringing under the leaves is not good; we believe it may be one cause of that lichenous eruption which is too frequently observed. The later grapes require nice and repeated thinnings: it will be better to thin regularly and by degrees, than to slash at random, leaving gaps which utterly disfigure the clusters.

## THE GREENHOUSE.

They who have means, and would do their work well, ought to have houses with two aspects: the sun scalds, decomposes, and hastens the de-

struction of bloom: hence, a shady, cool house is most fit for blooming plants; but we deprecate the practice of removal to the open air: deep shady pits are far better as summer habitats, for a full exposure paralyses all plants that have been under glass. We hear much of calico transparent covers, and know those who recommend highly Witney's new composition. A diffused light is soft and genial; it suffices for healthy function, without permitting decomposition of colour. Air, however, and plenty of water must be regularly given.

*Propagation* of greenhouse and stove plants must be continued. If cuttings will strike at all in water, a good deal of time is frequently gained by inserting them in bottles kept at 70° or 75°, till a ring of callus forms at the heel; each cutting may then be transferred to a single small pot of appropriate mould: leaf-soil, white sand, and some soft turfy loam, are excellent for most things with gentle bottom heat; and no plan to procure *that* seems so certain and genial as the new tank system now coming into vogue. We have watched the creation of a new house, fitted up expressly for propagation. The water flows first from a close copper boiler with two pipes, but no other vent; the fire is in the centre, and is supplied with coke or good cinders: the water is thus propelled into a square drain or flue, passes along the front of the house, then returns by the centre, enters a tank, flows and returns through it, and re-enters the boiler. Over the tank is a space, covered with strong slates, which form a close steam chamber, and support a stratum of sand or earth, that can always be maintained at a regular temperature, and be kept free from grubs and worms, while it never wastes or requires renewal. The boiler and appendages cost scarcely £4; and as bricks only well cemented are used for the water flues, which are covered with lady slates, the whole expense is little compared with the availabilities of the machinery.

*Pines, Melons, and Cucumbers* could, no doubt, be grown in such erection so heated, with the utmost certainty and regularity; and as to ornamental plants, we perceive every appliance to ensure the utmost cleanliness, while, at the same time, a vaporous or more dry atmosphere, is completely at command.

We earnestly desire to see the machinery brought into complete action, when we hope to give a candid report of what at present appears to comprise every requisite of success.

## REVIEW OF THE CORN TRADE

## DURING THE MONTH OF APRIL.

The weather has, since we last addressed our readers, been of as auspicious a character as could possibly be desired, and the apprehensions which the heavy rains in February and March gave rise to, have happily proved groundless. From the commencement of the month, the at-

mosphere has been dry and absorbent; the wind mostly from the east, the days sunny, and the nights, though cool, not so cold as to injure vegetation—a combination of circumstances highly favourable for bringing the land into good working condition; the superfluous moisture was,

consequently, dried up in an incredibly short space of time, and farmers were enabled, ere the first week in April had expired, to resume field labours. Since then they have scarcely met with a single interruption, and the sowing of barley, oats, &c., has made very rapid progress; indeed, in the more forward districts, this operation may be said to have been brought to a conclusion, and even in the north the bulk of work has been finished. Within the last week or two, fears have arisen that the dry weather may be of too long continuance, and the want of moisture retard the vegetating of the seeds. A plentiful supply of rain is now much required; for though the wind, which had previously blown from the eastward, has lately veered to west, and slight showers have fallen, a more copious supply of moisture is now requisite to impart vigour to vegetation. The reports respecting the young wheat plant continue satisfactory; and the absence of rain has, as regards this crop, up to the present time, been rather beneficial than otherwise. Its appearance, without being too luxuriant, denotes strength and health; here and there, it is true, exceptions may be found, but these are certainly less frequent than in ordinary years, and, both as to the breadth of land under this crop and its flourishing condition, there are reasons to expect (as far as any calculations can be depended on at this early period) future abundance. The auspicious accounts from all parts of the country on this important subject have tended to check all disposition to speculate, and the trade in wheat has, throughout the month, remained in a somewhat languid state; though, from the numerous out-door occupations, the deliveries have, during the entire period, been unusually short. It may seem strange that the weather should have much influence at so early a period as April, when any of the many atmospheric vicissitudes which must necessarily be expected to occur before the time of harvest comes round, might so speedily change the whole aspect of affairs; still, to the promising appearance of the fields a great part of the caution and want of animation which has lately characterized the trade is to be attributed. This, however, has not been the only cause; the knowledge that a larger proportion of last year's crop of wheat remained on hand over a great part of the north of Europe than has for several previous seasons been the case, has also had its effect. The importation from abroad will, of course, in a great measure, be regulated by the chances of profit held out; but, under any circumstances, the purchases made during the winter months, on British account, must come forward, and many of these may be almost immediately expected to reach this country. The anticipation of this early importation, and the notion that some importers may, perhaps, enter from on board ship for home consumption at whatever rates of duty may prevail, have prevented buyers purchasing freely; and thus, though the markets have been scantily supplied by our own growers, have prices been gradually drooping. The protracted winter expe-

rienced on the continent—the frost having been so severe that many of the Baltic ports remained blocked up by ice until the first week in April—has hitherto prevented any supplies of moment coming to hand; but, according to the most recent accounts from abroad, shipments were in active progress. The probable extent of the importation is variously estimated. In the first instance it will, we are disposed to think, not exceed half a million of quarters; but, should circumstances occur later in the year to give cause to apprehend any deficiency in our own crop, double or perhaps three times that quantity would come forward. We are satisfied that there is no want of stocks on the continent, our conviction on this point is founded on the comparatively small importation in 1843. Even making every allowance for the deficiency of the last harvest in Poland, Prussia, &c.; the quantity on hand must still be large. For several preceding years Great Britain has imported annually above two million of quarters; and by an official statement recently published by order of the House of Commons, it appears that the total quantity of wheat on which duty was paid in 1843, including colonial, amounted to only 990,523 qrs.; it is, consequently, fair to conclude that a larger quantity than usual must be held abroad, which may at any time be poured into this country.

The duty fell to 16s. per qr. on the 4th inst., and remained at that point till the 18th. Its rising again in so short a space, and the circumstances already alluded to, namely, the severity of the winter in the Baltic preventing any receipts of importance, caused less to be entered for consumption at that rate than might have been expected. Of the 250,000 qrs. previously in bond in the kingdom, about one-fourth has been liberated. The object we have had in view in the foregoing remarks has been to furnish our agricultural friends with the best materials in our power to enable them to form their own opinions respecting the future range of prices. One important element in the calculation we have, however, still to notice; but so vague and contradictory are the reports on this subject, that we find it difficult to come to a conclusion; we allude to the stock of English wheat remaining in the country.

We have spared no pains to collect the best information on this point in our power; and the inference we draw from the same is, that rather less is held by farmers than at the same period in ordinary years. In some of the south and south western counties the deficiency is considerable; but, on the other hand, there is a small surplus in the eastern parts of the kingdom, and the total quantity in the stack yards is probably not much below what is usual at the close of April. Viewing the subject in all its bearings, we can perceive no reason to calculate on the value of wheat rising much above its present level, unless brought about by speculation founded on the weather.

To put the case in as clear and distinct a manner as possible before our readers, we shall, at the risk, perhaps, of being considered tedious, state in a few words the reasons for and against a rise. In favour of the former, are the following:—A much smaller stock of foreign wheat than last year, the general belief that the quantity of home-grown is likewise somewhat less than usual, a larger consumption than in ordinary years, and the millers holding scarcely more than sufficient to carry on work for a few weeks.

Against these facts we have a large breadth of land under wheat, the crop wearing a highly promising aspect, the certainty of an early and not unimportant importation from abroad, with the probability of larger supplies during the summer months.

The existing corn law is, in our opinion, working well; inasmuch as situated as we have been of late, with very little free wheat on the markets, and, in consequence of occupations in the fields, short supplies from the farmers, speculators would, under the old law, have found little difficulty in tampering with the averages, so as to get the whole of the bonded stocks released at a low duty.

A most interesting document has lately been published by order of the House of Commons, giving an account of the different places from whence last year's supply of foreign grain was received, and the quantity imported from each country. We do not recollect ever having seen a similar statement before, and, as the information it contains is well worthy of attention, we subjoin the table, together with one showing the exports of grain from Great Britain during the year 1843.

Though we have already stated the business in wheat has, throughout the month, been dull, it may be as well to give a somewhat more detailed account of the course of the trade; and Mark Lane having a direct influence on all the other markets, we shall describe the changes which have there taken place.

As regards prices, scarcely any real alteration has occurred, the difference in the rates obtained having depended mostly on the condition in which the samples have come to hand. In the early part of the month a large proportion of the supply consisted of ordinary qualities, and rather less money was consequently, in partial instances, taken; the subsequent dry weather naturally caused an improvement in this respect, and, though the demand continued languid, former terms were well maintained up to the 22nd inst.: on that day we had an increased supply from Essex and Kent, consisting principally of secondary and inferior sorts; and though the best qualities still commanded the prices previously current, all other descriptions were quoted 1s. to 2s. per qr. lower. It is necessary to observe that the intrinsic value of the article for which the reduced rates were accepted, was as much below that brought forward in the middle of the month as the difference in prices obtained.

During the fortnight at which the duty on wheat was 16s. per qr., about 17,000 qrs. were released out of bond in London, 14,000 qrs. at Liverpool, 5,000 qrs. at Hull, 15,000 qrs. at Newcastle, 5,000 qrs. at Bristol and Gloucester; which, with 10,000 qrs. at sundry other ports; will make the total quantity liberated in the kingdom about 65,000 qrs., or rather more than one-fourth of the entire bonded stock.

Unimportant as this amount really is, it has proved sufficient to supply millers with the requisite quantity for mixing with the damp qualities of our own growth; in addition to what our own manufacturers have taken, several buyers have appeared from the west and north-west, and factors have therefore been enabled to make fair progress in its disposal, by acceding to a decline of 1s. to 2s. per qr. From the present position of the averages it appears probable that the duty will remain stationary at 17s. per qr. for several weeks, and a very slight rise in prices would suffice again to reduce it to the point from which it has recently advanced. Hitherto the importations from abroad have been trifling, but the time is now fast approaching when supplies from the Baltic must be looked for: whether importers will pay the 17s. duty, generally, may be questioned; we are, however, inclined to think that some will be induced to do so in preference to incurring landing expenses, and to such an extent as sales can be effected from on board ship entries for home consumption are likely to be made. With this prospect before us, it would, as we have before remarked, be unwise to reckon on high prices; whilst the fact that any material abatement in the value of English must add to the duty, and thereby diminish the quantity of foreign entered for home use, will act as a check the other way. To us the balance appears to be so nearly adjusted that, with moderately propitious weather, we can see no reason to expect a greater fluctuation than a few shillings per quarter; and, with the benefit of steady prices, the foreign wheat is likely to go gradually into consumption, without, as heretofore, a large stock accumulating under lock, to be thrown on the markets just previous to harvest time, when competition must always be the most detrimental to the home grower. Besides the quantity of foreign wheat liberated, a slight demand for shipment to France has been experienced, and at the present time there are probably not more than 150,000 to 200,000 qrs. in bond in the united kingdom. Flour has remained stationary in price in the London market during the whole of the month, nor have prices varied much in any part of the country. The millers complain that the value of the manufactured article is relatively below that of the raw material: if this be really the case, the extent of competition must be the cause—a good consumptive demand having been experienced, in consequence of the labouring classes being generally in full employment.

Since our last, a portion of the expected supply of foreign barley has come to hand; within this

week or two large arrivals have taken place at the principal out-ports, whilst the receipts into London have been abundant. A perfect panic has been created by the extent of the supply, and sales have been made at ruinously low prices; considering the cost of the article on the continent. Whether this state of things will be of long continuance remains to be proved; our own conviction is that the alarm is needless, and that this grain will, later in the year, bear a higher value. Good distilling barley, weighing 53 to 54lbs. per bushel, has actually been sold at Mark Lane at 28s. per qr., and other sorts at corresponding rates. Taking weight into account, this must be cheaper for feeding purposes than any other description of corn; we can therefore scarcely believe that the downward movement can extend much further; at all events, we should recommend our agricultural friends to refrain from pressing sales at present. The malting season may be considered as having terminated, but so scarce have fine qualities of English become, that notwithstanding the important fall in prices of all other sorts, the value of superior parcels has varied but slightly, 35s. per qr. having very recently been paid in the London market. The duty remained at 5s. till the 25th instant, when it rose 1s. per qr., previous to which the whole of the bonded stocks were released.

The inquiry for malt has, throughout the month, been languid; the receipts coastwise have not been larger than usual; and the only alteration which has occurred in prices has been a reduction of about 1s. per qr. on middling and ordinary qualities, really fine samples having commanded former terms.

Notwithstanding the reiterated reports from Ireland that the stocks of oats were nearly exhausted in that country, the supplies received from the sister isle have not been unimportant since our last. At most of the ports on the west coast of England and Scotland, as well as into London, the arrivals of Irish oats have been sufficiently large to prevent any advance of importance occurring in quotations, though of home-grown corn less than the usual quantity has been brought forward. The trade has, nevertheless, maintained a decidedly firm tone; and it is now the general belief that, as the summer advances, prices will gradually creep up a few shillings, in which opinion we feel rather inclined to coincide. The superior quality of the Irish Oats which have recently come forward, has occasioned a somewhat unexpected rise in the averages; and, contrary to what was calculated on, the duty receded a step on the 11th instant, there being very few oats in bond in the kingdom: the circumstance has produced no effect on prices. Beyond the usual yearly quantity from Russia, we do not reckon on any importation from abroad of consequence, this grain continuing to bear a relatively high value at most of the near continental ports.

Beans of our own growth have come forward rather sparingly of late, and the article appears

to have become scarce in most parts of the country; there is still a tolerable stock under the Queen's locks, consisting principally of Egyptian; but, compared with what was held at the corresponding period of last year, a considerable decrease is shown. On the 5th of April, 1843, there were in bond in the kingdom 111,261 qrs., and in London 43,903 qrs.; against which we had on the 5th of April (the latest day the stocks are officially made up) 20,996 qrs. at this port, and 66,465 qrs. in the kingdom.

The article has, until quite recently, been completely neglected, and up to the close of the month its value has undergone no change; rather more disposition has, however, lately been manifested to make investments in the finer kinds of English, and we should not be surprised to see a small advance. In the duty no alteration has occurred, nor is there any immediate prospect of a reduction.

The transactions in peas have been on a restricted scale since the demand for seed has subsided; the smallness of the arrivals has, however, prevented any decline taking place, indeed the tendency has been rather upwards. Still there is but little prospect of a lower duty than the present, a circumstance likely to discourage importations from abroad.

Before concluding our remarks we must briefly refer to the position of the wheat trade at the different foreign markets. From the south and south-east of Europe Great Britain is likely to receive far less this year than was at one period deemed probable, the extensive deficiency of the last crop over a great part of France, and the almost total failure in the kingdom of Naples, having now been proved beyond doubt. The supply from the Black Sea which would, under ordinary circumstances, have found its way to this country, will therefore be considerably diminished by a material portion being diverted to other markets. According to the most recent advices from Marseilles, we learn that extensive purchases had been made there for transit into the interior of France, Switzerland, &c., which, with the diminution of supplies in consequence of several cargoes, originally intended for that port, having gone to Naples, had imparted a very firm tone to the market; the inquiry had, however, towards the middle of the month, rather fallen off, and good qualities of Polish Odessa were, on the 20th of April, obtainable at 33s. to 34s. per qr., free on board. It is from the north of Europe that the bulk of the foreign supply must be looked for; and, with very small encouragement, large shipments would unquestionably be made from the leading ports in the Baltic. Letters from Danzig state that since the re-opening of the inland navigation (which did not occur till the beginning of April), the arrivals down the Vistula had been important; and most of the warehouses being previously full, much anxiety had been manifested to find buyers for immediate shipment. On the 13th of the month vessels had been already engaged to load

71,000 qrs., of which, however, only 8,400 qrs. were destined for London, 26,000 qrs. being for Liverpool, 11,500 qrs. for Guernsey and Jersey, and the remainder for other ports in England and Scotland. Superior qualities of high mixed wheat (crop 1842) having become comparatively scarce, had been held at relatively high prices, say 38s. to 40s. per qr., but very good parcels were obtainable materially below these figures, the last quotations for 60 to 61lbs. mixed being 35s. to 37s., whilst inferior sorts of new wheat were offering in abundance at from 32s. to 35s. per qr. free on board, according to weight, condition, &c. At Königsberg, on the 20th April, shipments to Great Britain were in full progress; but at Stettin there was not so much doing as had been the case earlier in the month; holders having become unwilling to accept the prices offered, say 35s. per qr. for fine 60 to 61lbs. red wheat. Large arrivals had taken place at the last named port from the interior, a portion of which had been stored for want of buyers. At Rostock considerable firmness had been shown by the holders of wheat, and prices remained high there as compared with those at which purchases might be made at some of the neighbouring ports. The transactions have, however, been on rather

a retail scale at that port, nor are the stocks supposed to be large there. The accounts from Hamburg state that the business for export had for some weeks been confined to small purchases of wheat, on French account, at equal to 37s. to 38s. per qr. free on board; these prices being above the limits of the English orders, scarcely anything had been done for shipment to this country. Thus much for the European corn trade and the supplies of wheat likely to be received from the continent. There is still another quarter to notice, however, a quarter from which the British farmer has even more to fear than from any other: we allude to Canada and the new bill. This year, and probably a few succeeding years, may pass over before full effect be given to the recent boon conferred on the colonies at the expense of the mother country; but the mischief will soon enough become apparent. By the last accounts from Canada we learn that large purchases of wheat had been made during the winter months in the interior by merchants from Montreal, with a view of the English markets; and as the bulk of the supply from thence will reach us in the shape of flour, another industrious and deserving class of men—our millers—will be injured as well as the farmers.

QUANTITIES OF GRAIN AND FLOUR IMPORTED INTO THE UNITED KINGDOM IN THE YEAR 1843.

Countries from which Imported.	Wheat.	Barley.	Oats.	Rye.	Beans <sup>a</sup> and Peas.	Flour.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Cwt.
Russia .....	33,666	2,655	45,849	1	1	5
Sweden .....	605	7,204	2,484	..	531	..
Norway .....	..	..	..	..	..	256
Denmark.....	69,767	130,154	16,143	600	16,670	887
Prussia .....	658,711	32,591	1,519	3,821	22,273	5,164
Germany.....	126,105	5,342	4,295	444	3,917	2,298
Holland .....	858	..	14,226	..	199	..
Belgium .....	332	..	..	6	..	..
France.....	3,638	692	10	..	164	48
Spain and Balearic Isles	1	..	..	..	3	2
Gibraltar.....	..	..	..	..	1	..
Italy and Italian Isles ...	5,232	4	..	..	4,488	..
Malta .....	3,195	..	..	..	..	..
Ionian Isles.....	456	..	..	..	..	..
Turkey .....	976	..	..	..	..	..
Egypt .....	11,540	..	..	..	39,176	..
Morocco .....	599	..	..	..	..	..
E. I. Co.'s Territories } and Ceylon..... }	621	..	..	..	..	11,310
China .....	..	..	..	..	7	3
Australia.....	1,295	..	..	..	..	6
Brit. Poss. N. America ..	20,367	842	254	..	8,978	328,246
British West Indies ....	..	..	..	..	..	8
United States .....	2,383	..	..	..	1	91,317
Chili .....	1,203	..	..	..	1	91
Isles of Gurnsey, Jersey, } Alderney, &c. (Foreign } Produce) .....	352	..	..	..	1	120
	941,902	179,484	84,780	4,872	96,412	439,761

QUANTITIES RE-EXPORTED FROM THE UNITED KINGDOM IN THE YEAR 1843.

Countries to which re-exported.	Wheat	Barley.	Oats.	Rye.	Peas and Beans.	Flour.	Wheat Flour exported as a substitute for foreign Wheat delivered from the warehouses, under Act 5 & 6 Vic.
Norway.....	..	541	..	..	..	72	3
Denmark.....	1,079	..	..	..	..	..	..
Germany.....	1,670	..	..	..	1,896	38	..
Holland.....	4,114	170	..	..	7,915	564	4
Belgium.....	21,113	1,238	1,952	..	4,146	..	..
France.....	9,561	888	13,261	..	150	..	..
Portugal, viz., Madeira	2,047	..	..	..	..	375	850
Spain and Balearic } Isles..... }	..	..	..	..	..	7	..
Gibraltar.....	..	..	..	..	..	3	..
Italy & Italian Isles..	..	..	..	..	..	24	10
Malta.....	..	..	..	..	..	..	35
Ionian Isles.....	..	..	..	..	..	26	..
Morea and Greek Isles	..	..	..	..	..	4	..
Egypt.....	..	..	..	..	..	104	..
Western Coast of } Africa..... }	..	..	..	..	4	279	372
Cape of Good Hope..	1,481	9	960	..	286	5,251	5,541
St. Helena.....	..	..	42	..	..	2,225	976
Mauritius.....	275	..	7,279	..	..	6,373	4,691
Arabia.....	..	..	..	..	..	9	..
E. I. and Ceylon....	..	241	286	..	36	804	319
Sumatra, &c.....	..	..	..	..	..	194	7
China.....	..	..	10	..	4	192	154
Australia.....	..	72	351	..	78	886	1,158
New Zealand.....	..	..	..	..	1	674	107
<i>British Possessions:</i>							
North America....	664	50	..	..	55	1,542	196
West Indies.....	..	..	15,172	..	2,884	6,889	6,730
Hayti.....	..	..	..	..	..	..	..
Cuba.....	..	..	..	..	..	51	..
United States.....	..	10	8	..	..	118	26
Texas.....	..	..	..	..	..	3	..
Guatemala.....	..	..	..	..	..	5	..
Colombia.....	..	..	3	..	..	..	..
Brazil.....	..	..	..	..	1	11,184	3,938
States of Rio de la } Plata..... }	..	..	..	..	..	23	14
Chili.....	..	..	..	..	..	65	21
Peru.....	..	..	..	..	..	12	7
Falkland Isles.....	..	..	..	..	..	..	5
Guernsey and Jersey.	6,036	1,226	2,674	5	3,300	7,292	4,869
<b>Total.....</b>	<b>48,040</b>	<b>4,445</b>	<b>41,998</b>	<b>5</b>	<b>20,756</b>	<b>45,288</b>	<b>30,033</b>

CURRENCY PER IMPERIAL MEASURE.

APRIL 29.

WHEAT, Essex and Kent, new, red	56	60	White 53	60	64
Irish.....	50	54	Do.....	52	58
Old, red.....	59	62	Do.....	63	66
RYE, old.....	30	36	New.....	56	—
BARLEY, Grinding, 28 30 Malting	32	34	Chevalier	34	36
Irish.....	28	32	Bere.....	28	28
MALT, Suffolk and Norfolk.....	60	62	Brown.....	56	58
Kingston and Ware.....	60	63	Chevalier	60	63
OATS, Yorksh. & Lincolnshire, feed	22	23	Potato.....	22	25
Youghall and Cork, black.....	19	20	Cork, white	19	20
Dublin.....	18	19	Westport	20	21
Waterford, white.....	18	10	Black ..	19	20
Newry.....	21	22			
Galway.....	18	19			
Scotch, feed.....	20	22	Potato ..	23	25
Clonmel.....	20	21	Limerick	20	21
Londonderry.....	20	21	Sligo ..	18	19

BEANS, Tick, new.....	28	34	Old, small	34	38
PEAS, Grey.....	32	33	Maple..	30	32
White.....	30	33	Boilers..	32	36
SEED, Rape.....	27	28	Irish..	22	26
Linseed, Baltic.....	30	38	Odessa	41	
Mustard, white	7	10	brown	8	11
per bush.....					
FLOUR, Town-made ..	50	Suffolk—	42	per sk. of 280lbs.	
Stockton and Norfolk —	42	Irish	44		

FOREIGN GRAIN AND FLOUR IN BOND.

WHEAT, Dantzic.....	40	44
Hamburg.....	40	42
Rostock.....	40	42
BARLEY.....	20	—
OATS, Brew.....	12	16
Feed ..	11	15
BEANS.....	15	19
PEAS.....	23	25
FLOUR, American, per brl.....	21	23
Baltic ..	21	23

COMPARATIVE PRICES OF GRAIN.

WEEKLY AVERAGES by the Imp. Quarter, from the Gazette, of Friday last, April 19th, 1844.		AVERAGES from the corresponding Gazette in the last year, Friday, April 22nd, 1843.	
s.	d.	s.	d.
WHEAT.....	55 1	WHEAT.....	46 7
BARLEY.....	33 1	BARLEY.....	28 5
OATS.....	20 1	OATS.....	17 4
RYE.....	32 4	RYE.....	28 7
BEANS.....	31 2	BRANS.....	25 11
PEAS.....	32 5	PEAS.....	27 5

IMPERIAL AVERAGES.

Week ending.	Wheat.	Barley.	Oats.	Rye.	Beans.	Peas.
March 9th.....	56 0	33 6	19 11	33 9	31 0	31 6
16th.....	56 3	33 3	20 1	33 8	31 3	31 4
23rd.....	56 5	33 1	20 0	34 1	31 2	31 0
30th.....	56 5	32 7	19 8	33 3	31 2	31 0
April 6th.....	55 5	32 10	20 1	33 9	30 11	31 8
13th.....	55 1	33 1	20 1	32 4	31 2	32 5
Aggregate average of the six weeks which regulates the duty.	55 11	33 1	20 0	33 6	31 1	31 6
Duties payable in London till Wednesday next inclusive, and at the Out-ports till the arrival of the mail of that day from London.	17 0	5 0	6 0	9 6	10 6	10 6
Do. on grain from British possessions out of Europe.....	3 0	0 6	2 0	1 0	2 6	2 0

PRICES OF SEEDS.

APRIL 29.	
Linsced, English, sowing 50	60
Baltic.....	— crushing 40 42 per qr.
Mediterr. & Odessa 40	42
Carraway.....	— new .. 57 62 per cwt.
Clover, English, red.....	56 70 white.. 86 116
Flemish.....	48 52 do...56 101 extra 116
New Hamburg.....	45 51 do...56 103 " 116
Old do.....	38 46 do...56 101 " 111
French.....	46 52 do... none.
Coriander.....	15 20 per cwt.
Mustard, brown, new.....	10 16 white.. 8 10 p bush.
Trefoil.....	— old.. 12 26 new 23 32
Rapeseed, English, new ..	25l. 26l. per last.
Linsced Cakes, English..	9l. 10s. to 10l. per 1000
Do. Foreign..	5l. to 6l. 10s. per ton.
Large, foreign.....	—
Rapeseed Cakes.....	5l. 5s. to 5l. 10s.
Hempseed.....	35 28 per qr.
Rye Grass, English.....	— Scotch — nominal.
Tarcs, Spring.....	4s. 0d. to 5s. 0d., very large 5s. to 6s.
Tarcs, old.....	— new .. per qr.
Canary, new.....	51 52 fine 54 — per qr.

POTATO MARKET.

SOUTHWARK, WATERSIDE, April 29.

per ton.	per ton.
York Reds.....	75s. to 90s. Essex & Sussex blues 65s. — s.
Perth do.....	65s. 75s. Wisbeach Kidneys. 75s. — s.
Late Devons.....	75s. 80s. Do. Blues.....
Jersey Blues.....	70s. — s. Do. Whites.....
Kent Sussex & Essex whites.....	50s. 60s. Guernsey Blues ..
Do. Kidneys.....	80s. 90s. Prince Regents.....
	— s. Belgium reds.....

PRICES OF HOPS.

BOROUGH, MONDAY, April 22.

The hop market continues very quiet, and prices remain about the same. Holders do not press sales.

BUTTER, BACON, CHEESE, AND HAMS.

Irish Butter, new, per cwt.	s.	s.	Cheese, per cwt.	s.	s.
Carlow old.....	60	70	Double Gloucester..	48	59
Sligo.....	60	—	Single ditto.....	42	52
Banbridge.....	60	—	Cheshire.....	52	74
Cork, Ist.....	64	70	Derby.....	50	58
Waterford.....	64	—	Foreign ditto.....	40	48
English Butter,			Bacon, new.....	44	50
Dorset, per firkin.	46	—	Middle.....	40	44
Foreign Butter, cwt.			Hams, Irish.....	56	64
Prime Friesland..	88	—	Westmoreland.....	64	70
Do. Kiel.....	86	—	York.....	70	74
			Fresh Butter, 13s. 6d. per doz.		

WOOL MARKETS.

BRITISH.

LEEDS, APRIL 19.—Although the transactions in combing Wools have been limited this week, there has been rather more inquiry, and a greater disposition to purchase than for the last few weeks. In short Wools we do not quote any alteration.

WAKEFIELD, APRIL 19.—We are unable to report any improvement in the demand or price of Wools of any description, and few sales are passing.

LIVERPOOL, APRIL 20.

SCOTCH.—There is a decidedly better feeling existing in our market, and a better inquiry experienced for Laid Highland Wool at fully late rates. Our late arrivals have either been to forward to the country, or sold from the quay on arrival. There has been something doing in White Highland this week at our quotations. The stock of Cross Wool is exceedingly limited; any thing good offering commands full rates. First-rate Cheviots are likewise light in stock, and are still inquired for.

	s.	d.	s.	d.
Laid Highland Wool, per 24lbs ..	9	3	10	9
White do.....	12	6	13	0
Laid Crossed do.. unwashed..	10	0	11	0
Do. do. washed.....	11	0	12	6
Do. Cheviot do. unwashed ..	10	6	13	0
Do. do. washed.....	14	0	17	6
do. White do.....	23	0	24	0

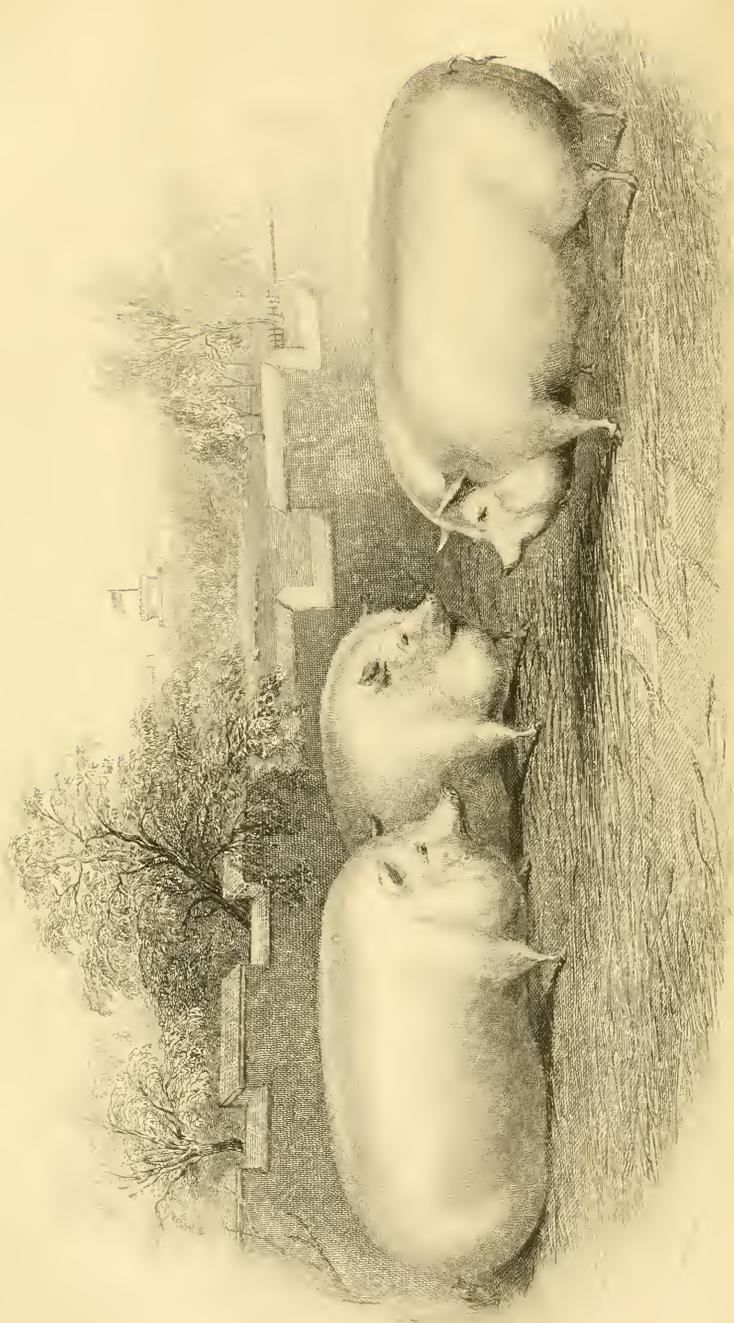
FOREIGN.—The sales of Foreign going on in London this week has attracted the attention of the trade generally. There has, in consequence, been little doing here this week; but, as the result of the sales in London are considered to have established fully last sale's prices, it will no doubt give a fresh tone to our market.

PRICES OF MANURES.

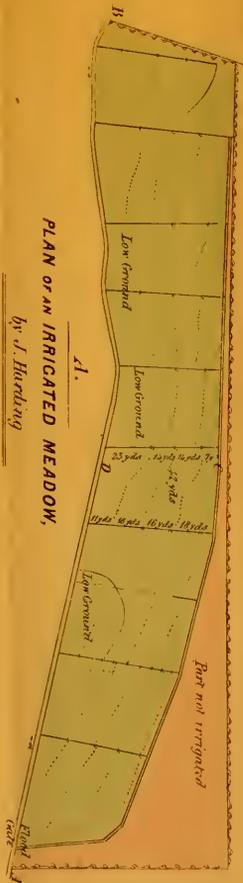
Subjoined are the present prices of several sorts of Manure:—

Hunt's Bone-dust, 16s. per qr.	Chic fou, 21s. per cwt.
Hunt's Half-inch Bone, 15s. per qr.	Wolverhampton Compost (Alexander's), 12s. per qr., subject to carriage to London, or forwarded from Wolverhampton
Hunt's Artificial Guano, 8l. per ton	Guano, 10l. 10s. per ton; 12s. per cwt.
Hunt's Stuff Graves, 5l. per ton	Potter's Artificial Guano, 12s. per cwt.
Rape Dust, 6l. to 6l. 10s. per ton	Muriate of Ammonia, 24s. per cwt.
Rape Cake, 6l. per ton	Muriate of Lime, 12s. per cwt.
Rags, 4l. to 4l. 10s. per ton	Clarke's Compost, 3l. 12s. 6d. per hhd., sufficient for three acres
Graves, 6l. 10s. per ton	Alkalies, 28s. and 42s. per cwt.
Gypsum, at the waterside, 32s. 6d. per ton; landed and housed, 33s. to 42s. per ton, according to quantity	Soda Ash, 14s. to 16s.
Agricultural Salt, 34s. per ton	Chloride Lime, 28s. per cwt.
Carbon, 12s. per qr.	Sulphuric Acid, 24d. per lb.
Humus, 14s. per qr.	Sulphur for Destroying Werm on Turnips, 16s. per cwt.
Soap Ashes, 10s. per ton	Sulphate Soda, 7s. 6d. per cwt.
Patent Disinfected Manure, 13s. 6d. per qr.	The Liverpool Abattoir Company's Animalized Manuring Powder, 2l. 10s. per ton
Highly Concentrated Manure, 30s. per qr.	Manure Powder, 16s. per qr.
Nitrate of Soda, 14s. 6d. to 15s. per cwt.	Boast and Co.'s (Bow) Inorganic Manures, from 6s. to 11s. per cwt., according to crop
Nitrate Potash (saltpetre), 26s. per cwt.	Boast's Guano, 9l. 9s. per ton
Petre Salt, 4s. per cwt.	Fothergill's Gypsum, 35s. per ton.
Willey Dust, 4l. 4s. per ton	Fothergill's Phosphate of Lime, 14s. per cwt.
The Urate of the London Manure Company, 5l. per ton	
New Bristol Manure, 8s. per qr.	
Hunt's new Fertilizer, 13s. 4d. per qr.	
Preparation for Turnip Fly, 10s. 6d. per pakt., sufficient for three acres	









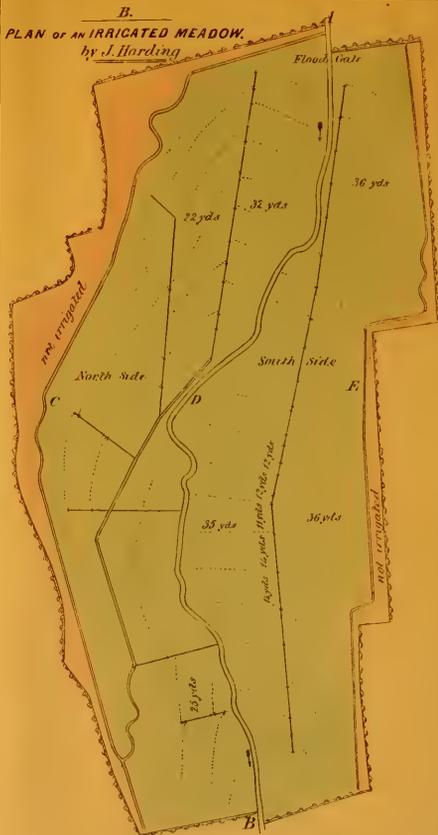
PLAN OF AN IRRIGATED MEADOW,

by J. Harding

REFERENCE.

- Brook course marked thus  $\text{---}$  from A to B with fall of 31' 6 in being a distance of 144 yds.
- Stops  $\text{---}$  with slope of 27' from C to D being a distance of 58 yds.
- Principal carrier  $\text{---}$  that act as Drains when the water is not applied.
- Small floating gutters  $\text{---}$  that act in several instances to convey the water to other parts of the meadow.
- Trailing or Draining gutters  $\text{---}$  which act in several instances to convey the water to other parts of the meadow.

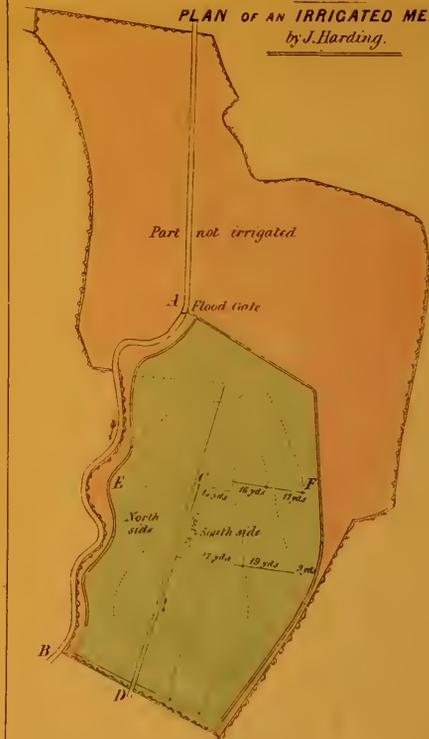
B.  
PLAN OF AN IRRIGATED MEADOW,  
by J. Harding



REFERENCE.

- Brook course marked thus  $\text{---}$  from A to B with fall of 31' being a distance of 130 yds.
- Stops  $\text{---}$  with slope of 27' from C to D being a distance of 65 yds.
- Principal carrier (on North side)  $\text{---}$  with slope of 16' from E to D being a distance of 60 yds.
- D<sup>o</sup> D<sup>o</sup> (on South side)  $\text{---}$  that act as Drains when the water is not applied.
- Small floating gutters  $\text{---}$  which act in several instances to convey the water to other parts of the meadow.
- Trailing or Draining gutters  $\text{---}$

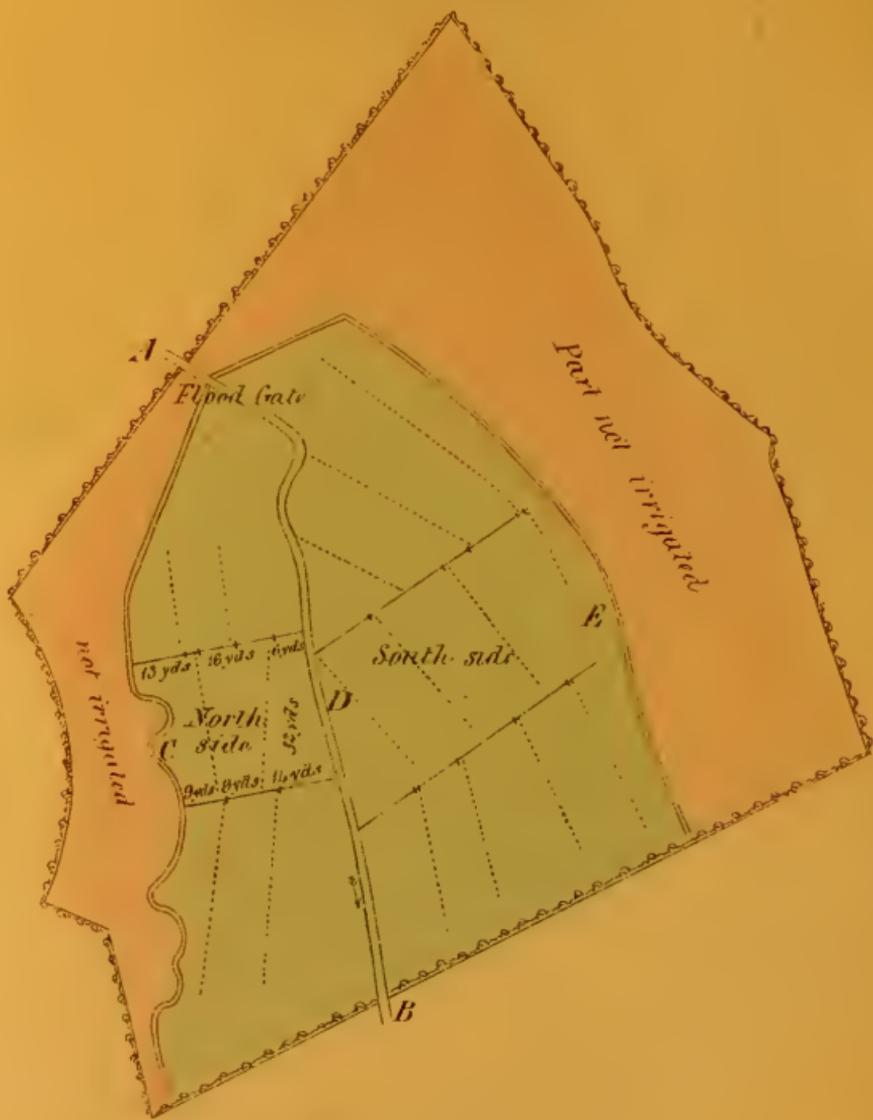
C.  
PLAN OF AN IRRIGATED MEADOW,  
by J. Harding.



REFERENCE.

- Brook course marked thus  $\text{---}$  from A to B with fall of 11' 6 in being a distance of 150 yds.
- D<sup>o</sup> D<sup>o</sup>  $\text{---}$  from C to D with fall of 8 in being a distance of 82 yds.
- Stops  $\text{---}$  with slope of 10 in from E to C being a distance of 55 yds.
- Principal carrier on North side  $\text{---}$  with slope of 11' from E to C being a distance of 80 yds.
- D<sup>o</sup> D<sup>o</sup> (on South side)  $\text{---}$  that act as Drains when the water is not applied.
- Small floating gutters  $\text{---}$
- Trailing or Draining gutters  $\text{---}$

D.  
**PLAN OF AN IRRIGATED MEADOW,**  
*by J. Harding.*



**REFERENCE.**

Brook course marked thus from A to B with fall of 11<sup>ft</sup> 6 in. being a distance of 143 yds.

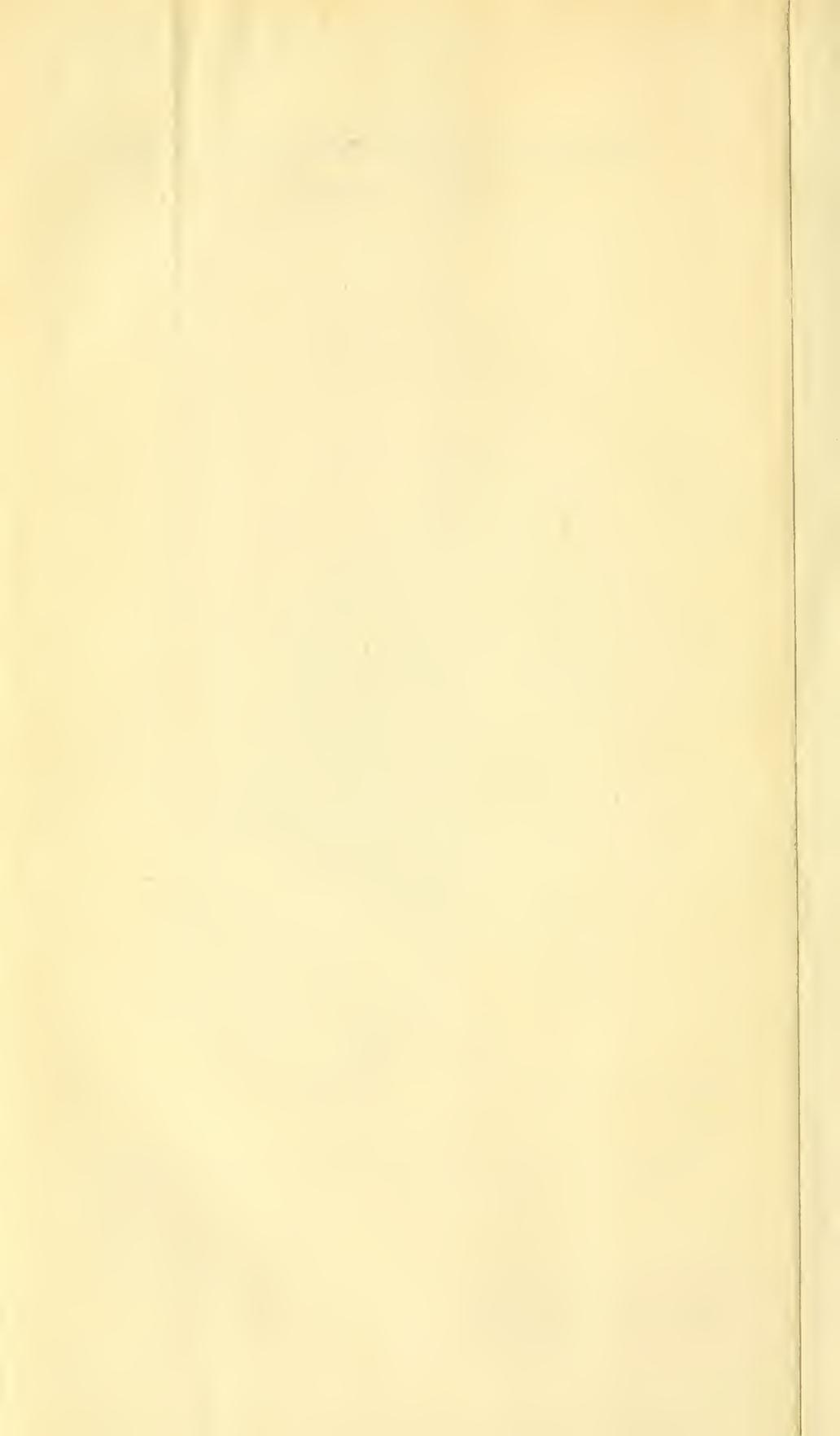
Stops

Principal carrier (on North side) with slope of 11<sup>ft</sup> 2 in. from C to D being a distance of 33 yds.

D° D° (on South side) with slope of 11<sup>ft</sup> 6 in. from E to D being a distance of 60 yds.

Small floating gutters that act as Drains when the water is not applied.

Tailing or Draining gutters



# THE FARMER'S MAGAZINE.

JUNE, 1844.

No. 6.—VOL. IX.]

[SECOND SERIES.

## PLATE I.

### THREE SUFFOLK AND BERKSHIRE PIGS,

Bred by and the property of His Royal Highness Prince Albert, Exhibited at the Smithfield Cattle Show, December, 1843. These pigs were of very superior character, and highly commended by the Judges, although not of sufficient merit to obtain a prize. We trust his Royal Highness will persevere until he is successful. Such laurels will afford more real gratification than those which are won in the battle-field.

## PLATE II.

### PLANS ILLUSTRATIVE OF MR. HARDING'S SYSTEM OF IRRIGATION

AS DESCRIBED BELOW.

#### ON THE BENEFIT OF IRRIGATING LANDS.

DISCUSSED AT THE FARMERS' CLUB, BURTON-UPON-TRENT, MARCH 7, 1844; PROPOSED BY J. HARDING.

Having had many opportunities of witnessing the great increase of produce from irrigated meadows, and being well convinced that the system of irrigation might be profitably extended to many acres of land in this neighbourhood, I have thought the subject worthy the attention of our club, and have ventured to bring before it such remarks as my experience and limited ability have enabled me to make. I must confess I can but very imperfectly execute the task I have undertaken, but hope that other members may be found who will correct my errors and supply any omissions that may appear.

It must have frequently occurred to the most careless observer, to notice the great improvement to land which is naturally overflowed by water at various seasons of the year, from rivers, &c., where the ground is sound. But where land is so situated as not to have the benefit of the current, but merely covered by the back-pounding of the water, which becomes stagnant, in

this case it does not improve the land, but on the other hand materially injures it, and in many instances becomes a complete bog, capable of producing nothing but rushes, sedges, &c., of little or no value.

I make no doubt that the very superior meadow land often adjoining rivers has been a great encouragement to the making of artificial meadows, which in some cases are even more valuable than those adjoining rivers, as the occupier might have the full power of the water at his command at the proper seasons of the year without the great danger of having the crop carried away by floods, as is sometimes experienced near large rivers. In proposing to make irrigated meadows, it will be well to take into consideration the many circumstances of your particular case before you proceed to make any outlay. The first is as to whether your land is favourably situated for a water meadow. You should then consider whether the land requires draining; for if the water be applied without a thorough drainage being first executed, the irrigation would prove a partial if not a total failure. It will then be necessary to consider from what source you purpose deriving your supply of water; whether it could conveniently be had from a brook,

spring, or pond; uniting, if possible, the essence from your fold-yard and premises. Not being a sufficient chemist to analyze and ascertain the fertilizing powers contained in water applied to these purposes, my usual plan is to make a trial on a small scale, of about a quarter to half an acre; and so soon as I am satisfied with the result, proceed with the operations accordingly. My limited experience has proved to me that most water (save and except that arising out of minerals and bogs), properly applied, with the ground well prepared for the operation, will benefit all kinds of land; but, of course, the better the land the better the meadow.

With respect to the best mode of irrigation, that must depend on the situation of your ground; for if the land be flat it will require very different management from that which has a good fall or slope, and I consider these points can only be determined upon by visiting the spot proposed for a meadow. It probably may be well to remark that great caution is required, when it is intended to obtain a supply of water from a brook, that it should be taken therefrom at a level in the stream, so as to prevent the water back-pounding on neighbouring land; should this be neglected, it would undoubtedly cause some injury, as well as unpleasantness between the parties, and this I think very important to avoid.

Irrigation having attracted my attention for some years, I have endeavoured, both from practice and theory, to carry out the system on various qualities of land where practicable, which have generally proved successful. I therefore trust that the information I am about to offer may throw some light on so important a subject.

#### FIRST CASE.

The first case is a water meadow that was made by my father, many years back. At that time he occupied a farm of about 500 acres of land, but was much inconvenienced for want of meadows. He selected a very poor piece of ground, in a good situation, for a meadow; it was chiefly a bed of peat, much saturated with water, and worth about 20s. per acre, including all payments, and only capable of producing about 14 or 15 cwt. of very inferior hay per acre. He was particularly anxious to proceed with the irrigation, but, owing to the great disadvantage with which he had to contend respecting the drainage, he could scarcely look forward to so favourable a result as the expense would warrant him to expect. Notwithstanding these impediments, he had the ground prepared, and proceeded with the operations at a cost of about £6 per acre, in having it judiciously laid out, and the water from a pool applied; it, however, proved satisfactory to a certain extent, yielding a crop, after the first year, of 25 to 27 cwt. per acre; but the crop was exceedingly coarse, and only fit for young cattle. A short time afterwards the landowner was induced to cut a new brook-course for upwards of a mile in length, for the purpose of benefiting his estate, which enabled my father to effect a proper drainage at a light cost; the meadow became so

much improved that it produced a great quantity of valuable sheep-keep in the spring, about 2 tons of hay per acre, and a good aftermath for milking-cows; and I can with confidence say that it has averaged that for fourteen or fifteen years (certain): thus it may be considered that the crop from irrigation is three times as much in quantity, and it may fairly be said three times as good in quality, as it was in its original state. It would be well to notice that there is a pond in an adjoining field which is usually filled from a very pure spring, as clear as possible, and unites with the pool-water about the middle of the meadow; and wherever that water passes over the surface, the grass is much more abundant than any other part of the meadow.

#### SECOND CASE.

The next statement I propose to bring before you is that of a meadow at Teddesley, belonging to the Right Hon. Lord Hatherton, which was made under the superintendence of my old master, Mr. Bright, to whom I shall ever feel indebted for much valuable information. When Mr. Bright went to Teddesley, thirteen or fourteen years ago, there was but little ground irrigated; consequently the expense of keeping up-land meadows in order was very heavy, and the crops generally very light, not exceeding 22 or 23 cwt. per acre, from its being naturally of a kind of hot sandy soil, which I had many opportunities of seeing. Mr. Bright proceeded to tap some springs by draining at a distance of a mile from the meadows, which he conveyed over this land, when properly prepared, at a cost of about £3 to £3 10s. per acre; and the second year I had the pleasure of witnessing 35 cwt. of good hay per acre, independent of the spring-keep and aftermath, which is particularly useful on large plough-farms, the former being a good succession when turnips are getting short: thus was obtained an increase of about 12 or 13 cwt. of hay per acre, besides dispensing with the necessity of top-dressing the meadows every alternate year, value £4, or equal to £2 per acre per annum, which had been the usual method prior to irrigation; and thus gives a great increase of food for cattle, as well as an increase of manure for other lands, which it must be admitted is a much more profitable plan than taking it away from the arable lands to support the meadows.

#### THIRD CASE.

The following is an account of a meadow belonging to Isaiah Deakin, Esq. :—

This is a very flat, wet, peaty meadow, without any means of its being properly drained; it formerly was so boggy that it produced nothing but rushes, rubbish, &c., indeed I understand it was at that period let for 10s. per acre, in fact it was scarcely worth any rent. Mr. Deakin having a very good supply of water passing down by the side, had it inspected by a skilful person, and was advised to form it into bed-work, being very flat, with shallow floating-gutters and deep tail or drain-gutters, in order that the land might be

tolerably sound when the application of water was not necessary; the works were proceeded with, and cost, as near as Mr. Deakin could ascertain, about £6 per acre. I have had a great many opportunities of seeing the land in question for the last twelve years, and can most confidently assert, during that time it has produced a very much more abundant crop than any practical man could have expected. I have always been much surprised at the very early as well as the very great crop of spring-eating for ewes and lambs, which have invariably been turned on the land at the latter end of March or beginning of April, and remained on until the middle of May; it is then laid up for mowing, and in six weeks from that time produces from 40 to 45 cwt. of good hay per acre. So soon as the hay is cleared off, the water is again applied for a short time, which causes a very great aftermath, usually eaten by cow stock, or mown again and eaten in the stable by horses. As this is a very striking case, I have put the following questions to the owner, who has kindly answered them in the following manner:—

What was the state of your present meadow before the application of water?—A bog.

What might the produce be per acre, or was it let?—It produced nothing but rushes, and was let for 10s. per acre.

Did you drain it?—No; because I could not get any fall.

What was the expense of preparing the meadow?—About £6 per acre.

How long was it before you received any benefit?—A little the first year, a great deal the second year.

What is the spring-eating worth per acre?—20s., as it is the only early keep I have for ewes and lambs from the latter end of March to the middle of May.

What do you consider the crop of hay to be per acre?—45 to 46 cwt., which I can always sell for 4s. per cwt.

What is the aftermath worth per acre?—20s. per acre.

When do you begin to apply the water?—November; it then remains on each flat four or five days at a time before Christmas, and as the spring advances I reduce it to two or three days; when the water is taken off I am careful to have all stops taken out to allow the ground to drain as much as possible, and it remains about a fortnight before the water is again applied.

Signed, ISAAH DEAKIN.

#### FIRST CASE, BY J. HARDING.

(Plan marked A.)

I shall now allude to cases under my own management.

In 1836 I was aware of some land favourable for the process of irrigation, having a brook running down the centre, which I thought might be most beneficially carried out; accordingly, I commenced operations, but as it appeared a new system in this neighbourhood, I had great difficulty

with the men, as they were very awkward. But, notwithstanding these obstacles, I proceeded to set out the catchwork method of irrigation (at a cost of about £3 per acre), which plan I thought best adapted to the land. I was informed by the tenant that he did not cut more than 22 or 23 cwt. per acre, with a regular top dressing of manure or compost every other year, at a cost of at least £4 per acre, or £2 per acre per year; I told him that I thought the water very good, and if it proved as beneficial as I had reason to believe, it would not only do away with the expense of manuring for hay, but would afford him much spring-keep and an additional quantity of hay, which would be valuable for his cattle, and much increase the manure for his arable lands, which I thought required it to a great degree. I am happy to say that the crop, even the first year, exceeded the produce of any former year, but the second year there was, as near as could be calculated, 35 cwt. per acre, consequently my expectations were fully realized, there being an increase of about 12 cwt. per acre, without the expense of top-dressing.

#### SECOND CASE, BY J. HARDING.

(Plan marked B.)

Having been successful in the last case, I was anxious to extend the system to another piece of land higher up on the same brook, which I thought might be much improved; I therefore had the same prepared for watering. The tenant informed me that the land in question was very uncertain for hay, much depending on the season; he said he had not, generally, more than 25 cwt. per acre. I told him it would be greatly benefited by the application of water, when properly set out; the works were proceeded with, and the result has been most favourable, the produce being nearly 2 tons of excellent hay per acre. The land, I must observe, is a good, deep loam, and the fertilizing powers of the water being much increased by the brook passing through a village, whereby it receives much nutriment from several farm-yard premises, &c., &c., which attracted my particular attention during the operations of the work. I must add that there is much land in the neighbourhood which would be equally improved by a similar application of water, which at the present time is totally neglected. The expense of the above meadow was about £2 15s., and has been the means of producing an additional crop of about 15 cwt. per acre; and, as it is of a superior quality, it is very valuable for winter food, and will much increase the manure for other lands which have from time to time been injured by the usual method of top-dressing the mow-land.

#### THIRD CASE, BY J. HARDING.

(Plan marked C.)

This is a small meadow on the same farm, of a very poor, black, thin soil, about four inches deep, on clay subsoil, yielding a very small quantity of rough, coarse hay, and said not to produce more than 16 cwt. per acre; indeed it

has been known not to cut more than 10 cwt. The land being smooth, with a tolerable slope, it was arranged in catchwork, as per plan, at a cost of about 40s. per acre. Considering the natural quality of the land, it has proved very successful, and now produces from 26 to 28 cwt. per acre; while the parts on the outside of the carrier, coloured pink, where the water cannot conveniently be applied, only yield about 20 cwt. per acre, as top-dressed with manure or compost at the rate of £4 per acre each alternate year: thus showing an increase of produce, by irrigation, from its original state of 11 to 12 cwt. per acre, and of about 7 to 8 cwt. over the part coloured pink, manured as aforesaid,

The following is a short statement of the produce:—	£	s.	d.
Meadow, when irrigated, 28 cwt. of hay at 3s. per cwt. . . . .	4	4	0
Deduct: expenses in cleaning out gutters and managing water, per acre. . .	0	8	0
	<hr/>		
	3	16	0

(Prior to irrigation.)

16 cwt. of hay, per acre	£	s.	d.
3s. . . . .	2	8	0

Expense of manure, twelve tons every other year,	£	s.	d.
5s. . . . .	3	0	0

Carting, filling, and spreading. . . . .	1	0	0
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Or, compost, 20 loads, 3s. . . . .	3	0	0
Carting, &c. . . . .	1	0	0

	<hr/>		
	4	0	0
The half this per year. . . . .	2	0	0
	<hr/>		
	0	8	0

Value per acre after the first year . . .	3	8	0
Deduct the expense of making meadow . . . . .	2	5	0
	<hr/>		

Value the first year . . . . . per acre.	1	3	0
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FOURTH CASE, BY J. HARDING.

(Plan marked D.)

The following meadow is on the same brook as the last, only a little lower down; it consists of a thin soil on a white clay, producing a poor crop of very inferior hay, of about 16 cwt. per acre. The expense of irrigating the same, from the favourable position of the land, was about 48s. per acre. This meadow, although somewhat improved, has not answered my expectations, the crop not being more than a ton per acre. This, I regret to say, may be partly attributed to the mismanagement of the occupier, and partly from the want of drainage; the tenant having neglected the cleaning out of the gutters and attending to the stops, and thereby preventing the land from becoming sound—this has been

the cause of much injury to the land, and I must say that I attribute this failure to the great negligence of the occupier. Wherefore I come to this conclusion, that unless water-meadows are properly attended to after the operation of the work, the money will be thrown away.

I here wish to say a few words with respect to the management. In the first place all the gutters should be carefully cleaned out at the latter end of each year by some man who understands such work; the water should be put on, and the soil out of the gutters should be carefully applied to fill up any holes, &c., made by cattle in the previous summer, so as to distribute the water regularly over all the flat at the same time; and where the water passes too freely, a little soil will invariably correct it. After it has been irrigated two days and two nights, it should be removed to the next flat, or flats, according to the quantity of water; and all the stops on the ground from which it has been just taken should be instantly pulled up, so as to permit the land to become sound. It is a very essential point that as much care should be observed in carrying away the water after a certain time, as in conveying it over the land; and unless this be strictly adhered to, no success can possibly be expected.

FIFTH CASE, BY J. HARDING.

(Plan marked E.)

The next is a boggy meadow in Cheshire, on which I was anxious to try an experiment. It was very useless ground to the tenant, as it yielded nothing but rushes and very coarse grass, little better than what would be used by potters for packing, of about 15 cwt. per acre. I laid it out in catchwork irrigation, without first being drained; I had the gutters cut about nine inches deep, with a small spade of four inches wide, which serve to convey the water on the land, and also act as drainers when the water is not required. The expense was about 45s. per acre, and the plan has exceeded my expectations, as the following year the produce was double in quantity, and of a very superior quality to that of former years, thus enabling the tenant to keep more cattle and make more manure. The tenant is so much pleased with the success, that he intends doing the whole of the meadow at his own expense. I wish to state that, although the land is considerably sounder than it originally was, I still think it might be much improved by partial draining, at a light cost.

SIXTH CASE, BY J. HARDING.

(Plan marked F.)

The next meadow is one in my own occupation: it is a second-rate piece of land, thin, with sand and mixture of clay subsoil, which in 1835 was well drained. I continued using this as a meadow for several years, top-dressing it every alternate year with manure or compost, at a cost of £3 10s. per acre; the crop was, during that time, very light, not exceeding a ton per acre, and that of very inferior quality. I was determined to try an experiment with the water from the brook,

which I understood had been tried many years ago, and the system abandoned on the ground of it doing no good; at this I was not surprised, as the land was not prepared or levelled for that purpose, nor was there even a single gutter to drain the land. I commenced the work much against the advice of my neighbours, who I found to be prejudiced against the system. I prepared about a quarter of an acre, and, as the land was very round in the middle of the flat selected—about the centre of the meadow—(as marked *E. E.* on plan), I was obliged to adopt a system quite new to me, but which experience has proved a very advantageous one. This was done at the rate of 48s. per acre, in the early part of 1842.

During the summer of that year I grazed the meadow, and found that the cattle were much more partial to that part over which the water had been applied than to any other, and this was evident from its being eaten particularly close, whilst the remainder was quite a good pasture. I was so much satisfied with the result, that I proceeded to prepare the part coloured green the following winter, at a cost of about £3 10s. per acre; and in the month of March I had an exceedingly nice pasture, and was induced to put in twenty ewes and lambs, and they remained in till about the 12th of May, which was of the greatest benefit to me at that time, and could not be valued at less than 10s. per acre.

I mowed the hay early in July, and being anxious to ascertain the correct difference in the crop, I called in a neighbour to witness it; we proceeded to measure a certain quantity of ground that had not been irrigated, and the same quantity that had; and on making a calculation as to the quantity, we found the part not irrigated, although manured with compost the previous year, did not exceed 17 cwt. per acre, when the part that was irrigated in 1842 produced a crop of 35½ cwt. per acre, this being an increase of 18½ cwt. of hay per acre, by irrigation; and I consider the additional hay and spring-keep amply repaid me for the expense of making that part of the meadow to which I allude, and was done for about 48s. per acre: the remainder cost me about £3 10s. per acre.

The following is a statement of the value of the produce in 1843:—

	£ s. d.
Spring-eating .....	0 10 0
35 cwt. of hay, to be consumed on the premises, at 3s. ....	5 5 0
Aftermath.....	0 15 0

	6 10 0
Annual expenses in guttering, putting on water, &c. ....	0 10 0
	6 0 0

(Before irrigation.)	£ s. d.
Spring-eating .....	0 5 0
20 cwt. of hay, at 2s. 9d. .	2 15 0
Aftermath, , , , , , , , , ,	0 12 0

3 12 0

Top dressing, with 12 tons of manure every other year, at 5s. . . . .	£ s. d. 3 0 0
Tilling, cart- ing, &c. . . . .	0 15 0
	3 15 0 or 1 17 6*
	1 14 6
	£4 5 6

In preparing land for a new meadow, it would probably be well, when seeding down the ground for that purpose, to select such grasses as might be best suitable for water meadows; for if layed down with the usual clover seeds, a longer time must be allowed prior to the application of the water, or in all probability some loss would be sustained in the tender plants before the natural grasses could appear from irrigation.

In concluding my remarks on this subject, I have been induced to make the following extract from a correspondence between the Duke of Richmond and the Duke of Portland, thinking it might be useful to our club. The Duke of Richmond having applied to the Duke of Portland for his grace's opinion on the effects of water-meadow hay as food for horses, has received the following communication:—

“There is reason to believe that water-meadow hay is not good for horses working on wind, but for all other purposes it is quite good. On account of its succulency, the grass is difficult to be made into hay, and requires much time. Horses of every description and cattle thrive greatly on the meadows themselves; and I should say that, unless they give the rot to sheep, they are the most wholesome pasture for them, as well as for horses and cattle; but my meadows are all apparently perfectly dry.

Signed, “SCOTT PORTLAND.

“*Welbeck, Jan. 5th, 1840.*”

“There is a general impression amongst owners of horses that hay grown on low and moist meadows is not so good for working-horses as upland-hay; but the hay which is usually called ‘lowland-hay,’ is not produced on water-meadows with porous subsoils, or well under-drained as all good water-meadows should be. The hay produced on such water-meadows is of a much better quality and more nutritious, and may probably be very fit for working horses.”

“W. L. RHAM.”

I was anxious to submit this subject to the notice of the club, because I am aware that the partial failure of many attempts at irrigation have created a prejudice in the minds of many against it; and if I should have induced any of you to re-examine the subject with a view to discover whether the failures you have seen have not arisen from such fault (in carrying out the principle) as I have pointed out, I shall account myself to have

\* Per year.

done some little good. Almost every farmer will find some portion of land on his farm suitable for irrigation, and when it is once believed that the operations can be made certainly profitable, many will, perhaps, be tempted to undertake it.

## ON GERMAN FARMING, AND M. VON THAER'S SYSTEM OF AGRICULTURE.

By CUTBERT W. JOHNSON, Esq. F.R.S.

The attention of many of the leading farmers of England has been, for a considerable period, directed to the agriculture of northern Germany, and more especially to the work of M. Von Thaer, so celebrated on the continent, entitled "Principles of Agriculture," a translation of which, edited by Mr. Shaw and the author of this essay, is now in the press. Some brief notices of these, therefore, may not be unacceptable to many of the enlightened readers of the Farmer's Magazine.

Von Thaer was a native of Hanover, and was born on the 14th May, 1752. He studied medicine, practised as a physician, and obtained the honour of being appointed physician to the king. His health having been impaired, he retired from his profession, dedicated his time to the study of agriculture, and signalized himself by the publication of a work, entitled, "*Introduction to English Agriculture*," and by the translation of several valuable agricultural works into his native language. In the year 1804, the king of Prussia invited him to settle in his dominions, and gave him the estate of Mögeln, situated about forty-five miles from Berlin, consisting of 1,200 acres, to manage as a pattern farm. He erected extensive buildings for himself, three professors, a variety of tradesmen, and the requisite agricultural buildings. The three professors are—one for mathematics, chemistry, and geology; one for veterinary knowledge; and a third for botany and entomology. An experienced agriculturist is also engaged, whose office it is to point out to the pupils the mode of applying the sciences to the practical business of husbandry. Von Thaer's "*Principles of Agriculture*" contain the result of his experience through a series of years.

The agriculture of a district so extensive as that of Germany, as I have in another place had occasion to remark, naturally varies with the nature of the climate and the degree of knowledge possessed by the inhabitants of the numerous and extensive provinces of which the empire is composed. In the Mecklenburgs, or that portion of Germany bounded by the Baltic on the north, according to Mr. J. S. Carr, "from north to south there is a ridge of elevated sandy land (the same which may be traced from the Bannat in Hungary to Jutland in Denmark) varying from 10 to 20 miles in breadth, affording miserable crops of corn and worse pasture; but the soil improves on both sides towards the Elbe and the Baltic, where fine districts of rich loams and clays are managed with considerable plodding industry."

The farms in northern Germany vary in size from 50 to 60 acres cultivated by peasants, to 300 and even 2,000 in the hands of the farmers and proprietors; the number of cows kept by the farmers are often 300 or 400, and they are sensibly alive to the advantages of sheltering stock in winter. Their sheep houses are commonly made large enough to hold 5,000 head. They usually harvest all their corn in barns. Their agricultural implements are defective; for instance, they use generally, instead of a plough, an instrument called a *haken*, which is exactly similar to one used by the Roman farmers. Their harrows have commonly wooden teeth, and are worked with five horses, in a very bungling manner. They often break up their pastures with this clumsy instrument in summer, in order to expose the soil more effectually to the frosts of the following winter, spread over it their dung, and, in the following July, sow broadcast rape-seed; this they dress with 100lbs. per acre of gypsum dust in the following spring, and in July the seed is ripe, which is then trodden out by horses on large canvass sheets in the field. "The oil of this seed, when purified, is without smell, gives a brilliant clear-burning flame, and is universally used all over Germany, in the saloon and the cottage." If this crop escapes the manifold contingencies of slugs, caterpillars, turnip-fly, and beetles, it is a very remunerative crop, worth from £10 to £20 per acre. The improved rotations now commonly followed in northern Germany are—1. Fallow well dunged. 2. Rape. 3. Wheat. 4. Barley. 5. (with light dunging) Peas. 6. Rye. 7. Oats, sown down with rye, or timothy grass, and red rover; "which, as well as the peas, is gypsomed with great effect before the dew has left the plant of a May morning." The clover, after being twice mown, is left two years longer for pasture. Marl, at the rate of 164 feet per acre, is much used, and is the beginning in many places of all improvements. The *haken* is worked by oxen. The Merino breed of sheep is now extensively cultivated in the Mecklenburg, and in Saxony. There is cattle otherwise noticeable in their live stock. The farm servants are commonly lodged and fed in the house, and are paid from £5 to £6 per annum. The married labourers have a free house and firing, a cow kept, and about one rood of garden, and twice as much potato land. The average rent of wheat and barley land is about 18s. per acre. Manures of all kinds are preserved with much care; and they show a wisdom in the collection of night soil, and that of the sewerage of their towns, which it would be well to imitate in England.

Such is the agriculture of northern Germany; a practice which the work of M. Von Thaer, was written, and with some of the happiest results, to improve. In this great work he laboured with an industry and a zeal which seemed never to tire or become exhausted, to improve the cultivation of his country, to banish old and erroneous practices, to elevate the character of its farmers, and to increase their profits in every possible way. Von Thaer very justly perceived

that in no way could these objects be so safely, so quietly, and so certainly accomplished, as by the formation of agricultural schools and model farms; for, as he truly enough told the German farmers, in his celebrated work—

“With equal instruction and equal talent, that person will always have the superiority, whose education, good in other respects, has been directed towards agriculture from its early youth. A young man, fifteen years of age, will best obtain the requisite education in an establishment which unites considerable activity in the different branches with the employment of the various means of obtaining the produce of the earth, although this establishment may not have attained the perfection of which it is susceptible. There the pupil will have all the objects and operations of agriculture brought under the cognizance of his senses: he will acquire a practical knowledge of all the details; he will learn to select the proper season for each operation; he will form in his own mind a kind of intellectual admeasurement of the nature and value of soils, the seasons, and of the requisite labour. He will also there be taught all that has relation to the general management and direction of business, and he will carefully observe the manner in which it is conducted as often as opportunity permits. Lastly, he will not fail to acquire, as much as possible, a certain tact in buying and selling.

During more than a century the possibility and advantage of a scientific education for the practice of agriculture has been maintained, and an agricultural chair has been established in almost every university. In so far as it is the duty of these institutions to afford the public functionary, the lawyer, and even the theologian and the medical man, a clear idea of agricultural practice and its importance, I admit the utility of these appointments, and only desire that the instruction shall be directed to the sole end which it can possibly attain.

These professorships, however, do not appear to me necessary or even useful to the agriculturist who seeks instruction there, because the nature of the life which is led there, and the usages of the university, and the general tendency of affairs in such places, seem to possess something altogether foreign to his habits and pursuits, and are calculated to unfit him for the peculiar species of activity, and the peculiar kind of life to which he is destined. Besides, it is scarcely to be expected that an agriculturist who unites practice with science will accept a professorship of this kind at a university; and he who does not possess both these requisites is by no means fitted for such a situation.

Nothing can contribute more to the acquisition of an enlightened knowledge of agriculture than travelling in those countries which are distinguished for the perfection of their agriculture. The contemplation of practices and institutions so various among different people destroys that prejudice encouraged from our childhood which leads us to believe that nothing can be done in

a better or in a different manner from our own mode of performance. The customs of different provinces and of entire nations, as well in the general proceedings of agriculture as in the performance of individual operations, are, with every thinking man, so many experiments on a grand scale, if he knows how to place them on a level with each other, and to compare their results. But it requires a great deal of perseverance, and the surmounting of many difficulties, to derive real advantage from such travels, and to extend the observation to the actual and true principles of things. They who have only run through a country as it were by post, and who stop only at the inns, will report very little that can be in any way useful. Besides, there would be required a correct judgment and penetration founded on preliminary and long-continued study, and an impartiality altogether free from prejudice, in order to derive true and positive results from the observations which are made. Without such acquirements, so far from being divested of our preconceived notions, we shall only bring back others still less suited to our climate, and the circumstances in which we are placed.

Von Thaer was not content with merely reasoning with the German farmers upon the errors of their practices. He employed considerable powers of sarcasm and ridicule for the same good purpose. He observes in one place—

With the view of placing in a clearer light the maxims by which dishonest farmers are in the habit of regulating their practice, and of putting those who let farms on lease on their guard against them, we shall here transcribe the *golden alphabet of the farmers who have placed themselves above the laws of duty and honesty*.

1. Above all things look out for a farm which has been brought into good condition by proper and improving cultivation, or by having had its resources but little exhausted. For such a farm you may, in proportion to its extent, pay double the rent, for a small number of years, which you would give for one which has been impoverished by an avaricious agriculturist or by industrious farmers. In the former you may employ the utmost refinements of the art of exhaustion; whereas, in the latter, you will be obliged to adhere to the ordinary mode of proceeding.

2. If possible, cultivate no grain except for sale; do not raise anything for the consumption of cattle, because they do not immediately pay the expenses of better feeding, and you would not be able to derive the full advantage of the quantity of manure which you would have put on the ground during the short term of your lease.

3. Among the fallow crops, cultivate those only which produce the greatest profit in money, as flax, tobacco, seeds which produce oil, &c.; and if you cannot undertake their cultivation yourself, let the ground to poor people in the neighbourhood who will pay you partly in money and partly in produce. Never mind if they do not give you any straw, for the farmer is generally

prohibited from selling it, and at all events you could not venture to sell it openly in large quantities.

4. As these crops require a great deal of manure, and you will every day obtain a smaller quantity of that article, content yourself with raising them on those fields which are in the best state of cultivation and at the smallest distance; and thus the cartage will occupy less time. Even if the other fields should be unable to produce anything during the latter years of your lease, you will be sufficiently indemnified for this miscalculation; and you will have a right to complain of the sterility of the soil, and to demand a reduction of rent. Besides, the nearer portions of the land are most likely to be noticed by the landlord and by strangers; and if any one should say that flax, rape, and tobacco exhaust the land, you have only to appeal to the fine wheat growing close by. Never expend manure upon the fields which are most in need of it, for poor land never pays the expense of the first manuring; you can, however, put a little on the sides of the fields, and near to the pathways. In the last year of your lease, apply the manure as much as possible to the spring crops, because you will reap those, but you will not reap the autumnal crop.

5. During the first few years, give the land the best possible tillage with the plough, the harrow, and the roll, in order to destroy all noxious weeds, to bring the manure which the soil may already contain into action, and to divide the clods so that the roots of the plants shall find nourishment in them. Therefore, increase your teams, and you will be repaid for the outlay before the expiration of your lease. But towards the end of the lease you must relinquish this perfection of tillage so as to be able to diminish your teams, or to employ them in other occupation which will yield greater profit. As far as possible, at this time, sow your seed after one or two ploughings; and let your ploughshares be very broad, so that you may be able to make furrows twelve inches wide. You need not trouble yourself about ploughing the land to sow seed from which you will not gather the crop, it will be much more to your advantage to make merely a secondary operation of it.

6. It is a great advantage to be allowed to plough up old grass land and root up plantations. In seeking for a farm, you should always endeavour to obtain this privilege. But in such a case, from the very commencement, direct all the means and powers you have at command to the undertaking. The lands thus brought into a state of cultivation, will produce at first fine crops of corn for market, and will afterwards, without manuring, continue to produce inferior kinds of grain until the end of your lease: it will matter little to you if they should then be completely exhausted.

7. Do not trouble yourself about the meadow land, excepting so far as is necessary in order to obtain fodder for your teams; for it does not repay the expense of management. If, towards

the latter end of your lease, the meadows should have become marshy from want of drainage, or from the ditches being choked, or should be covered with thorns and bushes, or broken by mole-hills, and on account of these defects yield a smaller quantity of hay, and of an inferior quality, you need not concern yourself much about it, it will make little difference to you, as you would otherwise be prevented from disposing of your hay.

8. If you have taken the stock upon lease at a valuation, and have to return it in the same manner, remove all the best horses, oxen, and cows, and replace them by inferior animals, or otherwise pay the deficiency in money. In valuations of this description, good stock are always estimated at a proportionally lower rate than bad, and the latter look less miserable when the good are not placed by their side. Towards the end of the lease, do not put the bull to the cows, or, at least, do not let it be done until a very late period, in order that the cows may not have calved before the time of returning the stock; they will then appear to be in much better condition, even if they have been badly fed. The continuance of the profit of the cows which are not in calf, will fully compensate you for the loss of the surplus that those which recently calved would have afforded you. You should likewise include all the old harness and farming implements in the valuation, keeping all that which is no longer serviceable for this purpose, and having it repaired and put in order: as to the new, you may put it on one side. A miserable-looking stock often inspires those who value it with compassion for the farmer, and inclines them to treat him leniently.

9. It is, of course, understood that you must not go to any expense in order to keep the gardens, ponds, and buildings in order: the landlord generally takes upon himself all the larger repairs at the end of the lease; it is, therefore, your interest to allow the small dilapidations to become large ones.

10. Exact all that the laws and customs will allow from those who owe you statute labour; it will not matter to you if they are ruined.

11. If the landlord should reserve any part of the produce for himself, and fix a high price on it because it is the growth of his own land, and, consequently, offer you a considerable reduction of rent in return for it, agree to his proposal by all means. It is true that you will the sooner be at issue with him; but that would happen under all circumstances, especially if he resided upon the estate: and, besides, it can be of little importance to you if your lease is properly drawn up. If it should prove injurious to you at first, you have only to contrive to enlist on your side the servants who receive the produce for the landlord."

These extracts are made from almost the first pages of M. Von Thaer's work. Each succeeding chapter abounds with matter highly interesting to the English farmer; and, at no very distant period, I hope to resume these notices of the

agriculture of Germany, whose provinces comprehend every description of soil, and are situated in almost every variety of climate, from the frozen shores of the Baltic to the warm sunny valleys of the Tyrol, and the banks of the Adriatic.

## LETTERS FROM IRELAND.

BY THE EDITOR OF THE FIFTH AND SIXTH EDITIONS OF "BAYLDON ON RENTS AND TILLAGES," AND AUTHOR OF A TREATISE ON MANURES AND GRASSES.

### I.

"Agricultura nihil melius, nihil uberius, nihil homine libero dignius."—*Cicero*.

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Having for some years past entertained a most anxious desire to visit Ireland, and the engagements of my agricultural profession having afforded at this time the convenience and relaxation necessary for that purpose, I embraced the opportunity, and I had myself conveyed from London, by steamboat, to Dublin, where I arrived on the 20th of April. The history of the past and present state of the "alien" country, and the multitude of evils which are said to afflict it, must have led most persons to form some opinion of the cause or causes that have occasioned such an anomalous state of society as is said to have existence there; among others, I had formed my own opinions, and, no doubt, my own prejudices, for who is without them? The removal, or even the modification of erroneous notions and preconceived opinions, is a very difficult attainment, and seldom or never completed, even by a personal inspection and examination of the operating circumstances and causes. The sphere of the traveller is naturally circumscribed, and he must in most cases of importance depend upon information tinged by party and clouded by interest; nor must his own judgment be supposed to be clearly exercised or thoroughly uninfluenced by the leanings and views which have ever produced the most opposite and contradictory accounts and representations of objects, according as they have been examined and looked at through a focus of a narrow or a comprehensive latitude, contracted and bedimmed by interest and prejudice, or enlarged and brightened by liberality and candour. The following letters will relate chiefly to agricultural subjects, interspersed with remarks on the social and moral causes connected therewith, and on the effects they may be supposed to produce. The author will endeavour, as far as his knowledge and experience enable him, to relate correctly and to compare judiciously the various agricultural practices he may see, and has previously seen and practised; and to suggest such improvements as may seem capable of being adopted under existing circumstances, without advancing beyond the path of possibility. The social and political causes that bear on agriculture must be noticed more or less. Any beneficial alterations that occur, or may be suggested as likely to advance the art and elevate the state of the practitioners, will be impartially considered and related; and every intelligence will be conveyed that can be obtained from observation and information, and which may tend to give a better understanding of the object in view than has yet, in many instances, existed.

Dublin is a fine city, containing about 250,000 inhabitants. The squares are spacious, and the streets wide, and the public buildings not inferior to those of any city of equal size in Britain. The granite stone for building purposes, which is obtained in the neighbourhood, is a most durable acquisition; and though too dark in colour to constitute beauty, it would have made a great improvement in the squares if the houses had been built with it, instead of the red glaring bricks which render the appearance both vulgar and disagreeable. The expense of procuring it, and the untractableness in the hands of the workman, have substituted bricks, which are now being used, of a neater shape and better materials. The College, both in situation and in buildings of the same extent, is superior to any other in Britain; the Museum is not inferior, while the Halls seem fully equal to the wants of the population, both for study and exhibition. I had little time to inquire, but I believe the means of obtaining inferior education are equal to similar extents of population, and that contributions for charitable purposes are not more deficient. These subjects would require a time and space I had not at my devotion.

In every country there is always found a party who live well, and the numerical amount of that party, great or small, marks the degree of advancement in civilization which the state of society has attained. In Dublin, the highest order seems as refined and polished as in any other city; but in descending to the lower orders, there is seen a greater amount of poverty spread over the mass than is to be observed in any other part of Britain. Every city or congregation of human beings contains a "cursed" quarter by the side of opulence and elegance, which, so far as present experience has shown, seems necessary to raise and support it both as basis and pillar, and which in many instances would have supplied Dante with materials in making a description of an abode of devils; but these quarters in Dublin, so far as my observation extended, do not exhibit either a greater amount or degree of wretchedness than is to be found in the wynds of Edinburgh, or in the lanes and alleys of London and Manchester. It is the dissemination of poverty that shows the difference between the kingdoms; for on leaving the highest order of society in Ireland there immediately takes place a dejection, languor, and carelessness, very visible in every other grade; while the lowest order appears sunk in the deepest abyss of misery which it is possible to describe or imagine. There is an inferiority in the neat attire and genteel appearance of the middle orders, which, with the dejection of countenance, increases downwards till it ends in filth and rags innumerable. The steps to almost every door of opulence contain at least one beggar, either very aged, or carrying a child to excite commiseration; at the corner of every street, and even on the broadest pavements and most fashionable walks, most importunate beggars abound; the minor coach-offices and public places are beset with the cravers of alms, exhibiting poverty in the most hideous form; while there may be seen, watering the flower-garden of the suburban gentleman or lady, a labourer clad with a coat of which an Englishman would not suffer the sight. Females with bare heads and naked feet are not very becoming in the streets of a town. The dress of the operatives is both clumsy and very coarse, while much carelessness is evinced by the people themselves in trimming and making as decent as possible the goods of which they are possessed. The windows are dirty; the shop-signs are clumsily executed; the appearance both of equestrians and pedestrians in the most fashionable resorts, and the

equipages of the nobility and gentry, are inferior to what is seen in other parts of the kingdom. A general view shows a most marked inferiority, while single objects are not wanting that will bear a comparison with any others of the same nature.

The river Liffey flows through the middle of the city, and is walled throughout the whole length by a strong bulwark of granite stone, confining the ships in the river, from which all goods are carted away to the warehouses in the town. From the wall of the river, alongside of which the ships are laid, to the frontage of the houses, there is, on both sides of the river, a spacious road, well macadamized, which affords a ready access both to the houses and to the river, over which there are convenient bridges of granite-stone and iron, forming the thoroughfares of the principal parts of the city. This embankment of a navigable river, with a spacious road or street on each side, forms a very great and a most valuable improvement, and highly deserving of imitation in every case where the adoption is by any means possible. Such an embankment of the Thames, from the lowest wharfs down the river throughout the whole length of the city up to Vauxhall, would constitute one of the greatest improvements of modern times; and connected at the same time with the formation of spacious docks into which all ships and floating vessels of any kind would be withdrawn from the river, in order to deliver the goods into the warehouses, and thus leave clear of the confusion of business the roads on each side of the wall of embankment. The convenience of stones near Dublin, no doubt, formed a great inducement in making the improvement; but the wealth of London must compensate and remove the unsightly wharfs, the most unsightly of all sights in the world. The proposed erection of a terrace of limited length will only form a patch of piece work; a very general mode of doing business, but deficient for useful purposes from want of comprehension. Such an embankment, with a wide road and front of good houses, docks, and a river clear of confusion and obstruction, would present a spectacle widely different from the present. The difficulty and expense would no doubt be great, but certainly not insurmountable.

The suburbs of Dublin are in many parts very beautiful, tastefully laid off, and well kept. The best are near Kingstown, where villas and terraces are to be seen not inferior to any in Britain. The Bay of Dublin presents a fine view, being studded round with neat mansions, with vessels and steamers passing and re-passing to all parts of the United Kingdom. Kingstown possesses a fine harbour, built with granite, which abounds in the neighbourhood, and the town stands on an airy and commanding situation. In other directions the mud-coloured walls impart a dingy appearance to many places in the suburbs; the want of coping on the walls, and of frequent colouring on the gates and fences, shows a neglect that is generally observable: many of the houses also have a dirty appearance.

The trade in the port of Dublin is neither great nor brisk, and there is little business doing at the Custom-house. Some cattle and grain are exported to England; coals form a considerable import, and sell at 14s. per ton from Whitehaven. I did not find provision so cheap as represented: beef, 4½d. to 7d.; mutton, 5d. to 6½d. per lb.; potatoes of the worst quality I ever saw, in retail at 4d., in wholesale at 3½d. per stone. But this is a dear time of the year. The charges in the second-rate hotels are one-fifth, and in some cases one-fourth, less than in England; in the best they are as high. Attendance is not so quick or so civil as in England; there seems in every business

and transaction a willingness to serve and oblige, but it is abruptly and uncouthly expressed. Conveyance is plentiful and cheap; the two-sided open cars are hired for 1s. per hour, within the fixed circle, and for 8d. per mile beyond it, or for what may be agreed upon. Coffee and eating-houses, and similar accommodations, are also found.

The Phoenix park is the only public place of resort for exercise; the thorn trees are very numerous; the soil is wet in some places, and wants draining, and more care bestowed on several points. Some draining has been executed at the distance of 40 feet, and, as might have been expected, has not been attended with any effect. The Botanic Gardens contain 27 acres, and show many exotic and indigenous plants.

#### *Dublin, April 22.*

The county of Dublin extends along the coast of the Irish Channel to the north and south of the city, about 30 miles in length, the breadth varying from 10 to 18 miles. The general aspect is level, with some rocky hills on the sea-coast and some cultivated ones to the south, where the county of Wicklow joins. The metropolitan county of any country can seldom be taken as a specimen of the country itself, for it always partakes of the wealth of the city, and the better condition that attends it. The northern part of the county is open and bare, and in about three miles from the city the traces of superiority cease—southwards the country is better wooded, looks richer, and is better cultivated. The mansions of the gentlemen are not very numerous; when they cease, the houses of the better farmers appear, and continue to the extremities of the county, till the common mansions commence. The better houses and farm offices are neat and commodious, but are built on the naked bare-wall system of the villas, which always remind one of a person without a shirt; some form of the Elizabethan order adds much to the neatness of the buildings and the beauty of a country; the common farmers' houses are thatched. There is everywhere a want of plantations, both for ornament, shelter, and use, especially in the northern part of the county, where, for miles, no tree is to be seen. This circumstance detracts much from the appearance of any country.

The soil throughout the country is excellent, and seems well adapted for the production of every crop cultivated in the present day. There is no clay wheat soil for summer fallow, but, what is far more valuable, potatoes, beet, and cabbages may be raised in abundance, and followed by wheat. The lighter soils are admirably adapted for turnips and the artificial manures. Notwithstanding this advantage, none are used, except in very partial instances; bones are imported at 2s. 4d. per bushel, there being no mill in the county for grinding them. Few turnips are sown, and these by a few leading individuals. Much of the land is in grass, and mostly of good quality near Dublin, yielding an herbage early, sweet and palatable, though not so abundant and heavy as in some parts of England; at the date of this letter, stock were getting a full bite. Draining is wanted in many places, but the land seems wholly left to the natural production, without care of any kind; fences are almost universally and totally neglected, being, with some exceptions near Dublin, only earthen banks partially ridged with furze in full blossom, with plants of thorns in some few places existing, but where they have been protected, the strong and vigorous stems and growth show the fertility of the soil; gates, there are none—one may be seen opening from the main road, but fallen down or unmanageable. The arable lands are cropped with po-

tatoes and wheat or oats alternately, and the inferior grass lands lie for many years in that state, and when broken up and cropped for a time, are again laid down to rest.

Potatoes are almost universally planted in the lazy-bed system, and certainly a more appropriate term could not be found in our vocabulary. The dung—dry and rough, without any preparation—is laid down on fallow ground, or on grass land, or on the winter furrow, and then spread over the surface; the potato sets are placed at regular distances, and then two men provided with long-shafted shovels make trenches, one at each side of a space of 8 or 12 feet in width, and lay the earth compressed over the sets. The trenches may be two feet wide by 15 to 18 inches deep, crooked and uneven, and most clumsily performed. The drill system is in some places adopted, but the land is imperfectly wrought: the drills are crooked and clumsy, and show the inexperience of the ploughman: the quality of the dung is something better, but the whole operation is tardy, and exposed too long in the performance. Little or no turnip land is seen in preparation. The wheat is sown in ridges of common breadth after potatoes, in most cases raised too high for dry lands, awkwardly formed and rudely finished. Oats are sown on ridges, also too high, with wide furrows apparently deepened and cleaned out by shovels, and from the potato lazy-bed. The grain crops show a close braid, and a most vigorous healthy hue. The few artificial grasses are in most cases very indifferent—patchy, with the clover and rye grass badly mixed; the produce may be averaged at 3 to 3½ qrs. per acre of wheat, 5 to 6 qrs. of oats, and about 300 bushels of potatoes—more or less according to quality and management of the land.

The rent per acre varies from 5*l.* for grass lands near Dublin to 25*s.*, and less on the arable lands at a distance; tithes at 2*s.* to 3*s.* an acre. Poor's rate at 5*d.* to 6*d.* per pound for four rates yearly, in some cases varying from 5*d.* to 10*d.* in a rate, as the steady expense of the system is not yet fixed by experience: road and county cess to 2*s.* an acre more—making the whole rent not exceeding 30*s.* an acre; a sum by no means oppressive at the present prices of produce, if common means were used to raise it in quantity. The farms are of a fair size, mostly held by lease, and by three lives: in the north of the county Lord Landsdowne gives leases of 21 years, and a wish is expressed that at least one half of the lands be kept in grass, one part being laid down when another is planted with potatoes on the sward. The want of resident qualified land agents to show improvements by precept and example, is a direct discouragement, and no countenance is given to depart from the beaten path, as very few suggestions of that kind may be expected from the people themselves, even though compensation be held in prospect. The horses used for farm purposes are much too small, and, as may be expected, seem badly fed and kept. They are sinewy and very active, and go along with a good load, in a one horse cart, at a very fair pace. The breed of cattle is much mixed with the short-horned: some fair bullocks may be seen in the Smithfield weekly market in Dublin, but the greater part of the beast are very motley group of all colours, shapes, and sizes. The cows are very mixed: the old Irish breed is said to give most milk, and that the cross of short-horn, and the Yorkshire are inferior; but this may arise from prejudice. Sweet milk sells in Dublin at 3*d.* per quart, and fresh butter at 1*s.* per lb. The weekly charge for a cow at grass varies from 3*s.* 6*d.* to 7*s.*, according to the quality of the meadow, and the rent of the meadows

varies from 5*l.* to 2*l.* as they are near or distant from Dublin, and one cow is an average stint per acre. In a few places, a flock of Leicester sheep may be seen; but the rugged state of many of the fleeces show a carelessness in the management not to be tolerated where understood. The sheep shown in Smithfield is a heavy, coarse, white-faced animal, kept till two or three years old, dull-eyed and heavy-eared, often reaching to 30 lbs. per qr.; legs hairy, and the wool coarse, and the fibre of the mutton corresponding. The pigs are generally good, and with judicious selection for breeding, the elements are ready for procuring a breed equal to any in Britain both in size and quality. In all kinds of live stock, there is most ample room for judicious and steady improvement, and the land is fitted to rear, and fatten them in full perfection.

The implements of husbandry are not numerous nor of the first kind—the one horse cart prevails with iron axle and good wheels nearly cylindrical, and the body of the cart is a medium between the neatness and clumsiness of north and south Britain in point of form and construction. They are drawn by a breast-chain fixed to the shaft opposite the thigh of the horse. The price of a new one of the best kind in Dublin is 10*l.* The ploughs are mostly of iron, with very convex mould-boards, which in no case make so neat a furrow as those of a shorter and more shouldered form. The price is 3*l.*: the workmanship is inferior. The harrows are of wood, and of the banded form; price 30*s.* per pair.

The double mould-board iron plough may be seen in drilling; the superior use of the common one for that purpose seems unknown. Drilling machines are not introduced.

The price of day labour close by Dublin is 1*s.* 6*d.* per day; at a little distance it is 1*s.* 4*d.*, and farther removed it is 1*s.* On farms, 10*d.* and 8*d.* a day is given to labourers with a cottage, and potato ground at 6*l.* an acre, the farmer giving dung and cartage, and the other the sets and the labour. Near Dublin, 4*l.* an acre is given, when dung and all labour is found by the taker of the ground. These prices are not exorbitant so near a good market.

Hay sells in Dublin from 20*d.* to 30*d.* per cwt., according to quality, which varies much. No green hay can be seen, both the natural and artificial being brown and withered from too much exposure in making. It is carried to market on the common carts in a loose state, often trailing on the ground, and forms a very slovenly scene compared to neat trussing. It is surprising that some individual has not introduced that neatly executed improvement. The neat hay and corn carts of Northumberland would be a very proper adjunct. Straw of wheat and oats sells at 1*s.* 3*d.* per cwt: it is tied in bundles, and better managed than the hay. Both articles show the quality of the land in the strength and vigour of the stems.

Messrs. Drummond and Sons, Seedsmen in Stirling, have opened a shop in Dublin for seeds and implements, which will prove of great benefit to Irish agriculturists. They will there find all the articles of the first-rate kind. An agricultural museum will be established, and the character of that firm for integrity, upright conduct, and enterprise, is a sufficient guarantee to the agricultural community. An inspection of the seeds, ploughs, subsoiling and draining implements, will amply repay the trouble of a visit.

Having been so fortunate in Dublin as to meet with Mr. Smith, of Deanston, the well-known agricultural engineer and drainer, I accompanied him and Mr. Drummond to the model farm at Glassniven, erected and carried on in connection with a normal school for

teachers, under the National Education Board. The farm consists of 50 acres of deep earthy loam, under a course of three years' cropping—viz., turnips, potatoes, and beet; grain crop—Italian rye grass, and clovers. Cabbages are used as a part of the green crops planted in autumn, and being early used for soiling, Italian grass is sown and is cut the same year. The dwelling-house and offices are commodious, and adapted for soiling about 16 cows, to provide milk and butter to the school, and for the neighbouring villages; and land is under vegetables for the same purpose. Part of the lands are drained and trenched, and the whole is neatly kept. Roots and chafis are steamed for cows and horses, and the artificial grasses are used partly for soiling and for hay. The cows show no discrimination in the selection, being of all colours and forms; and the small short-horned bull claims no merit, and is of a very unfashionable colour—a bluish roan. The farm-yard dung is well prepared, and regularly watered from casks sunk to collect the liquids. The manager, who I believe is a retired navy officer, argued strongly against the introduction of machinery in place of hand-labour in Ireland, while a thrashing machine of two-horse power was erected in the steading of offices. I have observed in all those pseudo-agriculturists whom I have met, that a knowledge and desire of cultivation was more engaging than the procuring of good live stock, the latter acquisition being much more difficult than the former. The horses, harness, and carts are shabby in the extreme, and consort badly with other departments. The gross-produce of the farm is 10l. an acre, and the rent 5l. Six or eight young men pay 10l. a year, besides their labour, in order to learn, and spread into different parts of the kingdom, a superior mode of cultivation. Such establishments are models only in particular places and for particular purposes; the model should be shown in everything as well as in one thing, and they can only become generally and comprehensively useful when means are obtained from some quarter to follow the same steps, and to employ, as well-paid labourers, the population that are devoid of those means. Detailed statements would be very acceptable if published regularly. The drained land is laid in ridges of about four yards in width. Mr. Smith lays all flat, and I think justly, where properly drained.

Much has been read and heard about the dense population of Ireland as being the chief cause of the necessity of small farms, of the lowness of wages, and of the poverty of the people. The part of the county of Dublin, apart from the immediate vicinity of the town, is as thinly peopled as any agricultural district I have seen, and the fences alone would employ the whole population for a year at least to put them into proper state and repair. The mud-cabins on the road sides are a disgrace to any country, and an outrage on humanity; the cry of nature shouts loudly for their demolition. In the suburbs of Dublin, and in the country villages, a butcher's shop is not found; in the latter a decent cottage is disfigured by the contiguity of a bad one, some without a roof, others untenanted; some half-built, and others nearly wholly demolished. The stage-coaches and cars are surrounded by beggary in every form of wretchedness, whose appearance, with that of their habitations, forms the most deplorable object of compassion I have ever seen. Hovels of a few feet square, almost without a roof, door, or window—a sunk, earthen floor, with a mud-wall inside flanking the door, and to fence the fire-place—children half naked, wallowing along with the pig in a puddle of dung and water before the door—men and women in a state of rags and nudity, and all huddled

into a space that destroys any ideas even of common decency, exhibit to the stranger a spectacle incredible if not seen, and shows to him his fellow-creatures reduced to a condition, in many instances, below the level of the brute creation. To look at this state of things, and the evident fertility of the soil, forms a remarkable contrast; but experience teaches us that fine climates and soils do not produce happiness to the human race. In the present case, there can seldom be seen a finer opportunity for improved farming; the soil is excellent, climate good, and markets ready, and there is only wanting the application of capital and skill under the necessary circumstances. At present, except in some few instances, there is no semblance of improved farming; no proper dung courts, sheds, nor accommodations of any kind. Of these subjects notice will be taken as they subsequently occur.

#### MAKING BUTTER IN CARLOW, IRELAND.—

Take the milk and strain it as quickly as you can after it is milked into deep brown pans; let it remain in the pans without skimming three, four, or even five days, according to the temperature of the atmosphere, and until it has acquired the proper acidity of which experience must decide; pour it then into the churn, which has been previously rinsed, in hot weather, with cold water, and in cold weather, with hot water, and churn immediately. In this practice, the whole milk is churned, not that it is more productive, but the butter is sweeter, and will keep better than that churned from cream alone, and the butter-milk is equally good for pigs. When the churning is completed, the butter is taken instantly out of the churn, and washed in a vessel of cold spring-water until quite free from milk; it is then weighed and salted in the proportion of one ounce or half an ounce to the pound, according to taste, carefully mixed with it. If the salt is not properly mixed the butter will be streaky. The butter is then printed and thrown into a tub of cold spring water, just to make it firm, for a few minutes. About twelve quarts of milk make a pound of butter. The keelers or pans should be 2½ feet in diameter, 8 inches deep. Dairy 15 feet square. Every vessel about the dairy must be scalded and scoured to a nicety. The cows must be milked round a second time for the striplings. Two acres of grass to each cow during summer. An acre of mangel wurzel will keep four or five cows from November to the first of May; twelve pounds of hay to each cow during that time. An abundance of pure wholesome water is indispensable for cows. The importance of milking to the last drop cannot be too strongly urged. All dairy utensils should be scalded, scrubbed, rinsed, and dried, every time they are used; oak, lime-wood, or zinc, is best for them. Some dairy-women put a pint of warm water to each gallon of milk into the churn during churning. By means of a simple instrument, a lactometer, the actual quantity of pure cream can be ascertained. The instrument consists of a glass tube, divided into one hundred degrees. This is filled with the cow's milk; left to stand twelve hours.

Observe the figure at which the milk and cream stand separated:—if at the 12th degree, the milk yields twelve pound; and if at the 15th, fifteen per cent., and so on. A thermometer is quite necessary in a dairy. The best quality of butter is obtained by churning at 51 and 53 degrees, not higher. When the thermometer stands below 50 degrees, you must use hot water to bring up the heat. The butter should come in two hours. Each cow should get per day 12lbs. hay, 40lbs. mangel wurzle, 1 bushel grains, 1½ truss of hay, per week.

THE WISP CLUB.—AVERAGE PRICES OF CATTLE AND SHEEP.

The annual meeting of the "Wisp Club" took place on the 19th ult. at Moss-paul. This club, which takes its name from a high range of hills near Moss-paul, in the counties of Roxburgh and Dumfriesshire, was established in the year 1826, and is composed of the principal farmers of that large and important pastoral district. The leading object of the club is to ascertain and record the average prices of the cattle, sheep, and wool of the district during the past year—a species of statistical information most useful to both landlords and farmers, as will be readily perceived when we state that the farms are let at, not so much per acre, but at so much per head for the number of sheep grazed. The usual calculation is that, in the North Highlands, five acres of pasturage are required for two sheep; whilst south of the Frith of Forth three acres will carry two sheep. Scarcely any hill pasture in Scotland, in its natural state, will carry one sheep to the acre. The extent of land thus occupied by many farmers is immense—many of them counting "hirsels" to the number of from 3,000 to 5,000, and even 10,000, whilst some go much beyond this; Cameron, of Corriehoyle, for instance, whose holding lies in the Lochiel country and away by Glencoe, counts his 40,000 bleaters on the wild mountain sides and deep valleys of the far north. Mr. Cameron, who was once a common drover, may thus be reckoned as, next to Prince Esterhazy, the greatest flock-master in the world. Farms of the kind of which we are speaking, are nearly all let upon leases of nine or thirteen years, whilst the leases of the arable farms in Scotland run from 15 to 19 years. The locality of Moss-paul is wild, stern, and rugged—the "Wisp" itself rising immediately behind the inn, to a height of 1,950 feet above the level of the sea, whilst "Alps upon Alps arise," all around closing in a narrow valley, at the foot of which there runs a mountain stream called the Ewes, and along which lies the road to Edinburgh, hemmed in on each side by immense hills, which rise almost perpendicularly, and strongly remind the passenger of the accounts he has read of the far-famed Kyber Pass. The inn of Moss-paul itself, a solitary dwelling amidst the mountains, stands at an elevation of 620 feet above the level of the sea, and is built on the very confines of Roxburghshire—the stables, barns, &c., which adjoin being in the county of Dumfries. For miles and miles around and along the road, the property is owned by the Duke of Buccleugh, and is divided into holdings, such as we have already indicated—many of the farmers being owners of from 3,000 to 5,000 sheep. The members of the "Wisp Club" are mostly pastoral farmers, and

may be reckoned amongst the most substantial men of their class in the several counties of Dumfries, Roxburgh, Selkirk, Peebles, &c. Its meetings are held at Moss-paul in the spring of the year, and one of its rules directs that a record should be made of "the average prices obtained the preceding season for one and two year old short-horned Galloway cattle, all descriptions of Cheviot and black-faced sheep and their relative wools, produced in Scotland south of the Frith of Forth." Each member is required to state what he conceives to have been the average price of the season, and the prices named by the majority are recorded in the secretary's book.

The assemblage this year was numerous and highly respectable, including gentlemen from Selkirkshire, Peebleshire, &c., besides those from the immediately surrounding district. The chair was filled by David Scott Esq., of Priest-haugh, and Mr. Common, of Meickledale, discharged the duties of croupier.

The following is a copy of the prices for 1842 and 1843:—

	1842.		1843.	
	£	s. d.	£	s. d.
Short-horned stirks (each)	..	5 0 0	..	5 5 0
Do. two-year-olds	..	7 10 0	..	7 15 0
Galloway stirks	..	3 10 0	..	3 17 6
Two-year-olds	..	5 10 0	..	6 0 0
Cheviot rough wethers (each)	..	1 1 0	..	1 0 6
Dumfries do.	..	0 15 0	..	0 15 0
Wether hogs	..	1 1 0	..	1 2 0
September wethers	..	0 16 0	..	0 17 0
Cheviot draught ewes	..	0 11 0	..	0 11 6
Black-faced	..	0 9 0	..	0 9 6
Cheviot top wether lambs	..	0 5 3	..	0 5 9
Do. mid. do.	..	0 3 6	..	0 4 3
Do. do. ewes	..	0 4 9	..	0 4 9
Black-faced top wether lambs	..	0 4 6	..	0 5 6
Do. mid. do.	..	0 3 6	..	0 4 0
Do. do. ewes	..	0 5 6	..	0 5 0
Cheviot tarred wool per stone of 24lb.	..	0 13 3	..	0 11 0
Do. buttered and boiled	..	0 17 6	..	0 16 6
Do. pure white	..	1 0 6	..	0 19 0
Black-faced washed tarred wool.	0	7 9	..	0 6 9

Carlisle Journal.

FARMERS' CLUB-HOUSE.

The monthly meeting of the committee was held here on Monday, May 7, at three o'clock. Present:—Thos. Knight, Esq., in the chair; Mr. Cheffins, Mr. Brown, and Mr. Shaw.

The following gentlemen were elected members:—

- G. T. Langridge, Wateringbury, Maidstone
- Hills Rowe, Hucklinge, near Sandwich
- Wm. Toms, Hungerford, Berks
- W. S. Budd, Winterbourne, Wilts
- Ed. Alex, Bridge-street, Blackfriars
- G. Johnston, Mereworth Castle, Tonbridge
- J. Browne, Bedford, Beds
- T. Slater, Kensington
- S. Abbott, Castle Acre, Norfolk
- L. A. Coupmaker, Westwood, near Farnham.

Mr. Shaw submitted to the committee a suggestion that there should be a meeting of the members of the club-house held once a month for the discussion of agricultural subjects; the suggestion was approved of, and a sub-committee appointed to draw up rules and arrange details, and to report to the committee at the monthly meeting in June.

THE THIRD ANNUAL REPORT OF THE  
ST. PETER'S FARMERS' CLUB.

## SUBJECTS DISCUSSED.

*May 2nd.*

The attention of the club was called to the consideration of the amount of success which appeared this spring to have attended their previous plans for preventing the ravages of the *wireworm*. Many had still to complain of annoyances from this destructive insect, but it did not appear that any better preventives or remedies had been discovered than those mentioned in a former resolution on the subject; nor was there any disposition in members to doubt the general utility of the plans then suggested, or the propriety of still persisting in their adoption.

The advice of the club being particularly solicited with reference to a case that seemed almost desperate, they added the following resolution on the subject, viz.—That when a field has been for successive years infested with worms, the surest cure is to make a summer fallow of it. This remedy is rendered effectual in the destruction of the insect by its great exposure to the *air* and to the crows, &c., and by the absence of food, if the fallow is kept quite free from weeds.

*July 4th.*

The meeting was occupied in adjusting the accounts of the Sparrow Club. It appeared that members had sent to the club during the year upwards of 3,000 sparrows. The fines were paid, which, after defraying necessary expenses, were by mutual consent handed over to the Farmers' Club and added to its funds.

*August 8th.*

The meeting was principally occupied in remarks on the general appearances of the crops in the neighbourhood, and the prices it would be requisite to pay for harvesting the different kinds of grain. Many observations were made proving the high estimation in which those labourers are held who may be termed good harvest-men, and the vexation and loss to which the farmer feels himself subjected, who is obliged at such a time to employ men of an opposite character. The feeling was general that the former class of labourers should in some way have advantages secured to them over the latter class. But, considering the different amounts of labour required in harvesting different fields of corn, even of the same sort, as well as the difference in the manner of the execution of the work, it seemed both impolitic and impracticable that the club should bind itself to any particular scale of prices. It was, however, agreed, that in general quite as much money should be paid as in preceding years, and that in some cases even more might with propriety be given. It was also thought advisable that in setting on persons who were strangers to the farmer, to specify as nearly as possible the manner in which the work is expected to be done, and on those conditions to arrange beforehand the price that shall be paid.

*October 24th.*

The topic discussed was—The most suitable time for the putting in wheat in the neighbourhood.

The experience of past years was adduced in proof of the general superiority of late sown wheat, and no one seemed to prefer early sowing, except on account of the difficulty which often arises at a later period from the unsettled state of the weather. It was observed, the case might be met by ploughing the ground as early as it becomes in a suitable condition in the month of October, and then to wait for a season till the end of November, or the beginning of December. Little risk was reckoned to attend this plan, as early-ploughed lands by frequent rains attain such a degree of firmness as to require but a short space of settled weather to put them into a good state to receive the wheat from the drill-machine. It was therefore given as the opinion of all present, that in our neighbourhood, in the wet soils as well as the dry, the surest way to obtain what might be properly termed a good wheat season is to plough the ground early, and to plant the wheat late. The favourite implement for depositing the seed is the five-furrowed drill machine, twenty-two furrows to the rod; and the quantity of seed generally preferred is 2½ bushels per acre. If the land at the time of sowing should happen to be in a bad state, or if it has become *very* late, the quantity of the seed should be increased according to the circumstances of the case.

*December 26th.*

The subject of sowing wheat broad-cast was discussed.

It was allowed that while the drilling of wheat was generally preferred, yet under some circumstances it might be advisable to sow it broad-cast. It was considered prudent to adopt this method on leys where a sufficiency of crumb could be obtained to bury the seed, and where the drill-machine might be expected to bring a quantity of turf to the surface. The junior members of the club were strongly recommended to attain a proficiency in this part of agricultural practice, that they might always be able to detect a bad seedsman before he had proceeded far enough to do much mischief. It was thought best to commence sowing a field on the leeward side, and to sow alternately with the right and left hands, as the field was crossed and re-crossed, always throwing the seed before the wind, to cast the grain well forward, and by no means to bring the hand round to the opposite side of the body till the seed is delivered, nor to suffer the sweep of the hand to be lower than the breast; and lastly, it was observed that a more liberal supply of seed should be furnished when the broad-cast system is adopted than is used with the drill-machine.

*January 23rd, 1844.*

The meeting was occupied in discussing the merits of sea-weed as a manure.

Members were not unanimous in their opinions, that it possessed nutritious qualities in a sufficient degree to render it a profitable manure under any circumstances, until the experience of those who

had used it for several years had been fully detailed. After much discussion, in which its several qualities were mentioned, and reference made to various modes of applying it, the meeting agreed in the following particulars, viz., that it possesses a considerable degree of nutriment, and has a very beneficial effect on lands where it has not been much used; and although it may not be wise to neglect any important work on the farm, or opportunities of getting town dung for the purpose of obtaining it, yet that every fair chance of adding it to our mixings should be embraced, especially in the summer, when it has been found that by placing a layer of it between the layers of dung taken from the yards, the heap has been improved both in size and quality.

*February 20th.*

The various methods adopted by several members in keeping farm-horses was detailed.

It appeared the usual winter allowance for a team of four horses, is four bushels of beans and two cwt. of Sanfoin hay per week, in addition to the chaff from the barns. The hay is in all cases cut and mixed with the chaff, and the horses are supplied with it in small quantities by a person always in attendance during the times of feeding. To this cut hay and chaff a portion of corn is added morning and night, at the discretion of the waggoner. In some cases the weekly allowance is six bushels of oats and four bushels of bran and the chaff. In other cases part beans, part oats, and part bran, with chaff. The expense of the different allowances was very nearly equal. The favourite keep in summer is lucerne, which it was the unanimous opinion should be generally cut in the cutting-box, and given to the horse in the manger. It was thought by some a good plan to allow a team two bushels of beans per week during the whole summer, as it proved a great saving in green-meat, and highly calculated to improve the condition of the horses. It was recommended to split the beans whenever they were given, whether in summer or winter. The annual expense is about £20 for each horse.

*March 26th.*

The attention of the club was not confined to any particular subject, but the conversation turned generally on matters of local importance.

**NORTHAMPTONSHIRE AGRICULTURAL BOOK CLUB.**—The following resolutions were agreed to at a meeting held at the Angel Hotel, on Saturday, the 30th of March, 1844, JOHN BEASLEY, Esq., in the chair, "on the best method of improving the condition of the English agricultural labourers:" *Resolved*,—That it is the opinion of this meeting, that the best mode of improving the condition of the agricultural labourers, is—1st, By establishing and encouraging, in every village, daily and Sunday schools for useful and religious education. 2nd, By promoting the establishment of Clubs, upon a sound and permanent basis, for providing funds for the relief of the sick and superannuated; and also

clothing and provident clubs. 3rd, By procuring cottage gardens, not exceeding one rood of good land, near to the residence of the occupier, and, where practicable, attached to his house. 4th, By providing them with comfortable cottages, containing not less than two bed-rooms. 5th, By paying the labourers weekly on a Friday, instead of Saturday, thereby giving them an opportunity of laying out their earnings to the best advantage. 6th, By adopting every possible means of giving constant employment to the agricultural labourers throughout the year, and of paying them according to the work performed, and not according to their necessities. 7th, By pressing upon the attention of the members, composed of landlords, land agents, and tenant farmers, the importance of carrying out the spirit of the 6th resolution, by devising means of increasing labour in such a manner as will secure to the employer a return equivalent to the additional outlay, without which the occupier cannot afford the expense consequent upon such increase of labour.

## REVIEWS.

### FARMING FOR LADIES; OR A GUIDE TO THE POULTRY-YARD, THE DAIRY, AND PIGGERY.

BY THE AUTHOR OF "BRITISH HUSBANDRY."

London: John Murray, 1844.

On a careful perusal of this most interesting volume we should at once pronounce its author as peculiarly fitted for the office of popular instructor in rural economy. Evident research, and consequently great information is here before us. Nothing contained in it is unsuited to the highest intellects, neither is it above the comprehension of the most humble; it is, to use his own words, "neither intended for the mere cottager nor for persons of large fortune, but for those ladies in the middle ranks of life who study healthful domestic economy, either for the pleasure or the profit which it affords; though, in saying this, we may justly add, that a cottage housewife might gather useful hints from its contents, and that a duchess would lose nothing by its perusal." As one intimately acquainted with the doctrine of household avocations, he deals with every subject in a practical way, and gives his readers a collection of facts, not only highly interesting, but useful. The style in which it is written is graceful, and abounds with anecdotes explanatory of the subject under consideration. The author has rendered his countrywomen an invaluable service by the publication of this little volume, and we venture to predict that it will, before many months, run through very many editions. "In London the common prices of poultry are generally so high, that people of narrow income, if living in town, can seldom put any on their table. Fortunately however the taste is now growing general amongst persons who are occupied in trades and professions of getting a box or villa for their families in the outlets; and if to their gardens be added a paddock for the feeding of a cow, with sheds for the accommodation of a pig and poultry, in the manner of a little farmery, or even for only a few cocks and hens, it is inconceivable how much it would add to the luxuries of the table, without at all increasing the expense: the most illustrious lady in the land, THE QUEEN, sets the example. Those residents at Windsor who are in the habit of taking an early morning walk, to enjoy "the cool, the fragrant, and the silent morn," in the splendid demesne, proudly

crowned by its ancient castle, must have often seen two persons in plain attire, tripping lightly across that pleasant meadow called "Datchet's Mead," in order to visit a farm at the extremity of the Home Park. These persons are her Majesty and Prince Albert, pursuing their way to the dairy and poultry-yard; and in their progress sporting with their infants, who are either mounted on their piebald ponies, or driving their well-trained goats in a phaeton. It is impossible to witness the unaffected enjoyment of the royal couple in this domestic excursion, unalloyed as it is by any restraint of official etiquette, without feelings of extreme pleasure, as a bright pattern to people of the highest rank, and if copied, would reflect credit upon those of an humbler station.

Upon perusal, we promise our fair readers that "Farming for Ladies" will be found to suggest methods for a serious saving in domestic economy. People are constrained, now-a-days, to open their eyes to their true interest; and if, upon reflection, the "fairest of creation" can find that, not by labour, but *mind*, they can assist in bearing the burden and heat of the day, here is a wide field now presented, where the acquisition of practical and scientific knowledge can be attained, and recreation enjoyed by the old, while "to the young (by the tenderness necessarily bestowed on the animals committed to their care), it engenders a kindly feeling towards the whole creation, as it springs up insensibly in their youthful bosoms, grows with their growth, to the manifest improvement of their dispositions, and this increases all the heartfelt joys of a beloved family."

"A TREATISE ON THE PRACTICAL DRAINAGE OF LAND. By HENRY HUTCHINSON, Land Agent, Valuer, and Professor of Draining, Walcot, near Stamford."

A book, with the above title, has been forwarded to us; and as we presume it is expected by the author that we should offer our critical opinion upon its merits, we shall do so with the utmost transparency and unreserve. We hail with pleasure every fresh contribution to the general stock of knowledge upon the subject of draining, and more particularly when it is offered us, as in this case, from the pen of "a practical man." The author sends forth his first-born under very high patronage, even no less than that of the Prince Consort, to whom the book is dedicated. We sincerely wish him all the benefit that he can have anticipated from the condescension of the distinguished personage referred to. It will be seen that the author has assumed the style of "professor of draining." We confess that we like the title, and we trust that the time is not distant when there will be a well instructed "professor of draining" fully employed in every country. The paper and type of Mr. H.'s book are good, and he illustrates his subject by four plans, showing certain drains executed by the author himself, and intended to explain his different modes of draining. A plate attached to the title page represents the different tools required for the various operations. Were we to criticise the work before us as a literary performance, we should offend against the rule which the author has himself prescribed for us, viz., to judge of it, for its *practical* views and directions. We are quite content to do this, as it is not only more congenial to our taste, but we have often found it a great relief to leave the unpleasant task of verbal criticism to others who may like to find fault better than we do. Our author's range is so wide and discursive that it is quite out of our power to do more than glance at a few of the

topics which he introduces. That there is a strong necessity for the close appeals which he occasionally makes to landlords and land agents as to want of proper judgment and supervision in the work of draining, we are as fully convinced as himself; and we also think with him, that it should proceed much more rapidly than it is now doing. From draining the author passes to the rent of land, to the practice of returning *per centages*, &c., &c., and, after making some very sensible observations on these topics, he has the following passage at p. 6:—"If the bad land is considerably improved, and the outlay great, and no notice is taken of it at the time of making the valuation for rent, then it may be necessary to add five or perhaps seven per cent. upon the outlay, *and this it will bear.*" Now, whatever "it will bear," we entirely differ from the author as to the propriety of laying on in any case, except there be something very special in it, more than five per cent. *If draining be well done*—as Mr. H. says, truly, it should be, if done at all—we ask him whether it will not last, in most situations, thirty, forty, fifty, nay, one hundred years? If this be answered affirmatively, *why should a tenant be called upon to pay more than from four to five per cent?* That the writer means fairly towards the tenantry is quite evident, from numerous passages in the book.

We have marked many passages for quotation and remark, but we perceive that we shall be obliged to return to the subject again, or we can by no means do justice to it; we therefore close our observations with a quotation from p. 57:—"I may be wrong in here making a statement, but it is one which I am sure will apply in too many instances where draining has been done, and that is, that too little attention has been bestowed on this subject by the agents of noblemen and gentlemen in looking after their tenantry, and making themselves acquainted with the best practical method of draining land, and conveying the same to the tenantry, so that the tenant might be saved an unwarrantable outlay, and the land improved for the benefit of the landlord as well as the tenant, and it cannot but be disadvantageous to both if the work has to be done over again."

MANURES.—Manures as to farming what blood is to the animal frame; divested of their aid, vegetation languishes, as the abstraction of the other leads to dissolution. Of all manures that are in use, commend your friends, I pray you, to that of the farm-yard. Much goes to waste about every steading, that, being otherwise carefully used, with a trifling amount of labour might be made available in superseding the use of artificial or foreign manures. Guano, I have found, under such circumstances, to be excellent when of pure quality, an article rarely to be found, producing fine potatoes and good oats. Clover treated with it has also done well, and seems to be deeper coloured than that from farm-yard manure; yet, tested on poor ground (recently reclaimed bog-land), compared with the latter, I have found it to fail. I have no doubt it has more of a speedy stimulative than a lasting nutritive quality, and therefore ought always to be used in conjunction with farm-yard manure, which it cannot, and should not be allowed to supersede. It, perhaps, ought not to be used at all, excepting under peculiar circumstances, or in the least accessible situations; certainly not after a sufficiency of green crops can be raised to enable the farmer, by the aid of house-feeding, to make plenty of dung for his land.—*Mr. Mc.Arthur, in the Ayrshire Agriculturist.*

## CATTLE INSURANCE.

Of all the benefits and improvements that have been brought under the consideration of the British farmer within the last half-century, *Insurance* is not one of the least important. Its advantageous application in cases of loss from incendiary and accidental fires has been experienced and gratefully acknowledged by thousands; whilst the more novel employment of its agency in mitigation of the damages occasioned by hail-storms, though to a comparatively less extent, is preserving numbers from a ruinous risk, against which they had, a few years ago, no possible protection. Both these modes of insurance, therefore have been highly beneficial to the farmer.

While these influences, however, have been operating to his advantage,—while human ingenuity has been taxing its powers to the utmost, in order to relieve him from the pressure of the burdens which the spirit of the times has entailed upon him,—while intelligence of every kind has been brought to bear on his interests,—while meeting after meeting has been held throughout the length and breadth of the land for the protection of his rights, and the permanent establishment of his privileges,—while chemistry has been opening up its secret stores, mechanism exhibiting its wonders, and foreign travel propagating the results of its discoveries, all for the benefit of the farmer,—is it not something wonderful that, till within the last few months, no plan has ever been devised for carrying out that grand desideratum, the INSURANCE OF CATTLE?

The farmer can provide against the uncertainty of human life; he can protect himself against the ravages of fire, and partially against the blighting agency of the elements; but in this portion of his capital (frequently a material one), he has been left altogether unprovided for and unprotected. Disease might riot unrestricted through his stock—deaths might result in scores, and his losses might reduce him to the verge of bankruptcy and ruin, and still he had no protection, no fund on which to fall back for alleviation, no Insurance Office to which he might look for restitution.

We are generally acknowledged to be, or at any rate we flatter ourselves that we are, the foremost among nations in the march of improvement; but, in this instance at least, the assumption will not hold good. However revolting to our national pride it may be, we are bound to confess that our continental neighbours are far in advance of us in the practical application of the science of insurance. Of *Cattle Insurance* we know comparatively nothing but what has been imported from them. In France, societies for the insurance of cattle have long been in existence; in Belgium they are equally popular; in many parts of Germany they are flourishing; in Prussia, and some other countries, they are upheld by legislative protection, and we believe they have been established in the United States; whilst, in England, no such society has ever been thought of till within the last few months, when the idea was conceived by one or two spirited individuals

in London, who have since succeeded in carrying it out on a great national scale.\*

For many years small local societies have existed in various parts of the kingdom, for the mutual protection of cow keepers against loss; and, during the last twelve months, the frightful havoc occasioned by that virulent epizootic the *pleuro pneumonia* has roused the attention of farmers to the subject. The result has been the establishment of many other similar societies for protection against loss by that particular disease. But it is evident that no association confined to a small locality can possibly compete with one whose ramifications extend throughout the kingdom, nor can they hold out that security to their members which is the main object of their existence, and the very essence of their stability.

The machinery required for conducting the operations of a large establishment is comparatively much less expensive than that of a multiplicity of minor ones, and consequently, farmers will find it advantageous, in a pecuniary point of view, to resort to this national institution, in preference to uniting with any local club. The rates will be found much more reasonable, and the names set forth in the prospectus will always be a guarantee for the responsibility of the office in case of claims.

We have examined the rules and regulations of some of the clubs that have been lately formed, and, on comparison, the results will be found much in favour of this general association as to economy, independent of every consideration of stability and responsibility; for though some of them show rates *apparently* lower, when all the expences of *entrance fees, spending money, charges for rules, and other et ceteras* are taken into account, the aggregate payments are, in fact, much higher. Indeed, some of these clubs fix their rates at 50s. per cent. for insurance against *Pleuro pneumonia* alone—such as the Nantwich, Bostock Arms, Broxton, &c.—and pay only *one-half* the value of the animal at death; whereas, the “Farmers’ and Graziers’ Cattle Insurance Association” insures against *all* diseases at the rate of 50s. per cwt., without any other charge whatever, and pays *two-thirds* of the value of the animal at death.

Other societies, again, which undertake to insure against *all* diseases, have adopted rates whose average, including contingent expenses, far exceed those of the “Farmers and Graziers.” Among those may be mentioned the Union Cow Club, Morpeth, Knaresborough, Southport, and Easingwold; the last of which costs the members at least *seventy shillings per cent.*

In making these remarks, we would wish clearly to be understood as not by any means derogating from the value of these clubs, for they have been highly beneficial to the localities in which they exist; they have “afforded a large measure of relief to many small farmers whose means could not otherwise have enabled them at once to replace the sudden loss of a cow, such a

\* Offices, 366, Strand, London.

loss being, under some circumstances, irreparable to an industrious labourer or numerous family.\* Far from carping at these clubs, we have watched the result of their operations with no little interest, as holding out an additional stimulus to prudence and economy in the labourer, and indicating a growing impression among the farmers that some provision of the kind was needed. What we desire to infer is merely that an association on a large scale, well-digested in detail, having the benefit of the past experience of other countries, and conducted by men of known respectability and practical talent, can afford to be much more economical in its rates, and must be more generally advantageous than a small one—a position which is borne out by reference to the comparative scales of payments adopted by some of the local clubs and those of the "Farmers' and Graziers' Mutual Cattle Association."

There is also another point of view, and one much more to the purpose, in which this subject should be considered. The small societies already in existence have been established merely for the benefit of the labourer, cottager, and probably the small farmer. They are not at all applicable to the great body of the agriculturists, graziers, and extensive farmers, for whom there has been no means of protection till this Association made its appearance; and when we take into consideration that there are estimated to be upwards of fifteen millions of cattle in the United Kingdom continually subject to the contingencies of disease and death, it is, indeed, marvellous that the importance of the application of insurance, to this portion of farming stock, has not long before engaged the attention of practical men.

We hail this Association as one of the most important, and comprising one of the largest fields for its operations, of any that has ever yet been brought before the agricultural public, and we predict for it a very large measure of success.

OBSERVATIONS ON THE MANAGEMENT AND APPLICATION OF MANURES.

BY A PRACTICAL FARMER.

(Continued.)

Whatever difference of opinion may exist among scientific men as to the exact proportion of each of the organic elements derived from the atmosphere, from the soil, and from water, the origin of the fixed or inorganic portion of plants does not admit of doubt. When, for instance, lime appears in combination with carbonic acid or sulphuric acid in the ash of plants, we are at no loss for its source. Plants are indebted to the soil for all the inorganic matters they contain; and an important point, on the part of the farmer, to be attended to, is to secure the presence of those ingredients which have already been seen to be essential in the vegetable economy. Attention to the absence or presence of the necessary ingredients for particular crops would prevent much disappointment and loss, and do away with the indiscriminate application of substances as manures to our cultivated crops,

without any consideration as to the precise substances really required to effect the object in view.

The inorganic matters of plants are composed chiefly of the following elementary substances in combination with acids:—Calcium, Magnesium, aluminium, sodium, and potassium; which, combined with oxygen, form lime, magnesia, alumina, soda, and potash, so well known in the arts; also chlorine, phosphorus, sulphur, silicon, and iron. Other elementary bodies occasionally present themselves in small quantity, but they do not appear to be essential constituents of plants. Nor are they, with perhaps the exception of sulphur, anywhere found in their elementary or uncombined state. The relative proportions in which the several compounds thus formed exist, is of more importance to be ascertained than that of the elements from which they are derived. The following table exhibits the proportion in which they are present in a few of the cultivated crops, 1,000 parts of each being taken.

	WHEAT.		BARLEY.		OATS.		TURNIPS.	CARROTS.	POTATOS.	RYE-GRASS.		BEANS.		PEAS.	
	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.				Hay.					
Potash	2.25	0.20	2.78	1.80	1.50	8.70	23.86	35.33	40.28	8.81	4.15	8.10	8.10	8.10	8.10
Soda	2.40	0.29	2.90	0.48	1.32	0.02	10.48	9.22	23.34	3.94	8.16	7.39	7.39	7.39	7.39
Lime	0.96	2.40	1.06	5.54	0.86	1.52	7.52	6.57	3.31	7.34	1.65	0.58	0.58	0.58	0.58
Magnesia	0.90	0.32	1.80	0.76	0.67	0.22	2.54	3.84	3.24	0.90	1.58	1.36	1.36	1.36	1.36
Alumina	0.26	0.90	0.25	1.46	0.14	0.06	0.36	0.39	0.50	0.31	0.34	0.20	0.20	0.20	0.20
Oxide of Iron	—	—	—	0.14	0.40	0.02	0.32	0.33	0.32	—	—	0.10	0.10	0.10	0.10
Oxide of Manganese	—	—	—	0.20	—	—	—	0.60	—	—	—	—	—	—	—
Silica	4.00	28.70	11.82	38.56	19.76	45.88	3.88	1.57	0.84	27.72	1.26	4.10	4.10	4.10	4.10
Sulphuric Acid	0.50	0.37	0.39	1.18	0.35	0.79	8.01	2.70	6.40	3.53	0.89	0.53	0.53	0.53	0.53
Phosphoric Acid	0.40	1.70	2.10	1.60	0.70	0.12	3.67	5.14	4.01	0.25	2.92	1.90	1.90	1.90	1.90
Chlorine	0.10	0.30	0.19	0.70	0.10	0.05	2.39	0.70	1.60	0.06	0.41	0.38	0.38	0.38	0.38
Total inorganic matter in 1,000 parts	11.70	35.18	23.49	52.42	25.80	57.40	63.03	66.19	82.83	52.86	21.36	24.64	24.64	24.64	24.64

\* See Report of the Jersey Agricultural Society.

The difference in constitution between the grain-crops and root-crops is manifest by glancing over the foregoing table, and will in some degree account for the different effects produced by each of these classes of crops on the soil. Some idea of the constitution of plants has been also afforded, and the inquiring farmer will not fail to see the necessity which exists to become likewise acquainted with the composition of the soils on which they are to be produced. The ingredients to be applied as manures then become apparent, and hence the foundation of a rational and economical system of manuring—rational, as supplying the particular matters required, and economical, inasmuch as those only are supplied.

The advantages of such a system being generally acted upon must be evident to every thinking mind; and the rapid progress in the path of improvement in this department of agriculture which has lately taken place, encourages the hope that the advent of such a system is more closely at hand than could have been anticipated some time ago. The physiology of vegetables is not now mere matter of speculation, as in times past; the component ingredients of the different classes of vegetables with the source from which each is derived have also been ascertained, at least so far as is necessary for practical purposes. The various kinds of manures, too, which are applied for the purpose of increasing their growth have often formed the subject of analysis; but in regard to them the same degree of precision cannot be acquired, the same substance being very different in quality under different circumstances; and hence the impropriety of arriving at general conclusions with regard to the composition of manures from isolated cases of analysis. In the case of soils the variation in quality is still greater than in that of manures. In their analysis, moreover, the greatest accuracy is required, in order that any conclusions of practical value may be deduced from them. The quantity of some of the inorganic ingredients of plants is so small, though their presence is not the less essential, that a due supply might be contained in the soil, and still not be found in any appreciable quantity in a specimen submitted to investigation. While, therefore, chemical analysis is calculated to do so much for the farmer in this department, it must be recollected that before such analysis can be of any value, they must be strictly accurate, otherwise the deductions from them will be calculated to mislead. It is, indeed, no difficult matter to perform an analysis, in the ordinary acceptation of the term, which is merely directed to the discovery of the predominating ingredients; but it is frequently the absence or presence of those contained in small quantity only which it is most important to ascertain. The fertility of soils being dependent on the facility with which they can supply certain constituents of plants, it is only the most refined analysis that, in many cases, is capable of determining whether they are present or not; much less of explaining to what their peculiar excellencies or defects may be owing, what ought to be added to render them productive, or why, in short, certain remarkable effects are produced by the addition to them of organic or inorganic matters.

This subject admits of illustration by a familiar example. Gypsum is well known to be essential for the production of red clover in luxuriance; but such a small quantity as 2 cwt. to the acre is found to be amply sufficient for the purpose. Now, supposing this quantity to be equally distributed through every part of the soil to the depth of twelve inches, the proportion found in a pound weight of soil would be about half a grain; and in one hundred grains (a very

common quantity of soil to submit to analysis) the quantity of gypsum present would not be more than one seven-thousandth part of a grain—a proportion which only the most carefully conducted analysis would be able to detect, and yet the detection of it would be of the utmost importance were it desired to know whether gypsum should be applied to that particular soil. While, therefore, chemistry is calculated to do much for agriculture, it is important that the farmer should know in what way it is likely to serve him. A very slight acquaintance with the first principles of that science will often enable him to obtain results of practical value; still it has been seen that such knowledge will not always avail him. The "chemistry for farmers," may emphatically be termed the "chemistry of nature," a knowledge of which may be acquired without much difficulty.

Before concluding these general remarks, and entering on the consideration of the various manures which are applied to the soil, a few words of application will not be out of place. It has been seen that plants are in a great degree dependent on water and the atmosphere for their support, and this should teach the farmer the necessity of securing a due supply of them to his crops. It is especially important that the individual plants should stand at such a distance from each other as to admit the air freely to every part of the foliage. The soil, too, should be pulverized to as great a depth as possible, in order that the air may permeate it, and further to enable the fibres of the roots to extend themselves. The same arrangements secure a due supply of moisture, and also guard against its detention longer or in greater quantity than is required for the purpose, as minute pulverization is equally favourable to evaporation and absorption. The dependence of plants on the atmosphere for their support was well known upwards of a century ago to the celebrated Jethro Tull, the father of drill-husbandry; but that he did not entertain very correct ideas on the subject is apparent from the fact of his conceiving that pulverization only was necessary in cultivation, to admit freely air and moisture. He persevered in this practice for a length of time, and brought his system of drill-husbandry to great perfection; but, as in every case in which general conclusions are drawn from a limited observation of facts, Tull was obliged to abandon his theory.\* The husbandman at the present day, however, would do well to follow his example, in securing a due supply of air to his crops. On looking over the crops of the country, especially drill crops, which usually have a large system of leaves, they are generally found growing so close together, from a mistaken idea that an increased produce will, in this manner, be obtained, as to exclude the free admission of air from among them; and also effectually prevent the free introduction of the implements of tillage, the action of which is essential to loosen the soil about their roots. Could farmers be induced to pay so much attention to the subject as to compare the produce of equal portions of their crops, where a proper system of tillage and a due application of manure had been given, the one standing, say in the case of turnips or potatoes, at intervals of ten or twelve inches apart, and the other at the more common distance of six or seven inches, a marked change in the cultivation of their crops in this respect would soon be apparent; while they are not warranted in going the whole length with Tull, who considered the direct application of manures unneces-

\* The reader is referred for further information on this subject to an Essay in the "Quarterly Journal of Agriculture" on "Jethro Tull and his Husbandry," vol. xi., p. 342.

sary, the preceding observations would tend to show that to secure a due supply of those elementary substances which form so large a portion of the vegetable structure, is no less important than the direct application of matters which are contained in plants in so much smaller quantity.

An attempt has now been made to place before the reader the general principles on which the application of fertilizing matters to the soil should be founded. The constituent parts of plants have been enumerated, with the sources from which they are available for the required purpose, and the necessity of increasing the presence of the requisite supply of such matters: it therefore now remains to treat briefly of the most important substances which are applied as manures, with the results, so far as ascertained, which follow their application.

The list of manures to which the attention of the farming community has been lately directed is extended, and calculated to puzzle them no little as to which they should select. The experiments which have, from time to time, been placed before the public cannot be implicitly relied on for this purpose, as the peculiar circumstances under which they have been applied are seldom sufficiently detailed, and from this cause the most conflicting testimony has repeatedly been given as to their value. In numerous cases, it is well known, the most important results have attended the application of certain of the portable manures, while in others they produced no sensible benefit, and in many cases the increased returns of produce barely repaid the expense of the application. But while almost each of the new manures lately brought into notice has, in its turn, in certain cases, disappointed the expectations of the farmer, it may be regarded as singular that the long tried and staple article, farm-yard manure, is in every case successful. This seeming paradox is, however, not difficult of solution. The dung of the farm-yard is to be regarded as an extremely compound substance, containing in abundance every ingredient furnished by the soil to the growing crops. Hence it is apparent that there can be no crop, or no soil, to which this manure is unsuited, as containing the necessary matters for all. Hence, also, the extension of its beneficial influence through a whole series of crops before its effects are completely exhausted, each crop appropriating its own peculiar aliment, until the whole is absorbed.

Farm-yard manure is thus seen to be not only general, but in fact universal, in its applicability as manure for the common cultivated crops; and where it can be obtained in abundance few others will be employed. Its agency is not merely confined to supplying the growing crops with their appropriate food, but it also exerts a most beneficial operation on the texture and quality of the soil itself, rendering it more permeable to the fluids, air, and moisture, the importance of which, in the economy of vegetation, has been already stated. The most sterile and barren soil is mechanically improved by the application of this manure, as may be apparent to every one on comparing garden mould with earth from land of a similar quality, but to which no such application of manure had been made.

Notwithstanding all these circumstances, as showing the superiority of farm-yard manure, it does not follow that it is the most economical that can be applied in all cases, especially where the home supply is not sufficient. The expense of an ordinary application of it, when purchased, without even taking into consideration the expense of transits, which in all cases is considerable, is usually two or three times that of the

portable manures; while, by a proper selection of the latter, the same effect, at least in the first instance, may be produced. It being at all times desirable to produce the intended effect with the smallest possible expenditure of means, the portable manures are deserving of consideration on this account alone, as they have enabled the farmer, in certain cases, to accomplish what, without their assistance, would have been impossible, and in others, what could not have been effected unless at a greatly increased outlay. They possess, also, this important advantage, that they can be used either before sowing or planting the crop, or at any stage of its growth, with the same facility. In the case of crops having small seeds, the rapid vegetation of which is important to guard against failure, as the turnip and many others, the portable manures are invaluable from their being readily placed almost in direct contact with the seed; in certain cases, indeed, being deposited simultaneously with the seed, the same machine serving both purposes. These crops are thus pushed forward at the most critical period of their growth; and should they afterwards, from any cause, appear to grow languid, the same class of manures presents itself to the aid of the farmer, being economical in its original cost, easily conveyed to any distance however great, and applied with facility and despatch to the growing crop, in such quantities and at such intervals of time as may appear necessary.

Farmers are often taken to task for the pertinacity with which they adhere to established practices and the earnestness with which they resist all innovations; but on this point there is much exaggeration. The favour with which the portable manures have been received, and the great extent to which they are at present employed, notwithstanding the comparatively short time which has elapsed since they were prominently brought into notice, show that such a charge is in some degree unfounded. Although carrying this disposition too far, in some cases, the wholesale imposition to which they are frequently subjected renders the utmost caution necessary on their part. Few who have not specially turned their attention to the subject could form an idea of the extent to which adulteration is carried in the vending of the manures now under notice; and it is to be feared that in many cases they do not exercise sufficient caution in the purchase of these articles. Adulteration to the extent of one third or one fourth might be supposed to satisfy the cupidity of even the most dishonest vender; but a case has been mentioned by Mr. Edward Solly, in the course of a lecture at the Royal Institution on a late occasion, in which the spurious matters composed no less than ninety-seven per cent. of the whole amount; or, in other words, the saline matters composing the manures under notice contained only three per cent. of the particular ingredient for which it was sold. This is, no doubt, an extreme case, but it is given on the highest authority, and as the analysis of the manure was conducted by Mr. Solly himself, no doubt can remain as to the fact. However far the general scale of adulteration may fall short of this, it does not admit of doubt that three-fourths of the portable manures are graduated by it, especially when they have passed through several hands between the importer or manufacturer and the farmer.

This is a great and crying evil. There is perhaps no other article of merchandize which presents so favourable an opportunity for adulteration as this new class of manures. From their very nature they contain impurities to a greater or less extent, even when no deception has been practised, or no means employed for specially introducing such matters. The various

saline matters employed as manures, as the nitrates of soda and potash, and similar substances, are never found to exist in a pure state, and are only divested of the admixture of foreign ingredients by chemical means, and this circumstance affords a greater facility for adulteration. It is also only by chemical means that the extent of such adulteration can be ascertained, and of this test the farmer is rarely, or never, able to avail himself. Unless, therefore, some means be adopted for effectually putting an end to the wholesale adulteration now practised with the portable manures, the farmers will be obliged to discontinue using them, and a serious obstacle will be thereby interposed to the progress of agricultural improvement.

This is one of the occasions in which the more extended application of chemical analysis is calculated to do much for the farmer. As a greater or less portion of impurities is necessarily present in these manures it behoves the respectable dealers, who are above resorting to such dishonourable means for increasing their profits, to procure an analysis of an average sample of the various parcels of manures which they have on hand. No difficulty can be now experienced in securing the services of competent persons for the performance of such analysis, and the proportion of the various ingredients actually present would enable both seller and buyer to form an accurate opinion as to the value of the particular manure he requires. The analysis of the manure would then determine its value, and the dealer would, indeed, have little regard for his character who would give a false return of the analysis, knowing how unlikely he would be to escape detection.

The impurities usually present in manures are seldom pernicious themselves, as containing any ingredient inimical to vegetation, but it is obvious that they are worthless for the particular purpose for which the manure is applied. Guano, for example, is frequently found largely adulterated with sand. Now, sand might be contained in considerable quantity in the guano before being at all removed from the place in which it was originally deposited; but then it is especially important that the proportion of sand thus contained should be declared to the purchaser, as not only the market price of the article is thereby determined, but the precise quantity which should be employed. Suppose, for example, one parcel of guano contains fifteen per cent. of sand, and another thirty, it is apparent that to produce similar effects by each of them, an increased quantity of the latter should be employed in proportion to the greater quantity of extraneous matters contained in it; the same circumstance also affecting its market value. If the former sold at 10*l.* per ton, the price of the latter would be about 8*l.* 5*s.* But, even in the event of this graduation of price being established, the purchaser of the inferior sample would still be labouring under the inconvenience and expense of carriage, and additional labour in its application to the soil of matters positively useless, in itself a serious drawback when the quantity employed is large.

The remedy for this imposition rests with the farmers themselves. They should never be driven from dealing with merchants of character by the lure of cheapness; and if they determinedly set their faces against dealing with any one who did not at once furnish them with an accurate analysis of the various specimens they had for sale, even the most respectable merchants would be compelled to provide themselves with it. It is evidently not necessary to understand almost anything of chemistry to be able to form an opinion of the value of an article from an inspection of the various ingredi-

ents contained in it, and the proportions in which they exist. A very slight acquaintance with chemical manipulation would, indeed, enable the farmer to test the accuracy of the analysis himself, the sand and other insoluble matters being at once separated from the more valuable ingredients by solution and filtration. But there are also soluble matters used for the purpose of adulteration, the detection of which is not so easily effected. The ingredients employed for the purpose of adulteration may even be valuable manures in certain cases themselves, and still not be the less spurious when mixed with substances of greater value. The adulteration of the salts of ammonia, and of the nitrates of soda and potash, with common salt, is extensively practised; and although the latter article is valuable as a manure, the fraud is not the less in adding it to the others for which much higher prices are obtained. The adulteration of these salts is also extremely difficult of detection, unless in the hands of the experienced analyst; and it is therefore the more necessary that in their selection the purchaser should be more on his guard.

The *doctoring* of spurious seeds has been long in practice; though it is believed not to be on the increase of late, from the determination so wisely shown to patronize only such seedsmen as had a character to lose. It is evidently false economy, in any case, to purchase inferior articles at any price; but when such articles are for consumption, it is of comparatively little consequence. It must surely be without reflection that any one will purchase unsound seed under the lure of cheapness, as such economy may occasion the loss of his crop altogether. Considering how much the value of the crop depends on the quantity and quality of the manure applied to it, it is scarcely less impolitic not to exercise proper caution in the selection of the manure as well as in that of the seed.

An attempt has now been made to state briefly the general principles on which the application of fertilizing matters to the soil should take place. The constituent parts of plants have been enumerated, with the sources from which they are available for the required purpose; and our attention shall, in the next place, be directed to the consideration of the various matters applied as manures, with the results, so far as ascertained, which follow their application.

At the head of this class of substances deservedly stands the dung of the farm-yard. Its peculiar adaptation to the support of vegetable life is apparent from the fact of its being composed of the remains of vegetable matters in various stages of decomposition, combined also with a certain proportion of animal substances. This manure is also, as may be easily conceived from its origin, very various in its qualities, depending on the kind of animals fed, as well as on the nature of their food. The manure from lean animals is very inferior to that of animals in high condition, as is known to every farmer on comparing the effects of the dung of the fold-yard in which the store cattle are kept with that of the cattle in the stalls being fattened. In practice, however, the manure from the different classes of animals of the farm-yard is usually combined, by carefully mixing all together as it accumulates, and afterwards by turning over the whole before being applied to the soil. And this is precisely as it should be, the effect of the mixture being to improve the quality of the whole. The manure from the stables, by itself, would ferment too rapidly, and thereby lose much of its value in the escape of the gaseous compounds evolved during fermentation; while that from the cow-house, on the contrary, is slow of decomposition, and is, therefore, much

improved by being incorporated with other substances having a tendency to ferment more rapidly.

Farm-yard manure having been applied to the soil from the earliest period, and, until lately, having been almost the only kind of manure in use, it might have been supposed that its management was generally well understood; but until the portable manures were introduced, the proper degree of attention was most directed to the former substance, nor was the importance of economising it sufficiently felt. From its greater bulk it does not admit of being so safely stored beyond the reach of the influence of the weather as the portable manures, and much of its value is lost by exposure alone. The necessity of its undergoing a certain degree of fermentation before being applied to the soil, and the value of the manure depending in so great a degree on the manner in which this has taken place, and the extent to which it has been carried, the proper and economical management of that important article required a degree of skill in the farmer which was rarely possessed.

This fermentation, so familiar to every farmer, is, in fact, a chemical process; and, to ensure its taking place under the most favourable circumstances, a certain knowledge of the elements of that science are necessary. The necessity for such information is not generally felt nor acknowledged by farmers; and the most illiterate among them would hear the announcement with no small degree of indignation if told that he was unable to manage properly the fermentation of manure heaps. But how few, of even the most intelligent class of farmers, are aware of the loss in value of that article sustained by the uninterrupted exhalation of ammonia which is almost constantly taking place! This has been satisfactorily shown to be the most valuable ingredient in the heap, although until lately no means have been employed to prevent its escape. Urine is also known to contain highly fertilizing matters; yet so generally is this substance disregarded, that it is allowed to run from the yards to waste. It is only now, indeed, that the attention of farmers is forcibly directed to the importance of judgment and economy in the management of the manure of the farm-yard; for however necessary it may be on their part to avail themselves of the assistance of the various other matters submitted to their notice, for the purpose of increasing their cultivated produce, it is much more necessary to guard any portion of the home supply from going to waste.

The proper management of farm-yard manure is not different when the correct principles by which the farmer should be guided are understood. The arrangements for economising the manure are also those most conducive to the health of the domestic animals, an important circumstance too often overlooked. The retention of urine in the stables is known to exercise a most injurious effect on the constitution of the horses; not only affecting their lungs, but also weakening their eyes, by the ammoniacal fumes with which the atmosphere of the stables in this case becomes charged. Arrangements for preventing this escape of ammonia have, therefore, the advantage of remedying one of the most fruitful sources of disease among horses—namely, filthy stables. The retention of the urine in the cattle sheds, though not so injurious, is also inimical to the thriving of the animals. The pungent exhalations so characteristic of filthy stables are not felt in the cow houses, although no doubt can be entertained of its injurious effects in polluting the atmosphere; and little consideration is necessary to see the injurious effects of which a damp bed must be productive to any species of live stock.

In the case of the hardy stock of mountain districts, little inconvenience might be sustained by this treatment; but in that of the more tender and comparatively artificial stock of the plains, inattention in this respect not only retards the growth of the animals, but is also productive of disease.

This is obviously not the proper place to enter upon the arrangement of the various parts of the farmery intended for the accommodation of live stock. Of the cow-houses, it may merely be mentioned that no irregularities should occur in the channels for conveying away the urine, which should be carried to the reservoir or tank in covered drains. In the stables a small metal grating should be placed in each stand, so that the urine would at once be conveyed into subterranean channels without passing over much of the surface of the stables. In large stables the urine frequently has to pass along the entire length of the house before making its escape, in which case evaporation to a very considerable extent must take place. The expense of forming a subterranean channel for this purpose is not, however, considerable, and should invariably be adopted. With this channel the gratings in the several stalls should communicate; and such a degree of inclination should be given as would insure all matters coming into the channel being quickly carried off.

The feeding of cattle in open sheds—with shelter sheds to retire to at night or during stormy weather—is daily becoming more general, especially in the northern part of the island. When straw is produced in large quantity, this system of feeding affords great facility for converting it into manure, both by the dung and urine of the animals, and by their constantly treading through it. Rain water should be kept from these yards as much as possible, as the undue dilution of the liquid manure by such means only increases the labour in managing it, and applying it to the land without any addition to its fertilising properties; indeed, the dilution may be carried so far that the liquid may not be worth the expense of applying it at all. The water from the roofs of the sheds and other buildings might be advantageously employed to supply the yards, being conveyed to a cistern for that purpose; but, in any case, it should not be allowed to run into the manure tank. To preserve these sheds in a proper state for the animals, as well as to keep the manure in a proper condition, it should be removed from them much oftener than is usually done, and conveyed to the general depository, or at once taken to the field, there to be stored up for use. Continued treading of the animals—especially if much moisture be present—is injurious to the manure, as depriving the more solid matters of a portion of their fertilizing properties by remaining in this semi-fluid state, and also rendering them less susceptible of undergoing fermentation afterwards. The precise periods through which the accumulation of manure in the sheds should be allowed to extend will obviously depend on the number of animals in the yard, the proportion in which the straw and roots are supplied, and, in some degree, on the state of the weather, as in continued drought the removals may be less frequent than would otherwise be necessary. In large yards, where a number of young cattle are kept, the manure is, in some cases, allowed to accumulate during the winter, without any portion of it being removed, fresh litter being added as the last becomes trodden down. This is obviously not a state favourable for the preservation of the manure, which would be much better in a comparatively dry state—having, however, always so much moisture as is necessary to carry on fermentation when it is desirable that it should take place. The manure in the bottom

of the yard will, indeed, in such a case, have sustained very considerable injury.

On being removed from the houses and shed, the manure may be formed into a heap in the vicinity of the farm-stead, or it may at once be conveyed to the fields in which it is to be applied, and there formed into heaps on the head-land, where it remains until the proper season for the purpose arrives. The latter system of disposing of the manure has this advantage, that it is conveyed at once to the fields as made, without materially interfering with the other operations of the farm; and the importance of having it stored in the field in the hurry of seed time, instead of leaving them to bring it from the farm-yard, is too obvious to require illustration. A greater waste—especially of liquid manure—is sustained in this manner, however, there being no means of collecting that which flows from the heap; but this may, in some degree, be remedied by placing a thick layer of such absorbent matters as can be collected in the bottom of the heap, which will retain the liquid that would otherwise escape and be lost. This layer may consist of scourings of ditches, road scrapings, or even the rich earth accumulated on the head-land of the field. When peat earth can be obtained, it may be advantageously rendered available for this purpose.

Even where the manure is stored at the farm-yard until required for use, it is sometimes recommended that a layer of such matters should be placed in the bottom of the heap, for the absorption of the juices of the manure; and, where proper arrangements do not exist for the reception and preservation of these matters, this precaution is necessary. The practice of the scientific farmer of the present day is, however, to concentrate his elements of fertility rather than to aid in their diffusion; it being apparent that if an equal amount of fertilizing matter can be applied to the land in half the usual bulk of material, an important object is thereby gained in the more economical application of the manure in question. For this reason, therefore, we cannot recommend any addition to the mass of manure, without, at the same time, adding in proportion to its fertilizing powers; and when proper arrangements are made for the collection of the urine and other liquid matters of the farm-yard, the practice of adding absorbent ingredients not containing within themselves the elements of fertility does not seem worthy of imitation. On these grounds, too, we cannot recommend the practice so general in many parts of the country of forming the whole, or the greater part, of the manure of the farm-yard into a compost with other matters previous to its being applied to the land. This process is attended with much labour in the formation of the heap in the first instance; and the application of such an increased quantity of materials, without a corresponding increase of the elements of fertility, is a work of great labour in the spring, at a time when economy in that department is of so much importance. The soil is also unduly consolidated by continued cartage on the land, which, especially if it be at all damp, destroys the pulverization previously secured as a preparation for the crop. Cases may, indeed, occur, in which much advantage will be derived from the application of a large quantity of compost, as altering the mechanical arrangement of the soil; and in the case of applying top-dressings to grass lands, an exception should perhaps be made, is being the case in which composts are most efficacious. In all other cases in which the application of matters similar to those used in the formation of composts becomes desirable for the improvement of the soil, we should much prefer the application

of such matters by themselves; in which event the work could be performed during the frosts of winter, when the land would not sustain injury by cartage, or some other equally convenient period of the season, when no interruption would be afforded to the ordinary labours of the spring.

(To be continued.)

### CHOICE OF POTATOES FOR SEED.

"*Unripened*, and consequently *watery*, potatoes make the best seed roots; inasmuch as they always produce strong, healthy, vigorous plants; this watery matter being the germinative principle. Potatoes which have been *planted late in the season*, therefore, or *dug early in the season*, or which have grown in *boggy land* or in a *mountain* situation, are to be preferred; as under such circumstances the tubers are *not matured*, the farina has not been developed. On the other hand, if we use for seed-roots those potatoes which have grown in good land, have fully ripened there, and have attained all the perfection of which they are capable as to quality, abounding in farinaceous matter, but deficient in mucilaginous matter, many of the plants produced from such roots will be curled and unhealthy; a general want of vigour will be evident, and the produce will be very inferior to that from *unripened tubers*, as they only possess the *pro-creative power in perfection*. As an illustration: it is known to most persons engaged in rural affairs, that in the long varieties of potato, one end, called the crown or rose end, makes, when cut off, better seed than any other part of the same potato; better, because the plant which springs from it is much more healthy, succulent, and vigorous than the others. How is this accounted for? Simply because such rose end is the watery end. To prove this to be the case, boil such a potato, and the part referred to will be found soft and uneatable, while the remainder of the potato is firm, dry, and floury. The circumstance of inferior potatoes begetting good ones is not peculiar to this vegetable alone, but is in unison with all the other operations of nature, and is a part of her great law, which decrees that when perfection in vegetable or animal productions has been attained, their reproductions degenerate, and *vice versâ*."—*Essay on the Field-culture of the Potato*, by Peter Cowan; second edition, 1834.

"We think that the experience of last year and this, in regard to the state of the potato crop, is strikingly corroborative of the theory of weakness in the potato as being the primary cause of the failure; for observe the results: the *under-ripened* seed raised in the bad season of 1841 produced a crop without failure in 1842, in the *alleged unfavourable* circumstances of heat and drought; while the *over-ripened* seed raised in the very fine season of 1842 has caused extensive failures in 1843, in the *alleged favourable* circumstances of moisture and coolness. What should be the practice indicated by these results, but that *un-ripened* seed should be planted in all cases; and, to prevent its becoming over-ripened in any season, let the potatoes intended for seed be raised before they become ripe."—*Quarterly Journal of Agriculture*, July, 1843.

"It was necessary to consider the substances which potatoes contained; which were—starch, albumen, and saline matter. It was the result of a great number of chemical examinations, that *potatoes which contained the greatest quantity of starch were the most likely to fail*."—*Professor Johnston's Lecture*, August, 1843.

## REPORT OF THE TITHE COMMISSIONERS FOR ENGLAND AND WALES.

TO THE RIGHT HON. SIR J. R. G. GRAHAM,  
BART.

*Tithe Commission Office, April 2, 1844.*

SIR,—It is our duty to report to you the progress of the commutation of tithes in England and Wales to the close of the year 1843.

We have received notices that voluntary proceedings have commenced in 9,555 tithe districts: of these notices 45 were received during the year 1843.

We have received 6,877 agreements, and confirmed 6,492: of these 183 have been received, and 281 confirmed, during the year 1843.

3,871 notices for making awards have been issued, of which 836 were issued during the year 1843.

We have received 2,681 drafts of compulsory awards, and confirmed 2,172: of these 675 have been received, and 559 confirmed, during the year 1843.

We have received 7,525 apportionments, and confirmed 6,881: and of these 1,074 have been received, and 1,186 confirmed, during the year 1843.

In 8,664 tithe districts, as will be seen from the above statement, the rent-charges to be hereafter paid have been finally established by confirmed agreements or confirmed awards.

We have in our possession voluntary agreements and drafts of awards, as yet unconfirmed, which will include 894 additional tithe districts; and make a total, when completed, of 9,558 districts in which the tithes are commuted.

We have to repeat the assurance which we have happily been able to give in every report, that the whole progress of commutation is proceeding steadily and harmoniously. The district of South Wales may appear to form an exception.

As far, however, as we can judge from our own correspondence, and our other means of information, very little discontent has existed between the real parties to the commutation; that is, the landowners and tithe-owners.

The occupying tenantry, however, have found grounds of complaint, in many cases not unreasonable: they are called on to pay rent-charges, the majority of which have been agreed to by their landlords, though a smaller portion have been awarded by us. Those rent-charges are very peculiarly low, and on the average do not greatly exceed one-tenth of the rent, or of the net value, instead of amounting to one-tenth of the gross value of the produce.

Still, low as they are, these rent-charges somewhat exceed the compositions which the tenants calculated on paying when they hired their farms and fixed their terms with the landlord.

The task of apportioning still goes on more slowly than it was calculated it would do when the Commutation Act passed; but it continues to be effected, as it has all along been, with much less difficulty and irritation than it was supposed would accompany it.

Much of the work which remains for us to do begins to assume a character which makes it advisable to draw your attention to some of its peculiarities and difficulties.

In many parishes in which the great bulk of the tithes have been commuted on enclosure or otherwise, farm or district moduses have been left, which, in the present state of the law it will become our duty to convert into rent-charges, and we must partially at least map, and apportion on the land subject to them.

The expense of such apportionment to the land-

owners will first be extravagant when compared with the amount of the sum apportioned, and then the expense of collecting will make the rent charge valueless to the tithe-owner.

It seems to us that in these cases a permission to redeem these payments for money, and thus to avoid the expenses both of apportionment and collection, would be advantageous, and, indeed, is requisite to protect both parties.

The managers of Queen Anne's Bounty are willing, we believe, to receive the redemption money; and if they are directed to apply it, as they do augmentation moneys, it may partially and gradually be invested in land, if that seems desirable for the tithe-owner. The operation of such a measure might, perhaps, usefully be somewhat extended.

In many cases of vicarial tithe, the individual payments are so minute as to convert the collection of them into a loss. We have even been requested to strike a mass of them out of rent-charges, because as the tithe-owner will be taxed upon the gross amount of them, and be certain not to receive them, the nominally giving them to him is substantially mulcting him.

The redemption of such small payments would clearly be a boon to the tithe-owner, and, as the liability to them is often felt to be a disagreeable incumbrance by the owners of property, the power of redeeming them would be in very many cases also considered a boon.

The state of the law, as modified by 2 and 3 Will. IV., c. 100, commonly called Lord Tenterden's Act, impedes our progress, and, unless cleared up, threatens to protract the close of our labours. In some hundreds of cases, and, indeed, in an indefinite number, we cannot give decisions as to the contested rights of parties, with any confidence that those decisions are correct.

Our own legal assistants are divided in opinion, and we are told that this division of opinion extends even to the superior courts; at any rate, no decision of those courts on the cases now before them has been obtained.

We are led to hope that some distinct decision may be given before the close of this year; if this is not the case, we may be driven to request the assistance of the legislature.

Whatever the law may turn out to be, those cases will many of them be obstinately litigated; and if our dealing with them is much longer postponed, the delays of issues and new trials, and of the apportionments which must follow them, may postpone what would otherwise be the term of our labours.

In the case of parishes containing open fields, where the tithes have been commuted and the rent-charges apportioned before enclosure, the re-apportionment of those rent-charges on the enclosed lands newly appropriated to individuals, is always desirable, and, indeed, almost indispensable.

We have no power to sanction this at present.

We think such a power might conveniently be given us.

The exercise of a similar power, after the close of our commission, may be provided for by an act, which, for that and other purposes, it will be necessary to pass before the tithe commission ceases to exist.

In a number of parishes, heretofore enclosed by act of Parliament, we have reason to believe that the provisions for extinguishing tithe have been in some cases wrongly, in others imperfectly, carried out.

If tithe litigation and tithe are to cease with the commission, some provision must be made for correcting the errors or completing the deficiencies of these enclosure transactions.

Some of the railroads, one of the most extensive in

particular, that is the Great Western, refuse to pay the rent-charges apportioned on the lands over which they pass.

It is illegal to seize and carry away the rail, so that the tithe-owner's remedy by distress is nugatory, unless there is a station in his district.

His remaining remedy is to take possession of the grounds over which the road passes; but as it is illegal for him to stop up a public way, his possession is useless to him unless he resorts to the doubtful benefit of a suit in equity, to compel an account of the profits made on portion of railroad in his legal possession.

We think that the owner of the rent-charge should not be driven to this experiment, but that whenever a rent-charge is clearly due from the railroad company, it should be recoverable by distress on the property of the company, on whatever part of the line found.

This would not increase the legal liability of the company.

They might still, by replevin or otherwise, dispute the legality of the rent-charge; only when they did not dispute it, they would be compelled to pay the owners of rent-charges in districts where there is no station, and where those owners have no other remedy than a suit in equity.

We have the honour to be, sir,  
Your faithful and obedient servants,

WM. BLAMIRE.  
T. W. BULLER.  
RD. JONES.

MONMOUTH FARMERS' CLUB.

REPORT OF SEVERAL TRIALS WITH SULPHURIC ACID AND BONE DUST, FOR TUPNIPS, IN 1842 AND 1843.

The Secretary of the Monmouth Farmers' Club, considering it to be of the greatest importance to raise a good crop of turnips at the least possible expense, has much pleasure in annexing to this year's report a statement of his own and other persons' trials with sulphuric acid and bones, and other manures.

*Trial of sulphuric acid and bone-dust*, with other manures, upon a worn out arable field of a sandy soil, sown in the beginning of August, 1843, with improved stone turnips, in lots of a quarter of an acre. The ground was ridged up at 24 inches, the seed drilled on the ridge and hoed out to 8 inches; the turnips were horse-hoed three times and hand-hoed twice.

The measure, weight, &c., are all calculated per imperial standard; one perch of each lot was pulled, topped, and weighed on the 8th of January, 1844.

The expense and produce per acre are as under:—

No. of Lot.	Manure per acre.	Expense per acre.			Produce per acre.		
		£.	s.	d.	Tons.	cwt.	qr.
1.	15 yards of fat pig's dung, rotten ..	3	0	0	15	2	3
2.	3½ bushels of bone-dust, and 80lbs. of sulphuric acid (oil of vitriol) ..	1	0	6	13	1	1
3.	40 bushels of coal ashes saturated with human urine in winter 1842-3.	1	3	0	12	12	3
4.	20 cubic yds. of road scrapings, mixed with 280 gals. of human urine, and twice turned over in 1842 .....	2	3	6	10	12	2
5.	2 cwt. guano, mixed with 12 bushels of pure charcoal dust .....	1	15	0	10	5	3
6.	7 cwt. urate .....	2	1	6	9	11	2
7.	20 bushels of bones (half dust) .....	2	14	0	9	1	1
8.	6 bushels of bone-dust and 20 bush. of charcoal dust ..	1	3	0	8	17	0
9.	4 bushels of bone-dust and 20 bush. of charcoal dust ..	0	18	0	8	17	0
10.	16 bushels of bones (half dust) .....	2	4	0	8	2	3
11.	15 yards of common straw dung, half rotten .....	1	10	0	6	13	1
12.	40 bushels of pure charcoal dust ..	1	0	0	5	4	1
13.	No manure .....				1	10	2

NEW DRILL-DRESSING FOR TURNIPS.—

To 1 qr. bone-dust, add 1 cwt. of salt and 10 gallons of water; mix them well; meanwhile mix 1¼ cwt. of sulphuric acid with 10 gallons of water, gradually, and let it cool; when nearly cold, pour some of it, say a gallon, gently over the bone and salt, over the whole surface, to prevent much fuming of muriatic acid, and mix it in; after an hour (or when it ceases to fume) add another gallon in the same way; and so on till all is in. The sulphuric acid decomposes the salt and part of the bone; producing sulphate of soda and gypsum, and setting free muriatic and phosphoric acids. The muriatic acid penetrates the remaining bone, and renders it soluble without decomposition. The whole may digest together a few days or weeks, if convenient. The result will be a mixture of sulphate of soda and gypsum, with bones rendered soluble by muriatic acid. The bone must be genuine, and not mixed with oyster-shells, &c., as they will neutralize the acid and destroy its effect. Whole bones would probably be made tender by a month's digestion, and by guano or rape in two or three months. This quantity upon an acre will produce more effect than 3 qrs. bone dust, at about half the cost; say 30s. For the drill, the acid may be neutralized by wood-ashes or mild lime; and dried by the addition of rape-dust, which will increase its activity, and probably make the most productive drill-dress that has yet been tried. It must not touch the seed. If used as liquid, it must not be neutralized, but dissolved in 1,500 gallons of water. In either case the land should be prepared with 6 or 8 loads of dung, to bear out the crop. These directions apply to turnips; but we think the same composition, neutralized with wood ashes, and dried with rape or bran, would increase the produce of grain (not of straw) in both wheat and oats; and perhaps barley also.

The turnips on lot No. 2, sown on the 8th of August, came into rough leaf before those on any of the other lots.

It is worthy of remark that Nos. 1, 2, and 3 are now (the 8th of January), in a very growing state, the tops weighing nearly five tons per acre.

The writer begs to call the attention of farmers to the plan used in lot No. 3; for every one can, if they please, adopt *that*, by having all the chamber-lye, soap-suds, &c., collected in the house, thrown daily upon the coal ashes; by which it will be seen that the crop nearly doubled lot 11 with 15 yards of common dung.

The ashes were not kept under cover, but no doubt that would be a great improvement, and, if a quart or 4lbs. of oil of vitriol diluted with 5 or 6 gallons of water, or 10lbs. of calcined gypsum, or half a bushel of charcoal dust was sprinkled over the saturated ashes once a week, it would prevent the ammonia flying off.

In addition to the trial of lot No. 2, there were nearly three acres with sulphuric acid and bone-dust in the same field; to cover this quantity of ground with the solution, two men and two horses were at work for nearly two days, with a water-cart that holds 200 gallons, the water being about 300 yards from the field; but when the men are accustomed to the work and the water is within the above distance, from two to three acres may be done in a day.

Almost every farmer to whom I have shown the crop, or spoken upon using sulphuric acid, has exclaimed against the *great trouble*; but surely it is worth a little *extra* trouble if we can raise a larger crop of turnips with this mixture (now costing 13s. 8d. per acre) than with 20 bushels of bones, nearly four times the expense. Should Mr. Pusey's plan of mixing with earth; or the Duke of Richmond's, by using only half the quantity of water, answer, it will remove this objection by saving the trouble which is so much thought of. As to a water-cart, every farmer can make one by putting a hogshead upon a pair of cart wheels, and thus provide himself with a most valuable machine for taking out his liquid manure, &c.

The autumn and winter having been so very favourable for the growth of turnips, the crops would no doubt have been much heavier if a larger sort of turnip had been sown. Another thing which operated very strongly against the crop was, the field being sidelong. The hail and rain accompanying the dreadful thunderstorm of the 9th of August washed much soil and manure from each lot, so that in the steeper parts of the field there were but few turnips: so severe was the storm, that the seed that had been planted the day before was actually washed out of the ground, to the extent of about an acre of the part manured with the sulphuric acid, so that not a single turnip made its appearance. What was then deplored as an evil may turn out to be a saving to the farmer, for, although this part was not ridged up again and replanted for nine or ten days, the turnips grown upon it were fully equal to those on lot No. 7, having 20 bushels of

bones per acre, thus showing that the solution had not been all washed away with the soil.

The fact that the storm did not wash away the solution in the last acre sown (although in the steep parts of the field the other manures, except the dung, were nearly destroyed), shews that perhaps half the quantity will be sufficient; and that the great chemist, Liebig, to whom we are indebted for this valuable discovery, is right when he says that a much *smaller* quantity of bones and acid (viz. 40lbs. fine bone-dust and 20lbs. sulphuric acid per acre) will produce a *good* crop of turnips. In the *Mark Lane Express* of January 3rd, 1842, a farmer signing "N. E., Scotland," says he has used for turnips sulphuric acid and bones at the rate of 60 to 70lbs. bone-dust and 30 to 40lbs. sulphuric acid per acre, for some years, and it has, in every year, produced a larger crop than 30 bushels of bones.

## A MEMOIR OF MATHIEU DE DOMBASLE.

### A FRENCH AGRICULTURIST.

In all countries where agriculture is justly considered as the first among arts and sciences, since it comprehends the warmest interests of mankind, the names of those men who have devoted their whole life to the advancement of this noble pursuit should be carefully recorded. This maxim has been constantly put in practice by our neighbours on the other side of the channel. They have never failed to give in their periodicals or to mention in their public lectures details of the life of the celebrated agriculturists like Bakewell, Coke, Thaër, and others whose loss was as much lamented by them as by ourselves. We therefore think it an act of justice, in every respect, to call attention to this sketch of the life of Mathieu de Dombasle, one of the most learned and devoted patrons of agriculture that ever existed. The town of Nancy, in the department of La Meurthe, in France, was his native place. There he was born on the 26th of February, 1777; there he died, December 27th, 1843, after having lived a noble life of nearly 67 years, the greater part of which being employed in making experiments or writing books which have been most serviceable to the agriculture of France. After having devoted many years to study the system of cultivation of the best lands in Europe—Flanders and England—he contrived to introduce in farming the improved system which he had seen. In 1814 he was the wealthy proprietor of the largest sugar-manufactory from the juice of the beet-root; but the political convulsions of that period ruined him. Yet his courage was not subdued, and instead of entering the career of ambition which was then opened to every enterprising character, he took up the interests of agriculture, and began a series of writings which soon convinced the public that in France, where four-fifths of the population are occupied in the tillage of the ground, it was requisite to place the knowledge of agricultural matters within the reach of young men willing to seek in the culture of the land the independence and security vainly promised by professions usually called liberal, or by places under government. But there was no establishment, no school for the theoretical and practical teaching of the mother-science.

AGRICULTURE.

Mathieu de Dombasle thought of remedying that evil; and in the year 1823, with a small capital of 60,000 francs (£2,400), took the lease of the estate of Roville, and there opened the first agricultural institute in France. His earliest care was to prove the superiority of the Flemish plough over the implement used in most of the provinces of France, which required from six to eight horses or oxen and several men; and, thanks to him, there is not now a rural district in France where a Flemish plough cannot be procured or seen in operation.

As a writer, M. de Dombasle obtained the admiration of Europe; and Sir John Sinclair, the illustrious founder of the Board of Agriculture in England, and whose chief work he had translated in French, expressed his very great regard for him in an address to the Royal Agricultural Society of Paris. Besides this important book, entitled "*The Code of Agriculture*," others, as "*the Annals of Roville*," the "*Farmer's Calendar*," the "*Manual of the Practical Farmer*," the "*Description of the best Agricultural Implements*," &c., testify the eminence of his talent. Such was the esteem entertained for his character in France, that since 1830, he was offered the dignity of a Peer of France, but he modestly declined this reward of his constant services. However, he was presented with the Golden Cross of the Legion of Honour, elected a member of the Royal Academy of Sciences, and was regarded as a friend not only by the most eminent men in the country, but also by his numerous pupils spread all over France.

To commemorate so glorious a life and such services a national subscription is being raised for the purpose of erecting a monument to this great citizen, in one of the squares of the town where he was born. Two of the most eminent royal academicians of France, David, the sculptor, and Galle, the medal-engraver, have tendered their services gratuitously; and in the list of subscribers will be found the names of the most illustrious landed proprietors in France, as well as every farmer's club in the country.

Should any of our readers feel disposed to contribute to the said testimonial of a posthumous homage to the memory of Christophe Joseph Alexander Mathieu de Dombasle, they may send their names to the editor of the Farmer's Magazine, 24 Norfolk-street, Strand, who will get the name inserted on the lists kept by M. de La Chauvinière, the founder of the "*Cercle Agricole*" of Paris, Rue Taranne, No. 10.

April 22nd, 1844.

PRUSSIAN CORN. — The *Prussian States Gazette* contains a long list of the prices of the four principal kinds of grain in the market towns of Prussia during the month of March last. The following is a statement of the average; the prices are in Prussian silver groschen the bushel:—

	Wheat.	Rye.	Barley.	Oats.
12 Prussian States . . . . .	56	33	10-12	27 9-12
5 Posen States . . . . .	57	2-12	35	4-12 27 5-12
9 Brandenburg and Pomeranian States . . . . .	61	10-12	40	6-12 30 4-12
11 Silesian States . . . . .	54	4-12	38	6-12 29 4-12
8 Saxon States . . . . .	60	11-12	49	4-12 35 11-12
4 Westphalian States . . . . .	67	4-12	50	8-12 45 7-12
14 Rhenish States . . . . .	73	7-12	56	6-12 47 2-12

We call attention to the following excellent remarks on this subject, lately made by Professor Johnston, at a public meeting of agriculturists in Glasgow.

Professor Johnston commenced his lectures by a reference to the great and pervading interest felt throughout the country, in relation to the Agricultural Chemistry Association, with which he had the honour to be connected. This arose out of the growing importance which was every where attached to the promotion of agriculture. It might be said that throughout the entire civilized world, the attention of individuals, of communities, and of governments, was, at the present moment, directed to this subject in a greater and more intense degree than had been manifested in any former period of the world's history; and in this country more particularly had it attracted attention, because of the great increase of our population, and the consequent large demand for food which that increase of population had given rise to. On a former occasion, he had the honour of explaining to that society the objects of the Agricultural Chemistry Association, and he would not now enter very largely upon the subject. It was gratifying to know, however, that the principles laid down by that association had made very rapid progress in the public mind. There was a growing conviction in many parts of the country, that the application to the cultivation of the soil of that kind of science which had so immensely benefited such towns as Glasgow, Manchester, and Birmingham, by the improvement of manufactures, was a thing not only practicable in itself, but imperatively called for in the circumstances of the country, and the position which agriculture occupied in relation to other occupations. Under this conviction it entered into the minds of several practical men to establish a society, having for its object the adoption of those means most likely to promote the end in view. Having stated more precisely the objects of the association, the learned Professor observed, that though three months had not elapsed since it came into working order, it had been the means of conveying a knowledge of its principles even to the most remote districts, and amongst the rural classes in those districts; and he was glad to say, that wherever the knowledge thus transmitted had come, it had been well understood and appreciated. The association had done him the honour to send him to this neighbourhood, as elsewhere, to diffuse such information as was in his power among the agricultural population; they had also resolved on disseminating their principles through other legitimate mediums, such as the parish schools for example; and for the promotion of the great national object they had in view, they had put into the hands of the schoolmasters, books containing elementary information upon the bearing of science on agriculture; works so plain and simple that every school-boy of ordinary intelligence could be brought easily to understand them. In this way it was hoped that the entire population would, by and by, be indoc-

trinated with the important principles which it was the aim of the association to promulgate. The importance of enlightening the agricultural body of this country must be apparent to every one. It was quite clear to him that the present agricultural class must be replaced by a body possessing more knowledge than was now exhibited. If the farmers now employed in cultivating the soil did not acquire a more scientific knowledge of the principles on which that soil should be treated, they might depend upon it they would be driven from their position, just as the artizans which carried out the arts in Glasgow upon an old and obsolete system were driven from the market by men who adopted new and improved modes of working (*hear*). If, therefore, farmers wished their sons to hold the place which they themselves did, and to remain upon the same soil which their fathers occupied, then they must acquire a greater and better kind of information than now they were possessed of, for it was perfectly clear that the same amount of knowledge on the subject of agriculture which had hitherto been exhibited in the farm-yard, and on the land, would not now answer the purpose. He had just travelled from Edinburgh to Lanark, and from Lanark to Glasgow, and in the course of his journey he had seen hundreds of square miles of land, all of which might be made capable of producing four or five times more grain than it now did. And yet, when a knowledge of this fact, and the means by which it might be attained, were within their reach, there were men in these districts cultivating the soil just on the same principle that it was cultivated 50 years ago—following out the very same system which had been practised by their grandfathers (*hear*). It was become absolutely necessary to grow more grain in this country; and, if the welfare and prosperity of the country mainly depended on the quantity of grain which we did grow, then, surely, it was of the last importance that this land should not be allowed to remain in the condition in which it was now found (*cheers*). He maintained that the same skill and intelligence, the same persevering energy which had made Glasgow what it was, would make land over which he had passed during the last two days, so far as climate would permit (and even that could in some degree be controlled) as fertile as the lands situated in countries which possessed more of the favours of nature. There was nothing in the city population, either as respected the qualities of the head or the hands, which did not belong equally to our agricultural population; and why should not the one class go forward in the career of improvement equally with the other? (*cheers*). On the present occasion he had come among them to explain a few simple principles of science, and to explain the application of these principles to one or two points in the practice of agriculture. He had been requested to deliver in Glasgow a lecture on the subject of guano as a manure; but he found it impossible to do this without first making them acquainted with these principles; and, after having done so, he would be enabled, in his second lecture, to apply these

to the subject of guano and other manures (*cheers*). The point, then, to which he would first direct their attention, was the nature of the soil on which their manure was laid and their crops grown; and in the next place he would say something of the crops which grew on that soil, and also of the air through which the plant raised itself after springing out of the ground. First, of the soil:—If they took a portion of the soil and heated it on the point of a knife, or piece of iron, it would become black or brown all over, according to the nature of the soil; but, if they heated it to redness, the blackness would disappear, and the soil would become reddish or brown, and a portion of it would entirely burn away—that portion which burned away consisted of vegetable matter, and was called organic. It would be found that a very small quantity of the soil remained behind after this burning, and what was left behind was called inorganic matter. [Here the professor directed attention to a table on which was delineated the different quantities of organic matter in three different kinds of soil. In 1,000 lbs. of these soils respectively, the quantity of organic matter was in the first 97, in the second 50, in the third 40]. They would, however, consider the inorganic matter. Of what did it consist? By putting a small quantity of soil into a tumbler of water, and stirring it about with a spoon, they would find that part of it floated, and the water would become milky. This indicated the presence of clay; and, by the same rude analysis, they would discover that all soils contained likewise lime, and a certain quantity of sand. By a reference to the table, they would see that the first class of soil contained, in 1,000 lbs. of it, 59 of lime, the second 18, and the third 4. Now, how did it happen that all soils contained lime? It happened in this way. If they looked at the sides of any quarry, they would see that the rock lay in beds; that it was placed in layers over each other; they would also see that the beds differed from each other; but all over the globe it was found that they consisted of sandstone, clay, and limestone—the clay being sometimes hard and sometimes soft; and these three were often found mixed up in the same rock. He would not enter upon the causes of this, but simply state the fact. Now, there was a constant crumbling down of these rocks, and from this crumbling, which was perpetually going on, the soil was formed, so that it must be apparent to all that the soil would essentially consist of the three substances of which the rocks were composed; viz., clay, lime, and sandstone. The waters which issued from the fissures of the rocks carried the crumbled particles along with them, and deposited them in lower levels, by which means all soils had these substances mixed up in them. At this point, he begged to stop for a few seconds, in order to show how useful this information might be to the farmer. By a reference to a geological map (one of which was suspended in the hall), they were able to ascertain what description of rocks existed in particular districts of the country, whether coal, lime, sandstone, or clay, and which of them

predominated. The moment they ascertained the character of the rocks, they were able to form an opinion as to the nature of the soil, which would, of course, exhibit the features of the rocks beneath. For example, where a geological map was coloured blue, they knew that this indicated lime, and therefore they would become aware that there was lime in the soil; but, if they looked at a part of the map which indicated stiff clay, they knew that lime was not there, and that, if this land was to be cultivated, it would be necessary to bring lime to it from a distance, of course at great expense; so that, if a man was going to purchase this land, he would not pay for it the same price as if it contained lime; and the same precaution could be exercised by the practical farmer in looking out for a farm in a distant country. Thus, a knowledge of the geological character of a country would tell a man what kind of land would be of the greatest use to him, and what he should take, and what not. This was, however, only by the way, and he would now bring them back to the constitution of soils. If they submitted the soil to chemical analysis, they would find that though it consisted essentially of the three substances he named—lime, clay, and sand—yet, nevertheless, all soils contained a great number of other substances; there were nine or ten other substances which were found more or less in different soils, some soils wanting certain of these substances altogether, or having traces of them almost imperceptible. If they looked at the table overhead, they would see described three different kinds of soil. The first and most fertile contained all these substances, viz., organic matter, silica, alumina, lime, magnesia, oxide of iron, oxide of manganese, potash, soda, chlorine, sulphuric acid, phosphoric acid, carbonic acid. All these substances always existed in a soil which was capable of producing good crops without manure, but they did not exist in all soils. The second description of soil laid down in the table would give good crops if manured, and a glance at the table would show the reason why it was not so fertile as the first: it wanted three substances which the first possessed, viz., potash, chlorine, and soda, while the others were not present in the same quantity. In the third and worst description of soil, there were no fewer than seven blanks; that is, it wanted seven substances which the first and best soil had, and this would not produce a crop at all. Now, the question arose, by what means could they raise the second description of soil to an equality with the first? Just by adding to it those three substances which the first had, but which it wanted, and by increasing the quantity of the other substances to the same extent as in the first. He would make the second soil identical with the first, and if so it would produce as good crops as the first. In the same way, if he filled up all the gaps in the third soil with the substances which were wanting, then he would make even this barren soil fertile and productive (*cheers*). Thus did the study of the constitution of the soil give the farmer practical information which he might work out to the greatest advantage. If he had one soil

that produced good crops, and another that would not produce them, he would, on analysis, find that the last wanted something which the first possessed, and his duty then was to make up the deficiency by putting in those substances which were required (*hear*). But there was another principle which it was here necessary to understand. He had said that a soil to be fertile must contain all the things before named; but the question arose, supposing it to contain them all, will it be necessarily fertile? His answer was, No; because it might contain something else which the plant did not require, and which might be hurtful to it; or it might have too much of some one of the above substances. If, for example, it contained oxide of iron or magnesia in large quantities, then the soil would be rendered bad, and they must take measures to remove them. Again; they all knew how necessary water was to the growth of a plant; but if the soil had too much water, if it was saturated with it, the plant would not grow; and they were to remember that every plant had its own particular nature, and would grow only on its own particular soil. The learned Professor pointed out, by some illustrations, the way in which a plant might be injured by water. He showed that the roots of the plant could not penetrate downwards if there was water below, and besides, that there might be something in the soil below which the plant required, but which it could not reach if the water remained. All that could in these circumstances be done for the plant above, would be comparatively useless, without taking away the water. He had that day seen large tracts of land lying under water, and where draining was of the utmost consequence to rendering the soil fertile, and not only that, but rendering valuable the under soil which could not now be reached. If proper draining was practised, the water which fell upon the soil would sink gradually through it, carrying off noxious substances; and wherever the water sunk, it would be followed by the air. The atmosphere would thus permeate the entire soil, and chemically decompose it, so as to render things useful to the plant, which before were noxious. Often, however, the practical farmer found himself at fault in draining. The water that passed into the drain was sometimes collected, and spread over the soil again to irrigate it; but how could that land produce good crops, which was thus irrigated by water which had before passed through the soil, and carried away from it those very things that were hurtful to the plant? (*cheers*). Here the learned lecturer made a variety of remarks to show the effect and utility of draining. He showed that water lying on the land made it cold and ungenial by the process of evaporation which went on, while, on the other hand, the land that was drained was dry and warm; draining altered the very climate, and had an effect upon the clouds themselves, as all persons must have observed who saw a cloud resting upon an undrained field, while it found no place on the dry warm field from which the under water was carefully drawn. Not only to crops, but to cattle also, was draining of the greatest consequence; and, by atten-

tion to this fact, the farmer might do much in the improvement even of the beef that was sent to market. In the subsoil of many districts, oxide of iron and other things were found, in which the plant would not grow. Now, how were these to be removed? They could not go down to the subsoil to remove these noxious substances; but suppose they sunk a drain to the lower part of the subsoil, when a heavy fall of rain came, it washed down through the soil into the drain; they made the elements descend where they could not go themselves, and purify and render wholesome this subsoil; nay, they did more; the air would follow the water with all its important influences, and by the action of the air and water together, the soil was cleared of its injurious qualities, and rendered wholesome and fertile (*cheers*). Here the learned lecturer referred to various sources of information on the above and other important points, particularly to a cheap catechism of agricultural chemistry and geology, and the elements of agricultural chemistry and geology, published by himself. He then proceeded to the second point to which he purposed directing their attention, viz., the crops themselves, observing that he would show them how the conclusions they had drawn from the study of the soil were proved and illustrated by the study of the crop. If they took a piece of straw or wood, and burned it, a quantity of ash would remain behind—in some substances more ash remaining behind than in others; therefore, the plant contained two kinds of matter, an organic matter and an inorganic matter. In crops the largest quantity was burned away; but, when they had the soils under consideration, they found that the smallest quantity of the soil was burned away—the cases being exactly reversed. Of the two parts of the plant, the organic matter came from the earth and from the air; the inorganic altogether from the roots, or from the earth. Now, of what substances did the inorganic portion of which he was about to speak, consist? These substances would be found delineated on a table overhead, and, on examination, it would be seen that they were the very substances which were to be found in the soil, so that the conclusion was inevitable that the plant derived these substances from the soil. Thus, the analysis of the plant proved the truth of what was discovered in the soil, and showed that, without these substances, the plant could not grow. It also proved that certain plants would not grow in certain soils, because they did not find there the substances which they required. Of course, it became an important question, how, in such cases, were the wanting substances to be supplied? Ordinary manure would not supply all these substances, but on this point he would not enter, as, in his next lecture, he would show of what particular substances common manure was composed. He would here remark that different kinds of crop took away from the soil more of the substances of which it was composed than others, and some crops carried off more of one substance, say, for example, lime, than of any other. In 1,000 lbs.

of ryegrass there were 7 lbs. of lime taken from the soil; in red clover there were nearly 28 lbs., and in white clover there were 23 lbs., while in lucerne there were 48 lbs. of lime taken away. They would now be able to see that the composition of the soil determined what kind of crops they ought to grow upon it, and what substances it would be necessary to supply. It was important to observe, however, that a great error might be committed by adding a great many things, in the belief that the right thing would be among them. This would be acting as rationally as if a man who was sick was to swallow the contents of all the bottles in a doctor's shop, in the expectation that the particular medicine he required would be among them (*laughter*). If a soil were found deficient only in phosphoric acid, then it was requisite to add that article only, and not all the others. He had now laid down a few principles, which he hoped the audience sufficiently understood. They were certainly of vast importance, and requisite to be understood before they could enter upon any intelligent and effectual mode of cultivating the soil. He would, therefore, leave them in their hands, and in his next lecture would enter upon a further stage of the investigation. The subject would be the use of guano and other artificial manures; and from what he had now said, he trusted the treatment of this subject would be more instructive than otherwise it could have been (*cheers*).

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## ON MANURES,

### AND THE PROPER APPLICATION THEREOF.

*Bones and Horns.*—Bones are a source of manure, much too little attended to in most places, though their value is well ascertained by a pretty extensive experience of their effects in different districts. The following particulars were transmitted from Yorkshire, in answer to some queries proposed by a writer in the *Encyclopædia Britannica*—1st. It is thought that all the bones of every animal are not equally valuable; but all the bones of an animal suitable for manure are equally good, and are much better when fresh. 2nd. The bones which are best filled with oil and marrow are certainly the best manure; and the parts generally used for buttons and knife-hafts, are the thigh and shank-bones. 3rd. The *powdered* bones are dearer, and generally used for hot-beds in gardens, being too expensive for the field, and not so durable a manure as *bruised* bones, though for a short time more productive. 4th. A dry, light, or gentle soil, is best adapted for the use of bone-manure, as it is supposed that, in land which retains wet, the nutritive part of the bone washes to the surface of it, and does not incorporate sufficiently with the soil. 5th. The autumn is the most proper time for the use of this manure, which should then be laid on fallows for a turnip crop. The powder only should be used on a green crop, as the bruised bones would interrupt the progress of the scythe,

6th. The effects produced on different crops are generally good on such soil as named in No. 4. 7th. Bruised bones are better when mixed with ashes of any other manure, as the juice of the bones is then more equally spread over the field. 8th. Bone manure ought to be ploughed into the land in tillage. On grass, the powder should be sown in by the hand. 9th. This manure is used on land before described, to the extent of several thousand acres, in the *higher* parts of Nottinghamshire, and in the *wolds* (or high land) in Lincolnshire, and in the East and West Ridings of Yorkshire. 10th. The primary object of keeping a bone-mill is the bruising of bones, which pays better than selecting and selling such as are suitable for buttons, &c. 11. In an agricultural district, where the generality of the land is of the nature before mentioned as best suited for bone manure, a mill for the purpose of bruising bones would certainly indemnify the proprietors. The cost of a mill is from 100*l.* to 200*l.* As to the number of miles the manure may be carried, the proprietors of the mill will be best able to judge of that. "*Horn*," says Sir H. Davy, "is a still more powerful manure than bone, as it contains a large quantity of decomposable animal matter. The shavings or turnings of bone, though they cannot be procured in great abundance, are much esteemed as a manure, and have been long known to the farmers in the West of Scotland, who sometimes bring them from Ireland. They are sown by the hand as a top-dressing for wheat and other crops." *Burnt clay*—This is a mode of preparation which has been recently introduced into the West of Scotland from Ireland, by Mr. Craig, of Cally, in the stewardry of Kirkcudbright. It has been tried with great success; and if it should succeed generally, it will form a new era in the practice of agriculture, and contribute essentially to the general improvement of the country. The want of manure has been always felt as a great obstruction to the cultivation of waste lands, and it has been thought that the limited quantity to be had is more profitably applied to the land at present under tillage than to new land. But if burnt clay, or *tilly* subsoil, have the effect of producing full crops of turnips—from the consumption of which enriching manures may be always procured—there are few situations in which an almost unlimited supply of it may not be got, at a very small expense. The following is the substance of Mr. Craig's letter to Mr. Boyd, of Merton Hall, in the contiguous county of Wigton, on this highly important and interesting subject. It is dated 28th January, 1815. "Being perfectly convinced, both from ocular demonstration, and personal experience, of the infinite utility of clay ashes, as a manure for every kind of crop, as well as a top-dressing for grass lands, I am extremely anxious that the use of them should become universal. I shall, therefore, have much pleasure in communicating to you every information on the subject; and I have now sat down to accomplish that object, as far as lies in my power. Having had occasion, for some years past, to go

repeatedly to Ireland, on the business of Mr. Murray's estate there, I was struck with the mode adopted, in some parts of that country, of burning clay, and making use of the ashes, in preference to lime, of which there is such abundance. The method also adopted of causing the clay, just as it is dug out of the ground, without the assistance of any combustible, except merely to set it on fire, and without preparation of any sort, to burn of itself, arrested my attention, and having witnessed the crops of wheat and corn, of every description, as well as flax and potatoes, luxuriant almost beyond credibility, produced from stiff clay soils, without the aid of any other manure than ashes so obtained, I determined to make the experiment at home. On my return, I accordingly commenced operations, and have practised the burning of subsoil for three years with the greatest success. I felt considerable difficulty at first for want of clay; but I hit upon a vein or bed of tenacious subsoil, partly *till* and partly clay, which answers the purpose quite well, though I do not apprehend it is so good as clay. The ashes I have hitherto applied solely to the production of turnips; but within the last ten days I have laid nearly 500 cart loads on grass lands as a top dressing. My turnip crops from ashes have *exceeded* anything of the kind in this neighbourhood. I was twice in London in the course of last summer and harvest, and in my way to and from town, I saw no turnips equal to my crop, though I passed through Berwickshire and Northumberland. Last season, by way of experiment, I manured part of my turnip field with the best stable dung, which was ploughed in the same day it was led out of the yard; the remainder with ashes. The seed, which was of the yellow field sort, was sown on the same day. That sown on the ashes sprung much earlier than that on the dung, continued more vigorous during the season; and when I pulled them lately, the turnips produced from the ashes were more than double the size of those from the dung. I regret that I did not weigh the produce from each; but I have marked off a square chain of Swedish, which I mean to weigh, to ascertain the produce per acre. Excepting myself, no person has hitherto practised the burning of subsoil in this country, till last season, when I prevailed on Mr. John Wallace, tenant of Mr. Murray's farm of Clairchan, in Tongland parish, to try the experiment. In consequence of some misunderstanding that had arisen between Mr. Wallace and the former tenant, the latter, contrary to usual practice, declined to sell to Mr. Wallace the outgoing crop, and carried the whole off to the immediate adjoining farm, which he rented. Mr. Wallace was therefore put to considerable inconvenience, having scarcely any fodder for his cattle, and being thus deprived of the means of raising dung for his green crop, in his distress he applied to me, and I engaged for him a person to burn clay. Though it was the beginning of May before the burning commenced, yet Mr. Wallace procured as many ashes as manured twenty acres. Notwithstanding the

turnips were later in being sown than usual, and were too long in being hoed, Mr. Wallace obtained for them the second premium for green crops from the agricultural society in the Stewartry; and since that time, the Highland Society have awarded to him their first premium. He laid on, at first, about 45 single cart loads to the acre, and diminished the quantity to 30. I laid on, however, a much larger quantity; but I should imagine, that from 40 to 50 cart loads per acre would be a fair dose for our light soils. You, who have experienced the beneficial effects of ashes obtained by paring and burning the surface, can easily appreciate the value of ashes obtained from burning subsoil, and conceive the facility which they afford to the extension of the green crop system, to a breadth not hitherto contemplated. I may, however, mention, that this year, by means of ashes, I was enabled to raise three times the quantity of green crop that I had of white crop, and shall thus have it in my power to feed my cattle on turnips for more than six months, affording them, night and morning, as much as they are able to eat. Though my farm is, no doubt, of small extent, still this shows what may be done on a large scale, where greater facilities can be obtained. Though I do not apprehend that any written account that I can give you will afford half so satisfactory an idea of the method of burning clay as ocular inspection of the work, yet I shall give you the best description I can. The general method of proceeding to work is to make an oblong enclosure, of the dimensions of a small house (say 15 feet by 10) of green turf-sods, raised to the height of  $3\frac{1}{2}$  or 4 feet. In the inside of this enclosure air-pipes are drawn diagonally, which communicate with holes left at each corner of the exterior wall. These pipes are formed of sods put on edge, and are so wide only as another sod can easily cover. In each of the four spaces left between the air-pipes and the outer wall, a fire is kindled with wood and dry turf, and then the whole of the inside of the enclosure, or kiln, is filled with dry turf, which is very soon on fire; and on the top of that, when well kindled, is thrown the clay, in small quantities at a time, and repeated as often as necessary, which must be regulated by the intensity of the burning. The air-pipes are of use only at the first, because, if the fire burns with tolerable keenness, the sods forming the pipes will soon be reduced to ashes. The pipe on the weather side of the kiln only is left open, the mouths of the other three being stopped up and not opened unless the wind should veer about. As the inside of the enclosure, or kiln, begins to be filled with clay, the outer walls must be raised in height, always taking care to have it at least 18 inches higher than the top of the clay, for the purpose of keeping the wind from acting on the fire. When the fire burns through the outer wall, which it often does, particularly when the top is overloaded with clay, the breach must be stopped up immediately, which can only be effectually done by building another sod wall from the

foundation, opposite to it, the sods that formed that part of the wall being soon reduced to ashes. The wall may be raised as high as is convenient for throwing on the clay, and the kiln may be increased to any size, by forming a new wall when the previous one is burnt through. I have had kilns so wide that a horse and cart might have turned in them; but when they are so broad, it requires the workmen to walk on the top of them while laying on the clay, which I would not recommend, because the more loosely the clay can be laid on the more rapidly will it burn. I did not take all the trouble above stated with my kilns: having the advantage of a quantity of old moss sticks and tree roots, which I split, I kindled a large parcel of them, and surrounded the fire with a quantity of dry turf, and as soon as it was well kindled, I built round it a strong wall of sods, and went on adding to the fire, and sods to the outer walls, when necessary, till the kilns were as large as to contain upwards of 100 loads of ashes. "The principal secret in burning consists in having the outer wall made quite close and impervious to the external air, and taking care to have the top always lightly and completely covered with clay; because, if the external air should come in contact with the fire, either on the top of the kiln, or through its sides, the fire will be very soon extinguished or at least be much weakened. In short, the kilns are to be attended to nearly as closely as charcoal pits. Clay is much easier burnt than either moss or loam, as the latter, by crumbling down, are very apt to smother the fire unless carefully attended to. No rule can be well laid down for regulating the size of the lumps thrown on the kilns, as that must depend on the state of the fire; but, on opening the heaps, I have always found all the lumps completely reduced to ashes, and some of them were thrown on larger than my head. Clay, no doubt, burns more readily if it be dug up and dried for a day or two before it be thrown on the kiln; but this operation is not necessary, as it will burn though thrown on quite wet. When put on too wet, however, the fire, if burning very intensely, is apt to reduce it to a cakelike substance, and thus to render it unfit for manure. After a kiln is fairly set agoing, no coal or wood, or any sort of combustible is necessary, the wet clay burning of itself, and it can only be extinguished by intention, or the carelessness of the operator, the vicissitudes of the weather having hardly any effect on the fire, if properly attended to. It may, perhaps, be necessary to mention, that when a kiln is burning with great keenness, a stranger to the operation may be apt to think that the fire is extinguished: if, however, any person, either through impatience or too great curiosity, should insist on examining the interior of the kiln, he will entirely retard, and may possibly extinguish the fire; for, as I mentioned before, the chief secret consists in keeping out the external air from acting immediately on the fire." \* *Other Manures.*—The properties and

\* Farmers' Magazine, vol xvi.

nature of the manures in common use should be known to every cultivator; for as different manures contain different proportions of the elements necessary to vegetation, so they require a different treatment to enable them to produce their full effects in the culture. All green succulent plants should be ploughed in, if it be possible, when in flower, or at the time the flower is beginning to appear, for it is at this period they contain the largest quantity of easily soluble matter, and that their leaves are most active in forming nutritive matter. Green crops, pared weeds, the paring of hedges or ditches, or any kind of fresh vegetable matter, requiring no preparation to fit them for manure. The decomposition slowly proceeds beneath the soil; the soluble matters are gradually dissolved; and the slight fermentation that goes on, checked by the want of a free communication of air, tends to render the woody fibre soluble without occasioning the rapid dissipation of elastic matter. When old pastures are broken up and made arable, not only has the soil been enriched by the death and slow decay of the plants which have left soluble matters in the soil, but the leaves and roots of the grasses, living at the time, and occupying so large a part of the surface, afford saccharine, mucilaginous, and extractive matters, which become immediately the food of the crop, and the gradual decomposition affords a supply for successive years. *Rape Cake*, which is used with great success as manure, contains a large quantity of mucilage, some albuminous matter, and a small quantity of oil. This manure should be used recent, and kept as dry as possible, before it is applied. It forms an excellent dressing for turnip crops, and is most economically applied by being thrown into the soil at the time with the seed. *Matt Dust* consists chiefly of the infant radical separation from the grain. Sir H. Davy never made any experiment upon this manure, but has great reason to suppose it must contain saccharine matter, and this will account for its powerful effects. Like rape cake, it should be used as dry as possible, and its fermentation prevented.

*Linseed Cake* is too valuable as a food for cattle to be much employed as a manure. The water in which flax and hemp are steeped, for the purpose of obtaining the pure vegetable fibre, has considerable fertilizing powers. It appears to contain a substance analogous to albumen, and likewise much vegetable extractive matter. It putrefies very readily. By the watering process, a certain degree of fermentation is absolutely necessary to obtain the flax and hemp in a proper state; the water to which they have been exposed should therefore be used as a manure as soon as the vegetable fibre is removed from it. Washing with soap has been successfully substituted for watering by lie.

*Mere woody fibre* seems to be the only vegetable matter that requires fermentation to render it nutritive to plants. Tanner's spent bark is a substance of this kind. A. Young, in his excellent "Essay on Manure," states "that spent

bark seems rather to injure than assist vegetation;" which he attributes to the astringent matter that it contains. But, in fact, it is freed from all soluble substances, by the operation of water in the tan-pit; and if injurious to vegetation, the effect is probably owing to its agency upon water, or to its mechanical effects. It is a substance very absorbent and retentive of moisture, and yet not penetrable by the roots of plants.

*The entire parts of the muscles of land animals* are not commonly used as manure, though there are many cases in which such an application might be easily made. Horses, dogs, sheep, deer, and other quadrupeds that have died accidentally, or of disease, after their skins are separated, are often suffered to remain exposed to the air, or immersed in water, till they are destroyed by birds or beasts of prey, or entirely decomposed; and in this case, most of their organized matter is lost for the land in which they lie, and a considerable portion of it employed in giving off noxious gases to the atmosphere. By covering dead animals with five or six times their bulk of soil, mixed with one part of lime, and suffering them to remain for a few months, their decomposition would impregnate the soil with soluble matters, so as to render it an excellent manure: and by mixing a little fresh quicklime with it at the time of its removal, the disagreeable effluvia would be in a great measure destroyed, and it might be applied in the same way as any other manure to crops.

*Fish* forms a powerful manure, in whatever state it is applied; but it cannot be ploughed in too fresh, though the quantity should be limited. A. Young records an experiment, in which herrings spread over a field, and ploughed in for wheat, produced so rank a crop that it was entirely laid before harvest. The refuse pileyards in Cornwall are used throughout the county as a manure, with excellent effects. They are usually mixed with sand or soil, and sometimes with seaweed, to prevent them from raising too luxuriant a crop. The effects are perceived for several years. In the fens of Lincolnshire, Cambridgeshire, and Norfolk, the little fishes called sticklebacks are caught in the shallow waters in such quantities, that they form a great article of manure in the land bordering on the fens. It is easy to explain the operation of fish as a manure. The skin is principally gelatine; which, from its slight state of cohesion, is readily soluble in water. Fat or oil is always found in fishes, either under the skin or in some of the viscera; and their fibrous matter contains all the essential elements of vegetable substances.

Amongst *oily substances*, blubber has been employed as a manure. It is most useful when mixed with clay, sand, or any common soil, so as to expose a large surface to the air, the oxygen of which produces soluble matter from it. Lord Somerville used blubber with great success at his farm in Surrey. It was made into a heap with soil, and retained its powers of fertilizing for several successive years. The carbon and hydro-

gen abounding in oily substances fully account for their effects; and their durability is easily explained from the gradual manner in which they change by the action of air and water.

The refuse of the different manufactures of skin and leather form very useful manures; such as the shavings of the currier, furriers' clippings, and the offals of the tan yard and of the glue-maker. The gelatine contained in every kind of skin is in a state fitted for its gradual solution or decomposition; and when buried in the soil, it lasts for a considerable time, and constantly affords a nutritive matter to the plants in its neighbourhood.

Blood contains certain quantities of all the principles found in other animal substances, and is consequently a very good manure. The scum taken from the boilers of the sugar-bakers, and which is used as manure, principally consists of bullocks' blood, which has been employed for the purpose of separating the impurities of common brown sugar, by means of the coagulation of its albuminous matter, by the heat of the boiler.

Amongst excrementitious animal substances used as manures, *urine* is the one upon which the greatest number of chemical experiments have been made, and the nature of which is best understood. Human urine contains a greater variety of constituents than any other species examined. Urea, uric acid, and another acid similar to it in nature, called rosacic acid, acetic acid, albumen, gelatine, a resinous matter, and various salts are found in it. The human urine differs in composition, according to the state of the body and the nature of the food and drink made use of. In many cases of disease, there is a much larger quantity of gelatine and albumen than usual in the urine: and in diabetes it contains sugar. It is probable that the urine of the same animal must likewise differ, according to the different nature of the food and drink used; and this will account for discordances in some of the analyses that have been published on the subject. Urine is very liable to change, and to undergo the putrefactive process; and that of carnivorous animals, more rapidly than that of granivorous animals. In proportion as there is more gelatine or albumen in urine, so in proportion does it putrefy more quickly. The species of urine that contains most albumen, gelatine, and urea, are the best as manures; and all urine contains the essential elements of vegetables in a state of solution. During the putrefaction of urine, the greatest part of the soluble animal matter that it contains is destroyed; it should consequently be used as fresh as possible; but if not mixed with solid matter, it should be diluted with water, as, when pure, it contains too large a quantity of animal matter to form a proper fluid-nourishment for absorption by the roots of plants. Putrid urine abounds in ammoniacal salts; and, though less active than fresh urine, is a very powerful manure.

*Dung of Birds.*—Amongst excrementitious solid substances used as manures, one of the

most powerful is the dung of birds that feed on animal food, particularly the dung of sea birds. Some of this, brought from Merionethshire, produced a powerful but transient effect on grass. The rains in our climate must tend very much to injure this species of manure, where it is exposed to them soon after its deposition; but it is found in great perfection in caverns and clefts of rocks haunted by cormorants and gulls.

*Night-soil* is well known to be a powerful manure, and very liable to decompose. It differs in composition, but always abounds in substances composed of carbon, hydrogen, azote, and oxygen. From the analysis of Berzelius, it appears that part of it is always soluble in water; and in whatever it is used, whether recent or fermented, it supplies abundance of food to plants. The disagreeable smell of night-soil may be destroyed by mixing it with quicklime; and if exposed to the atmosphere in thin layers, strewed over with quicklime, in fine weather, it speedily dries, is easily pulverized, and, in this state may be used in the same manner as rape-cake, and delivered into the furrow with the seed. The Chinese, who have more practical knowledge of the use and application of manures than any other people existing, mix their night-soil with one-third of its weight of fat marl, make it into cakes, and dry it by exposure to the sun. These cakes, we are informed, have no disagreeable smell, and form a common article of commerce of the empire. The earth, by its absorbent powers, probably prevents to a certain extent the action of moisture upon the dung, and likewise defends it from the effects of air. Desiccated night-soil in a state of powder, forms an article of internal commerce in France, and is known under the name of *pourrette*. In London it is mixed with quicklime, and sold in cakes under the name of "desiccated night-soil."

*Pigeons' dung* comes next in order as a fertilizing power. This manure should be applied as new as possible; and, when dry, it may be employed in the same manner as the other manures capable of being pulverized. The soil in woods, where great flocks of wood pigeons roost, is often highly impregnated with their dung, and, it cannot be doubted, would form a very valuable manure. Such soil will often yield ammonia when distilled with lime. In the winter, likewise, it usually contains abundance of vegetable matter, the remains of decayed leaves; and dung tends to bring the vegetable matter into a state of solution. Manuring with it was, and still is, in great esteem in Persia. The dung of fowls is employed, in common with that of pigeons, by tanners, to bring on a slight degree of putrefaction in skins that are to be used for making soft leather. For this purpose the dung is diffused through water. In this state it rapidly undergoes putrefaction, and brings on a similar change in the skin. The excrements of dogs are employed by the tanner with similar effects. In all cases, the contents of the *grainer* as the pit is called in which soft skins are prepared by dung, must form a very useful manure.

In the treatment of the *pure dung of cattle*,

sheep, and horses, there seems no reasons why it should be made to ferment except in the soil, like the other pure dungs; or, if suffered to ferment, it should only be in a very slight degree. The grass in the neighbourhood of recently voided dung, is always coarse and dark green. Some persons have attributed this to a noxious quality in unfermenting dung; but it would seem to be rather the result of an excess of food furnished to the plants.

*Street and road dung, and the sweepings of houses,* may be all regarded as composite manures. The composition of them is necessarily various, as they are derived from a number of different substances. These manures are usually applied in a proper manner without being fermented.

*Soot,* which is principally formed from the combustion of pit-coal or coal, generally contains likewise substances derived from animal matters. This is a very powerful manure, and is well fitted to be used in a dry state, thrown into the ground with the seed, and requires no preparation.

*Common salt* is sometimes an useful manure.—*Sleech* or *sea-ooze*, containing animal and vegetable substances, with a large proportion of calcareous matter, affords a valuable dressing, increasing the staple of the soil to which it is applied, as well as its fertility.

*Pond and river mud,* mixed with lime, has been often applied with good effect. Even *coal-sill* or *schistus* has been used with much advantage, after being decomposed with lime, in proportion of one part of the latter to six of the former.

*Composts* have been lately much used. A recent writer on this subject says—

“Mixing farm-yard dung, in a state of fermentation, with earth in which there is much inert vegetable matter, as the banks of old ditches, or what is collected from the sides of lanes, &c., will bring this inert, dead matter, consisting of the roots of decayed grasses and other plants, into a state of putridity and solubility, and prepare it for nourishing the crops or plants it may be applied to, in the very manner it acts upon peat. Dung, however, mixed with earth, taken from rich arable fields which have been long cultivated and manured, can have no more effect as manure to other land, than the same earth and dung would produce if applied separately, because there is generally no inert matter in this description of earth to be rendered soluble. Mixing dung, earth, and quicklime together, can never be advisable, because quicklime will render some of the best parts of the dung insoluble. It will depend on the nature of the soil or earth, whether even quicklime only should be mixed with it to form compost. If there be much inert vegetable matter in the earth, the quicklime will prepare it for becoming food for the plants it may be applied to; but if rich earth be taken from arable fields, the bottoms of dung-pits, or, in fact, if any soil full of soluble matter be used, the

quicklime will decompose parts of this soluble matter, combine with other parts, and render the whole mass less nourishing as manure to plants or crops, than before the quicklime was applied to it. Making composts, then, of rich soil of this description, with dung or lime, mixed or separate, is evidently, to say no more of it, a waste of time and labour. The mixtures of earths of this description with dung produce no alteration in the component parts of the earth, where there are no inert vegetable substances to be acted on; and the mixture of earth full of soluble matter with dung and quicklime, in a mass together, has the worst effects: the quicklime decomposing and uniting with the soluble matter of the earth, as well as that of the dung, in every case, is less efficient as manures, than if applied separately from the quicklime; and even the quicklime itself is more inferior as manure for certain soils, than if it had never been mixed with the dung and earth at all.”

Mixing dung in a state of fermentation with peat, for forming what in Scotland are called meadow-bank middens, is a successful mode of increasing the quantity of putrescent manure. The peat being dug and partially dried, may either be carted into the farm-yard and spread over the cattle court, there to remain till the whole is carted out and laid upon a dung-hill to ferment, or it may be mixed with the farm-yard dung as carted out. If care be taken to watch the fermenting process, as the fire of a clay kiln is watched, a few loads of dung may be made to rot many loads of peat. Adding lime to such composts does not in the least promote fermentation, while it renders the most valuable parts of the mass insoluble. Adding sand, ashes, or earth, by tending to consolidate the mass, will considerably impede the progress of fermentation.

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#### SUGGESTIONS FOR EXPERIMENTS IN AGRICULTURE.

The cultivation of the earth was one of the first occupations of man, and as we emerge from the darkness and doubt which envelope a later period in the history of our race, we find it ranked, in the annals of the most distinguished nations, amongst the highest and most honourable pursuits. In our own day it is perfected by study and the contrivances of art; and chemistry, hitherto only known and kept a mystery by “wise men,” has condescended to use her mighty powers to assist us. The great advancement of agriculture to success must be considered as the basis of prosperity and power; and now that that progress is encouraged by the Royal Agricultural and other Societies throughout this and the sister kingdoms offering premiums not only for experiments in, but treatises on, the state of agriculture in the several counties, it is, we think, highly desirable competitors should have something like a method pointed out to them in order to enable them to

proceed. Conceiving the following remarks to be quite suited to the purpose, we offer them to the consideration of our readers as admirably adapted to assist those who are trying experiments, to draw up their reports.

#### UNCERTAINTY OF IMPORTED MANURES.

Of guano the supply is so limited that the consumption of Peru and Britain alone would soon exhaust it. But within these few months it has been tried in the West India plantations with the best results; and, before a year pass, it will be extensively used in all the sugar-growing colonies of the West Indies and America. The United States largely imported gypsum from France. Will these fail to improve by a manure much more valuable to their soils and crops? Successful trials have last season been made with guano in France. The attention of the farmers of Holland, Belgium, Prussia, and Germany, has just begun to be directed to it; Spain, Portugal, and Italy, will come in for their share, and the demand will soon annihilate the stock.

The paralyzed state of the manufacture of beet-root sugar has so diminished the demand for animal charcoal, that bones have greatly fallen in price; but we have no security that this depression will continue. An increased demand for charcoal, or a difficulty of obtaining bones from South America, may soon raise their price higher than ever.

The results from all other imported and saline manures are so various, transitory, and apparently capricious, that not one, nor any mixture of them, can be generally trusted for raising either a white or green crop, much less for supporting the crops of a rotation. In a few cases splendid results have been reported; but in many others expenses were not paid, and in not a few the produce was less than where no manure had been given. In purchasing these the farmer is liable to endless imposition. I have more than once bought saline substances which, on chemical examination, did not contain one particle of the substance for which they were sold. In other cases, I have found them so largely adulterated with common salt and other very cheap matters, that I believe the unchemical farmer is never safe to give his money for them, or to trust his crops to their aid. Even when he succeeds, his success can be no guide to others, as they have no certainty that they can obtain the same article under the same name.

#### OBJECTS OF PROPOSED EXPERIMENTS.

It is proposed experimentally to compare the effects of dung, guano, and bones, both alone, in different quantities, and in mixture, on every variety of soil; not because any doubt remains of the value of these manures (for experience has fully established their claims), but in order that we may discover 1. The quantity of each suited to our various soils; 2. The most economical method of using them on each soil; 3. The special adaptation of any one, or any mixture of them, to a particular variety of soil, and the cause of this adaptation; 4. The means of pro-

ducing similar effects on each soil (or fertilizing it) by our own resources, when price put foreign manures beyond our reach.

This last object is both the most important and the most difficult; but, from what is stated above, it is essential to our agricultural prosperity. The discoveries already made give advantages in grappling with it, which, till now, we never possessed; and the hope begins to dawn on us, that our own soil may yet be induced to give us what she has hitherto held with iron grasp. Every experimenter ought to supply such facts as may show how much of the success or failure of each experiment is due to the soil or previous treatment, and how much to the locality and manures used; and queries ought to be proposed for eliciting these facts.

Where all the circumstances of an experiment are explicitly detailed, its failure or unprofitable result is quite as valuable as the most successful result; and more valuable than any result, however successful, where the reporter does not fully state the circumstances, or afford the means of knowing them. A knowledge of the conditions and soils in which an experiment succeeds, and those in which it fails (in raising a profitable crop), is the whole that a practical man desires to possess; and if no reports of unprofitable experiments are received, the general value of the experiments will be diminished. The knowledge sought will be incomplete, unless reports are given from soils of every variety of value and character in the district.

#### IMPROVEMENT OF SOILS BY MIXTURE.

There are few of our soils which may not be greatly and permanently improved by suitable mixture. This is one of the ends answered by fallow and green crop labour; but we may often, with economy, extend this farther than the plough can effect it. I have practised this with so much success, that some soils, most barren a few years ago, are now at least equal to the best on the farm.

The farmer who mixes soils merely to improve their texture, attends but to the least important half of his subject; and while he improves their texture he may diminish their fertility.

The great end of mixture is to bring together particles which (by aid of air, warmth, and moisture) act chemically on each other, and produce fertilizing compounds.

When we survey our natural pastures, we observe that the mud and detritus washed from our barren hills and rocky ravines fertilizes the holms below. The fertile strips along the Daer-water, and the rich grazing holms of Crawfordmoor, are illustrations of this. The broad holms of Nith, and the verdant fields of Tongland, Twynholm, Borgue, and Kirkcudbright, where the finest of Galloway cattle are raised, display the same fact on a grander scale. We have only to observe how nature lays the basis of fertility, examine her materials, and imitate her hand.

Not only is the tath lost on worthless pasture, but when dung is carted on it, the results are

said not even to pay the cartage. Rich soils naturally contain what both raises abundance of valuable grass, and turns the tath to the best account; poor soils, on the contrary, want those ingredients which are essential to fertility, and which cannot, in any durable form, be administered except by proper mixture. For a few months we may renovate their surface by a dressing of alkaline matter or wood-ashes, or we may often more durably augment their value by an expensive lining; but it deserves our most serious attention whether we may not be able to find on our own farms what will, either alone or at a little expense of preparation, more permanently improve our soils.

#### IMPORTANCE OF A CHEMICAL EXAMINATION OF OUR SOILS.

This discovery cannot be made with certainty till our soils are chemically examined, and the effect on them of particular known manures closely considered.

Nor do the soils alone need to be examined. We have numberless alluvial deposits which are allowed to lie in useless mounds. These may not be so quickly fertilizing as the banks of shell sand in South Cornwall, yet they may amply repay the expense of cartage and spreading on soils that need them. I have experienced the best effects from spreading the contents of ditches (cut in clay, slate, &c.), and following this with a slight dressing of lime. On this I sowed oats of 36lbs., and reaped 43lbs. per bushel. I found sulphuric acid in the clay slate after its exposure to the air, and, of course, the lime formed gypsum with it. At present my best grass is on it. This dressing was done six years ago.

Yet it is sometimes painful to see a farmer dressing his fields with what is either poisonous to plants or is already in excess in the soil. This is worst than lost labour. If once our soils and deposits were generally examined, a few general principles may be given which will, in most cases, safely guide those who have not studied the science of chemistry.

As the results of the proposed experiments cannot be trustworthy, nor of general use, unless much more attention be given to the soils than hitherto, and as one general examination of the various soils of any given district will be of great value in all the future experiments of the same district, a brief description of the soils usually distinguished by particular names may not be out of place here.

With the exception of loam, most soils have their name from the ingredient in each which most strikes the farmer's eye.

1. Those adhesive soils where clay is most conspicuous are called clayey. Of this variety there are various sub-varieties, according as the clay is red, yellow, brown, blue, &c.

2. Those loose soils abounding in small stones are called gravelly. But here, also, we have sub-varieties. When the small stones are generally hard enough to scratch glass, it is called a hard or a silicious gravel (an attempt at an exact de-

scription of all the varieties of "hard gravel" would perplex rather than aid many farmers, and it is unnecessary, as specimens of each must be examined.) When the small stones or fragments are slaty, or chiefly slaty, it is a slaty gravel. One of the most interesting varieties of slaty gravel is that which lies on clay slate, is blue, and easily scratched when first raised, and becomes red after exposure for a while to air and water. Both sulphuric and phosphoric acids have been copiously found in this; and as, with proper management, the iron is quickly turned into the valuable peroxide, this soil may give valuable crops at little expense, and be a valuable dressing to soils of a different quality.

3. Loamy soils are those which have much vegetable or peaty matter thoroughly mixed in their composition. Where the peaty matter is mixed with clay, it is called clayey or peaty loam, according as the clay or peat appears to preponderate. Where the mixture consists chiefly of sand and vegetable matter, it is a sandy loam; where it is gravel, with much vegetable matter, it is a gravelly loam. No soil is more variable in agricultural value than loam, and none is more apt to deceive a stranger.

4. Peaty soils consist mostly of peat, with, perhaps, a little ill-mixed clay. In this quarter they are of little value, but may be improved where well drained. A well incorporated mixture of clay and lime is, perhaps, the best dressing. Lime alone is wasted on them, as it quickly sinks.

5. Sandy soils appear to consist mostly of sand.

6. Alluvial soils are confined to our holms.

By far the most instructive period for chemically examining any soil is when it is just to be employed in raising a particular crop with known manures. When we know the soil, the manures, the crop, the locality, and the season, we have a combination of facts from which safe and valuable inferences may be drawn,

#### ALL THE LOTS IN EACH GROUP TO BE OF THE SAME SOIL, AND THEIR SIZE.

In making experiments for comparing the value of the different manures, it is of essential importance that all the experiment lots in the same group be of as uniform soil as possible.

Experiments performed on a large scale are always preferable when accurately executed; but on the small scale of one-tenth, or even one-twentieth of an imperial acre, for each lot of a group, if the experiments are performed with a rigid and conscientious regard to accuracy, the results will be more valuable than those on any scale which are carelessly performed; and the following objections lie against large lots:—

1. Many fields are so various in soil that it is often difficult to find on them more than an acre of uniform soil lying conveniently together in the same lot.

2. The facts learnt by a chemical examination of the soil cannot confidently be made to bear on those from its crops and manures, except where

there is sufficient evidence of uniformity in the soils examined and cultivated; and this uniformity can seldom be relied on in large lots.

3. As the crop on one of the lots must be raised without any manure, it is desirable that this lot be small, perhaps but 1-20th of an imperial acre, 8 perches, or about 6½ falls. The farmer must lose a little by this lot; yet, as it is indispensable to show what the soil can do without manure, few will grudge a lot so small for the discovery of this fact.

4. As the whole turnip crop on each lot should be accurately weighed on the field, it may be both inconvenient and too laborious to weigh the crops of large lots.

Where the turnip-drills are made 27 inches wide, 6,453 yards 1 foot length of this drill make one imperial acre, 645 yards 1 foot make 16 perches or one-tenth of an imperial acre, and 322 yards 2 feet make 8 perches or one-twentieth of an acre. Where the drill is 27½ inches wide, 6,336 yards of it make an imperial acre, and 633.6 yards make one-tenth. Where it is 28 inches, 6,223 yards make the acre.

The experiments will be most accurately performed where short drills are used, as the same uniformity of soil will seldom be found in a long drill. If each (27 inch) drill were 80 yards and 2 feet long, it would contain two perches; and four such drills would make one-twentieth of an imperial acre, or eight one-tenth.

QUANTITIES OF MANURE.

The quantities of manures proposed are those which have been found to raise good crops on soils of medium quality. A comparative trial of two quantities of each, as in the table, will tend to show whether the increase of crop will pay the excess in the heavier dose of manure.

Lot.	Manures.	Per Imperial Acre.	Per Scots Acre.	Per 1-10th Imperial Acre, or 16 Perches.
1.	Dung . . . .	20 yards.	25 yards.	2 yards.
2.	Dung . . . .	25 yards.	31¼ yards.	2½ yards.
3.	{ Dung . . . .	12½ yards.	15½ yards.	1¼ yard.
	{ Bones . . . .	12½ bushels	15½ bushels.	1½ bushels.
4.	Nothing			
5.	Guano . . . .	3 cwt.	3½ cwt.	33½ lbs.
6.	Guano . . . .	4 cwt.	5 cwt.	45 lbs.
7.	{ Dung . . . .	12½ yards	15½ yards.	1¼ yard.
	{ Guano . . . .	2 cwt.	2½ cwt.	22½ lbs.
8.	{ Bones . . . .	12½ bushels	15½ bushels.	1¼ bushels.
	{ Guano . . . .	2 cwt.	2½ cwt.	22½ lbs.
9.	Bones . . . .	20 bushels	25 bushels.	2 bushels.
10.	Bones . . . .	25 bushels	31¼ bushels.	2½ bushels.

SEED TO BE USED.

The next idea in order is the variety of turnip seed to be sown on these lots. It is obvious that if all the experimenters do not use the same variety of seed, the results cannot be compared, as different varieties yield different weights of crop with the same manure. The common green-topped yellow bullock is, perhaps, the most valuable variety, which is generally suited to all our soils. I have more reasons for recommending this variety than I can state at present. I observed the green-topped yellow stood the severe frost of 1837-8 much longer than the purple-topped Swede did. The observation of a Norfolk farmer, recently published in the *Farmer's Magazine*, open a series of inquiries (on this root) of very deep interest to the farmer. We have grown turnips so long that we are apt to think we know all about them. Yet, if it shall turn out that the purple-topped varieties are less nourishing and more purgative to stock, and at the same time more exhausting to the soil than the green-topped yellow-fleshed varieties, while the latter both resist frost and mildew better than the former, and are less apt to run to seed—if an acre of the green-topped varieties both give us more beef or mutton than an acre of the purple-topped, and afterwards four extra bushels of wheat or five of barley (from the same manure)—it is worth while to attend to this.

Some facts also tend to show that some varieties of turnips are best fitted to one variety of soil, and others to other varieties. We know that few of our soils, however manured, will raise a heavy crop of good purple-topped Swedes. If each farmer knew the varieties which he could most economically raise on his different soils, the knowledge would amply repay a series of well-conducted experiments.

Yet if some of the more courageous would try another variety or two, along with the green-topped yellow, they would add greatly to the value of their reports; and if some of the most attentive feeders would try the feeding value of the green-topped against the purple-topped yellows, they would deserve a good prize. I suppose that analysis will show the purple-topped and mottled-fleshed varieties to contain more potash and soda, and less lime and sulphuric acid, than the yellow-fleshed.

NATURAL ORDER OF CROPS.

Numerous collateral facts tend to show that there is a natural sequence of crops for each class of soils. As yet we are in a great measure ignorant of that sequence, or of the order and kind of crops which ought to follow in succession. When we deviate from the natural order, we cross nature and must suffer for it. When we follow nature, we reap the greatest profit. It would often be unsafe, in the present limited state of our knowledge, both for the landlord and tenant, if no rotation were prescribed; yet it may soon appear that few of our rotations are calculated to yield the best results.

I have ventured these ideas to show what an

ample and yet unexplored field lies open for experimental research.

I now add queries, with a view of showing the information that ought to be given in reports:—

*Queries respecting the Soil.*—1. What is the average depth of the active soil? 2. Is the sub-soil open or close? 3. Is it till, red or blue clay, gravel, or rock? 4. If rock, is this clay slate, or what? 5. Has it been drained, or did it need draining? 6. Has it been subsoiled or trench ploughed, and when? 7. Are any red iron springs near it, or is red matter at the mouths of drains? 8. What weeds have been most apt to grow either in the green or white crops; are they wild-mustard, spurry, sorrel, dockens, or what else? (A distinct answer to this question is important, as several of the weeds which infest soils have been chemically analyzed, and as weeds are known to stamp a character on the soils which they infest.) 9. What was the last green crop borne by the soil? 10. Was it manured with dung or bones, or both, and what quantity of manure was given per Scotch acre? 11. Was the green crop good, bad, or average? 12. If turnips, what variety of turnip (white, yellow, or Swede), and were they lifted, or ate off by sheep? 13. How long is it since the ground received lime, and how many imperial bushels of shells were then given it per Scotch or imperial acre? 14. Did it yield a good or bad crop of red clover when last sown out? 15. How long was it pastured before it was ploughed up last? 16. Did it receive any manure or dressing while in pasture? 17. Has it borne one or two oat crops since it was ploughed, and were these tall or short in straw, or lodged? 18. What kind of oat was last sown? 19. When was it ripe or cut? 20. What was the weight per bushel, and the number of bushels per Scotch or imperial acre? 21. Was any root-weed especially observed in cleaning for the experiment, and was it couch or knot, or hair-grass, or what? The answers to these queries may be given in few words,

#### MANURES.

Before the comparative merits of each manure can be estimated, the quality of each must be known; for it is doing no justice to the character and value of good dung to analyse guano and bones, and then compare valuable samples of these with any poor inert trash which may be carted from the dung-yard; nor is it proper to decide this question by comparing excellent dung with worthless guano and bones. But as each farmer must use the dung at his command, and the guano and bones which he can purchase, it is enough if each experimenter afford the means of knowing the quality of each.

*Queries respecting the Dung used.*—1. From what kinds of stock was the dung prepared—cows, horses, bullocks, or feeding cattle, and what proportion of each stock contributed to its formation? 2. Were the cattle generally fed in houses, or in loose open sheds? 3. Were the cows and lean stock allowed any large proportion

of turnips or meadow hay, or had they chiefly oat straw? 4. Was their straw or hay salted? 5. If the dung of feeding stock entered it, were these fed on turnips and potatoes only, or was much oilcake, or corn, or beanmeal given? 6. Can the urine of the cattle-houses or stables run to the dung-hill, or is the dung-hill placed above the level of the cattle-house? 7. Did swine's dung, or coal or peat ashes form any part of it? 8. Was it carted out to the field in winter, or has it been turned? 9. Was it mixed with peat or any substance, and in what proportion? (It is desirable that the experiment should be made with dung as produced by stock, without mixture with peat.) 10. How old was the dung, and was it dry or moist when used?

The experimenters should also give answers to the following queries, with any other information which they consider valuable or interesting:—

1. When were the different manures put in the soil? 2. Was the soil then dry or moist? 3. Was the guano mixed, and with what? \* 4.

\*The guano, for comparative trial in experiments, should not be mixed with gypsum or coal ashes, or any other substance which is also itself a manure, for this would confound results; but it may be mixed with dry soil of the same field, though (except on very light warm soils) the small quantity needed will be most equally and quite safely spread on the lots without any mixture. If any experimenter wishes to try the effect of mixing with a weighed quantity of gypsum, &c., he has only to add another lot or two to the above table.

Was the seed given immediately after the manure, and what was the kind of seed, and quantity used? 5. On which manure did the plants first appear? 6. Was any injury done by the "fly," or did the guano seem to give any protection from the fly? 7. On which manure were they first ready for the hoe? 8. At what distances were they singled out? 9. What were the appearances of the several crops, at the end of every two weeks, from sowing to the middle of October? 10. State the quantity of each manure given, or if the above proportions were closely attended to? 11. Did either the bones or guano, on your soil, seem to have more effect in making the turnips spindle or shoot up towards seed than the dung had? 12. Did mildew appear on any of the lots? 13. What was the exact weight of turnips, both tops and shaws together, on either 8 or 16 perches of each lot, and also the weight of the bulbs after the leaves and tails were cut off? Those who scruple the double weighing, will give only the weights of the bulbs after leaves have been cut off; but as the weights of leaves on different soils and from different manures is important both to science and future practice, it is hoped that, at least, a few will give the weight of the leaves separately, where the leaves are not withered. The crops should be weighed as soon after the middle of October as other work will allow. Mention the date at which the crops were weighed.

1st June, 1843.

## AGRICULTURAL CHEMISTRY ASSOCIATION.

A meeting of the members of this body was held on Wednesday, May 1, in the hall of the Agricultural Museum, to hear a report of the proceedings of the association from Professor Johnston.

On the motion of Mr. Maconochie (Lord Meadowbank), Lord Dunfermline was called to the chair.

The CHAIRMAN said, in acknowledging the unmerited honour which they had that day conferred upon him, he could not refrain from congratulating them upon the numerous attendance that day, which evinced not only that an increasing importance was attached to this subject, but also the respect which was entertained for their learned Professor, who had devoted his experience and his knowledge to the important object of the scientific improvement of agriculture. It appeared to the committee that the time had now come when it was due to the members and to the interests of the association that some account should be rendered both of what had been done and of what was in the course of doing. Professor Johnston would, therefore, lay before them an account of what he had observed in the different districts of the country he had visited, and of the results which had been obtained by analysis in the laboratory, of the different kinds of manures, soils, and vegetable products which had been submitted to examination. Might he be permitted to add what he confidently anticipated, that the more the practical objects of the association were explained and understood, the more would its members be increased and its influence extended. It was remarkable that the association had not, as might have been expected, originated with those who had been less successful and enterprising in agricultural pursuits, and who might be desirous of raising themselves to a higher level; but it had originated with those practical farmers who had themselves been most successful and most enterprising in the pursuit of agriculture, and who, by the management of their farms, by their experience and knowledge, had placed themselves in the first rank of British agriculturists, and whose farms were universally applauded and admired. These individuals, acting not as foolish men who supposed that they already knew all that was to be known, but, on the contrary, acting as men who felt that there was still much to learn, and aware of the need there was for the support of agriculture by the judicious application of science, they had come forward and formed this Association. It appeared to him that when the mass of the tenantry of Scotland, who were not so successful and not so enterprising as those to whom he had alluded, came to reflect upon this circumstance, and to see that a short and an easy way had now been opened for them to be put in possession of the most approved and recent additions to agricultural processes, they would then become

members of this association. They could not but feel that a great boon had been conferred upon them by this association; and he could not suppose that they would be so blind to their own interests as not to profit by it. Still less could he suppose that the intelligent landlords, making a just appreciation of the character and spirit of the times in which they lived, could fail to see that their interests were identical with those of their tenants. It was also impossible that the public could look upon this association with jealousy, because it was not infected with the least taint of a monopolizing spirit; on the contrary, its object was to diffuse practical improvement and knowledge, which was calculated to be useful in agricultural pursuits, and thus to benefit the whole country. He would now call upon Professor Johnston to make his report.

Professor JOHNSTON said, that at the close of this, the first term, of the proceedings of the association, it was thought desirable by the committee that a report should be presented, not only to the members of the association, but to the public in general, of what the association had done during the last four months, and of what they yet expected to do. In order that this report might be made as interesting as possible, it was thought better to request him to make an oral statement, than merely to circulate the report in the ordinary form of a printed pamphlet. There were two objects or means which the association had in view, as calculated to promote their great end—the improvement of the agriculture of the country. The first was, the diffusion of the knowledge that already existed on the subject; the second was, the obtaining additions to our knowledge by means of the investigations carried on in the laboratory. He should divide the observations he had to make into these two branches. With regard to the first object, the committee were desirous to avail themselves of every means in their power to diffuse existing knowledge among the agricultural population; and they thought that lectures to agricultural audiences was one of those methods which were most likely to produce that result. They had therefore commissioned him to go into certain counties, into which he had been invited by local societies, for the purpose of conveying to their members a certain amount of knowledge, such as he might hope to impart in the course of two or three lectures; but more especially with the view of impressing upon those who listened to him the idea that there was something in the subject that was really important and useful to them, and thus of inspiring a desire for farther knowledge. With this view he had gone into several counties—he had visited Ayr, Paisley, Glasgow, Lanark, Stirling, Alloa, Crieff, Cupar, St. Andrew's, Kircaldy, Dalkeith, and Linlithgow, and he had received invitations from a number of other places, which he had not yet been able to overtake. Wherever he had gone, he had been listened to with enthusiasm by all classes, thus showing that the interest in agriculture was universal throughout the country, and that all classes felt that improvement in

this art was calculated to benefit the whole community. Another means by which they hoped to enlist the interest of the public was through the provincial press. There were, no doubt, several agricultural periodicals of great merit already in existence; but these were all published in Edinburgh, were comparatively high in price, and of too limited a circulation to produce the desired amount of good. Above all, they seldom found admission into the houses of the humblest classes of farmers, upon whose knowledge and skill so much of the general state of agriculture depended. It was a satisfactory proof of the interest that had been excited on this subject, that, even in the infancy of their career, not less than six journals had sprung up in the several county towns, devoted solely to agricultural purposes, and diffusing information throughout the country; and there were two or three more, of which the first numbers were now in preparation. If they considered that, in the first place, an impression had been made by means of lectures, and that it was important to keep up the impression thus transitorily excited by affording food to it, they would then see that the establishment of these periodicals was likely to be a permanent good. In Ayrshire two such periodicals had been started; in Dumfriesshire one; in Stranraer one, under the direction and encouragement of the Earl of Stair, himself an eminent agriculturist and a great promoter of agriculture. In Berwick a similar journal had been commenced for some time, and was conducted with great spirit. The little island of Bute sustained its small agricultural *broadside*; and in Aberdeen, in Perth, and in Cupar, he hoped other similar periodicals would soon be established. A third mode by which the committee hoped to effect their end was by enlisting the schoolmaster in the cause. This idea was not a new one. It had been attempted in England, and still more in Ireland, under the direction of the Commissioners of the National Schools; and in testimony of what had been done there he read an extract from an account of the mode in which agricultural chemistry and practical agriculture were taught in the national schools at Larne, in the north of Ireland, by which it appeared that very great good was done at a very little cost of time or expense. The first attempt that had been made in this way in Scotland, in connection with the association, was in Ayrshire. The zeal that existed there for the improvement of agriculture was beyond anything that he could describe. It was necessary to go into the district to understand it in any degree. He had been applied to, soon after his appointment to his present office, to publish an elementary *Catechism of Agricultural Chemistry* for the use of the schools in Ayrshire, a request with which he had complied; and it had already been introduced into various schools in the counties of Ayr, Lanark, and Renfrew. The subject had not rested with the parish schools alone; it had found its way into the higher schools; and the Directors of the Ayr Academy, the rectorship of which was now vacant, had intimated that they would give a pre-

ference to that candidate who could teach agricultural chemistry.

This movement was about to be followed in other academies—and he was sure they would concur with him in thinking that the good which was likely to follow from the general introduction of this subject into the common schools of the country—could scarcely be overstated. Now, what had they to expect for Scottish agriculture from this diffusion of knowledge among the agricultural population? Was there really great room for improvement? If they would allow him to refer to the opinion of an eminent English agriculturist, Mr. Pusey, late President of the Royal Agricultural Society of England, they would see that in all probability considerable benefit might be expected from this diffusion of knowledge. That gentleman describes the impressions he received from an agricultural tour in the south of Scotland, where it is usually supposed that a higher state of cultivation is to be found than elsewhere. He says—"I cannot place the general farming of southern Scotland or of Northumberland on a level with the farming of our southern counties, such as Buckinghamshire, but rather with that of North Devon; nor the general farming of East Lothian on a level with the general farming of Lincolnshire; nor the best farming of East Lothian on a level with the best farming of Lincolnshire, because it is the best land only of East Lothian on which such noble examples of farming are given, while in Lincolnshire, the barren heath and wold have been taught nearly equal luxuriance." It would appear from this observation of Mr. Pusey, that, in his opinion, Scottish agriculture, in general, is by no means so high as it might be. He (Professor Johnston) was satisfied that the agriculture in some parts of Scotland might justly be ranked among the first in the world. But, in visiting the various parts of the country into which he had lately gone, it had struck him that a great deal was yet to be done for districts that were hitherto neglected. In passing from Edinburgh to Lanark, the quantity of land which lay uncultivated was enormous; and he was satisfied that it might be improved in a high degree. So, in passing from Lanark to Glasgow, he found great tracts of land which, in the hands of an East Lothian farmer, was susceptible of much higher cultivation. So, also, on the sides of many of our straths, there was a great extent of land which at present received no cultivation, but which was capable of being brought under profitable culture. He would not dwell on the several points which had struck him in the various counties; but there were one or two things he would allude to, in regard to which merely mechanical means, without having recourse to chemistry at all, might increase the productiveness of a large extent of country. First of all, he might allude to draining. In passing from Edinburgh to Lanark, and from Lanark to Glasgow, the want of draining struck him as most conspicuous. Great tracts of land were undrained; and it was said by some that the climate was so bad that no remunerating cul-

tivation could go on. Now, it was true, if they drained a patch of land here and there, that the climate might prove bad, and the crops apt to fail. But he was satisfied that the climate need not form an obstacle to the permanent improvement of large tracts of country. Draining itself improved the climate; the land became warmer, and, in consequence, the rain that fell was less; for nature herself not only pointed out the means of ameliorating the climate, but actually held out a reward to industry by sending less rain where the land was drained, and so rendered less cold. But the effect did not cease with the climate; but the soil yielded a better herbage, and became of greater value for feeding stock; because it was a well-known fact that the warmer stock were kept, the less food was eaten. Then, draining altered also the entire character of some kinds of poorly productive land. In passing from Lanark to Glasgow, he had observed land with a soil as stiff as pipeclay, which the farmers thought it was impossible to bring into such a condition that they could commit the seed to it, with any hope of reaping a remunerating harvest. But if the land was thorough-drained—if it was subsoiled—if the air was allowed to penetrate, it then became loose, mellow, and friable. The roots were enabled to penetrate deeper, and to obtain food from sources which they could not reach before; and not only was the quantity of the crops increased, but the quality also: they yielded various kinds of produce which they refused to grow before. Another point that struck him was not so much the want of draining, as the too shallow nature of their construction. He held that the more soil you put within reach of the plant, the more food it would obtain, and the better it would grow. It was like drawing upon a bank with a larger capital than before. The only practical objections to deepening the drains were first the expense, and then the opinion that when the drains were deep they would not draw. Now, he observed that in Roxburgh, where the drains were constructed of the depth recommended by the best authorities, it was found that in five years at the farthest, and often in three, the whole of the capital was returned. As to the drawing, he would make but one observation. A gentleman in the south, who made his drains three feet deep, and puddled them on the top, was so satisfied that the water would reach the drains, that he offered a reward to any man who would keep the water out. In Ayr, in Lanark, and in the Carse of Stirling, where draining was first begun by Mr. Murry of Polmaise, and even nearer Edinburgh, he found the same objections to deepen the drains beyond twenty inches existing. He did not mean, however, to enter into a discussion as to the benefits of deeper draining, or to discuss the mode in which it ought to be done; he could only advert generally to such points as had struck him in passing through the several districts. He would, therefore, turn to another point. If they looked at the map, they would see tracts of land on the Forth and on the Tay, in Strathallan, to the southward of Perth, and eastward to Kinross

and Fife,—lands which, at certain seasons of the year, were all covered with moss, where grass alone should grow. The practical agriculturists of these districts attempted to counteract this by applying lime, and this was likely to have a beneficial effect for a certain number of years; but it was impossible entirely to eradicate the moss without ameliorating the climate. The cause lay in the fact, that from the vicinity of the sea on both sides of these districts, and the abundance of water upon its surface, a great quantity of vapour fell on the lands in the shape of mist, and spread itself to a greater or less extent. The draining that had already been carried on in Stratheden, had sensibly diminished this mist to a certain extent. Observations had been made in Cupar, by which it was found that while the mist from the west formerly enveloped the town steeple up to a certain point, it was now not so high by several feet. This showed that the quantity of mist might be diminished, precisely in proportion to the quantity of draining. If the country were all drained, there would be less moss on the grass lands, and there would be less need for the application of lime, which had not always the desired effect. In some districts, again—in the Clyde above Lanark, and in Strathallan—a great improvement might be effected by lowering the level of the rivers; by removing some rocks out of the channel, which would allow a free passage to the stream, and prevent the periodical flooding of tracts of low land along their banks, which now suffered from occasional inundations. Private interests might stand in the way of such things as these being done; but when attention was fairly called to the subject, private interests would give way to the public benefit, and the lands which were now waste would grow food for the use of man. Many present might know a tract of land in Dumfries-shire, called the Lochar Moss, where thousands of acres were left unreclaimed. The draining of this land had been in agitation for the last twenty years, but the neighbouring proprietors could not agree about the expense of the undertaking. When that was done, and he understood there was now a prospect of a favourable arrangement—then a large tract of country would be open to the energy of the Dumfries-shire farmers, and a corresponding increase would be made in the agricultural produce of the district; for few bodies of men among whom it had been his fortune to go, possessed more natural intelligence and energy, and were more capable of contending successfully against the difficulties of soil and climate, than the Dumfries-shire farmers.

Another thing that struck him was, that a deeper ploughing would be advantageous in many districts. It was not so necessary in this district, where the soil presented no natural obstacles to deeper ploughing. But on the sides of our sloping hills and long valleys it was otherwise. It was well known that on the sides of valleys there were certain geological deposits, which had lately drawn much of the attention of scientific men, consisting of banks of sand and gravel, with a

small quantity of soil only on the surface. The custom had hitherto been to plough only this soil on the surface, and not to tear up the stones beneath, because of the expense. Now, it was not to be expected that small farmers would readily undertake this expense; and yet he had been told by a gentleman who had a few years ago a surface-soil of only two inches, that he had now reached a depth of ten or twelve inches; and that the crops, compared with what they were formerly, were enormous. Then there were other soils that would pay better under deeper ploughing. He instanced those lands which, like parts of Stratheden, contained under them red deposits of clay, or sand, or gravel. This was the debris of the old red sandstone; and wherever that took the form of clay, the subsoil might be brought to the surface with great benefit; and in a case he could mention, in which it had been lately tried, it was found to have increased the value of the land from 1*l.* to 3*l.* per acre; but this kind of improvement was yet in its infancy, for it was now only beginning to be understood. He might farther mention, that even where the deposit did not take the form of clay, it would not of itself prove unwholesome to the soil, and might often be brought to the surface with great benefit. With regard to deeper ploughing, he could point out an economical illustration, which might be advantageous in this district. He had been told by a practical farmer, who was in the habit of ploughing his land to the usual depth practised in this neighbourhood, that he began to suspect the manure placed on his land had sunk down beyond the reach of the plough or of the plant. Accordingly, he began to plough deeper, and the effect was to bring up the whole deposits of town dung which had been laid upon the land from generation to generation, and the effect of this being brought up was materially to increase his crops. These observations all tended to show that really a great deal yet remained to be done for Scotch agriculture; not, perhaps in this district, so much as in those which were remote from the highways. How much could be done? Might the produce of the land be doubled? could it be tripled? There were some men who believed that the produce might be increased fourfold, and that we should yet become a great exporting country. He was not anxious to adopt any such sanguine opinion without having a clear proof of the matter; but he was satisfied, from what he had seen in various counties, that Scotch agriculture was very much more capable of being improved than he had before supposed. Let the same skill be applied to all parts of the country which is now exhibited in those which have been brought to the highest state of cultivation, and we shall soon see the produce enormously increased. But in order to effect this, public attention must be drawn to the subject. And it must be considered that they could not transplant an East Lothian farmer into the wilds of Lanark; he was not acquainted with the country—he could not submit to the drudgery which the first improvements of that district involved; and there-

fore the benefit could only be obtained by training the inhabitants of the county to an improved system of cultivation. Then there were other obstacles in the way. In this country they had not the evil of a want of leases; but too long leases were as bad as none at all; and he had observed in part of Lanarkshire that farmers held leases for three nineteen years, and the present owner cultivated the farm in the style his grandfather did, with scarcely any improvement. Then there were also obstacles arising from the peculiar tenures of land. A case had been mentioned to him of a gentleman with a life interest in an estate of 10,000*l.* a-year, which all believed could easily be rendered worth 30,000*l.*; but the gentleman himself had no interest in laying out capital on improvements. His personal interest, in fact, considering the uncertainty of human life, lay all the other way. But though it might not be his interest, it was for the interest of the country that it should be improved, because the produce of the soil would thus be tripled. Was no effort to be made to reconcile these conflicting interests? Another obstacle was the indifference too often displayed to the improvement of land both by landlord and tenant; and he looked forward to the agitation excited by this association to remove that indifference, and to bring into a hearty concurrence both landlords and tenants, to assist in the improvement of the whole country. (*Applause.*)

He would now come to the second object of the association—the increase of knowledge by means of the investigations carried on in the laboratory. Time would not permit him to detail the tenth part of what had been done there, but he would advert to a few topics, which he hoped to make as clear and interesting as possible. In the first place, a great number of soils had been analyzed from all parts of the country—not only in Scotland, England, and Ireland, but even from our West Indian colonies. He did not mean to direct their attention to particular cases, unless these involved some general principles; but he might remark that it was of great consequence when gentlemen, enlightened in all the bearings of the practical improvement of the country, saw the benefit that was to be derived from some particular series of analysis, and sent different varieties of soil to be analyzed for that purpose. Among the soils which had been examined with the view of clearing up points of general interest, was a series of six soils sent by Sir George Macpherson Grant, of Ballindalloch. They had all heard of what was called *over-liming* land. The physical or mechanical effect of this was known to be to make the land light and porous; to blow it up, and to make it heave out, so that it became in some degree hollow underneath, and sunk beneath the pressure of the foot. This state of matters involved some agricultural differences; such lands produced good crops of barley and turnips; but the oats failed. Now, to clear up the causes of this, Sir George Grant sent specimens of six soils from his own estate, to see whether

they were over-limed or not—whether the effect was really caused by their containing or having received too large a per centage of lime. About thirty years ago these soils had been limed very highly, but not generally since, and they had produced good crops of oats for the first two or three years; but ever since, the oats had failed. Now the following was the result of the analysis of these soils:—

	Bow-Moon Park—soil.	Bow-Moon Park— subsoil.	Misty Park —soil and subsoil.	Southerland Park—soil and subsoil.	Carron Park —soil and subsoil.
Organic matter.....	10.29	9.54	5.65	5.73	5.23
Salts, soluble in water...	0.45	0.15	0.50	0.15	0.44
Oxide of iron.	2.49	3.68	0.50	0.96	2.04
Alumina....	1.71	2.54	1.11	1.48	1.15
Carbonate of lime.....	1.40	0.69	1.10	0.98	0.67
Oxide of man- ganese...	trace.	0.72	trace.	trace.	0.22
Carbonate of magnesia.	do.	trace.	do.	do.	trace.
Marshy mat- ter.....	81.77	82.79	91.20	90.34	89.60
	98.11	100.02	100.06	99.64	99.35

From these tables it appeared to be clear that the cause of the failure of the oats was not in the presence of too large a per centage of lime. But if they considered that barley and turnips both required a light soil, and that clover and oats—for both these had failed—required a close stiff soil, he thought they would agree with him that it was not the chemical constitution of the soil that caused the failure, but its mechanical condition; and that if the land could by any means be squeezed and pressed together, that would tend to cure the defect, and to produce the oats which had not hitherto been grown. In order to remedy what had been called over-liming, two practices had been had recourse to—in some places the soil had been brought up. It was clear that if the subsoil was of a stiff nature that would have a good effect. In other cases, particularly in the county of Fife, another application of lime had been found to cure it; and, indeed, if he had been asked simply what these soils principally wanted, he would have answered at once, more lime. Indeed, Sir George had mentioned to him that his overseer had quoted a case on his own land, in which a new liming had been productive of good, but he had thought it so unlikely that more lime should cure over-liming that he considered the alleged fact unworthy of attention: so necessary is it to understand what the words we use in reference to agricultural operations really mean. But then the application of lime ought to be made with

some precautions. It ought not to be added in large doses, as the effect of that would be still further to heave out the land. Then it ought not to be laid on till the land was thoroughly drained. The consequence of having stagnant water in the soil was that certain acids accumulated, which acted chemically upon the lime, and tended still farther to heave out the soil. It might also be a question whether the lime would not be better applied in the form of compost. But he was sure that the application of a heavy instrument to press and squeeze the land together would be most efficient and immediate in its benefit. Another interesting inquiry he had been engaged in would be explained by a reference to another table. On the farm of Pinkie-hill, near Musselburgh, there existed a field which, thirty years ago, had been a moor covered with furze, with the exception of a lower portion, which was wet and marshy. It had been sparingly limed, drained for springs, and brought into cultivation. For four rotations since, that is, for the last sixteen years, the turnips in a particular part of the field—the marshy part—were infected with a peculiar disease—with a wart or fungus, which rotted the turnips; while, in the rest of the field they were pretty good. The following was the analysis of both the ash of the diseased turnips and the soil from which its constituents were obtained:—

Comparison of Ashes of Swedish Turnips, and the Soil in which they were grown.

	Turnips.	Soil.
Chloride of potassium.....	5.42	0.02
Sulphate of potash.....	31.37	0.87
Phosphate of do.....	5.72	—
Carbonate of do.....	24.39	0.11
Phosphate of magnesia.....	1.05	—
Do. of alumina.....	6.06	6.45
Do. of iron.....	—	—
Do. of lime.....	2.64	—
Alumina.....	—	—
Carbonate of lime.....	10.97	0.29
Oxide of manganese.....	8.70	0.22
Silica.....	1.32	78.99
Organic matter.....	—	6.24
Water.....	—	6.61
	97.64	99.80

In these analyses they would perceive that the ash of the turnip contained a large proportion of oxide of manganese, while in the soil this oxide was also present in nearly as large quantity as lime was. Finding that this was the case, he thought that the oxide had found its way into the turnip, and that one reason of this was the small quantity of lime in the soil. To remove noxious substances that might exist in the soil, he knew nothing more efficacious than draining; because in this way the rain was enabled to wash into the drain all the noxious substances which the soil might contain. He therefore recommended, first, that that part of the field should be thorough-

drained: and in the second place, that it should be limed, because, from the table, they would observe that it wanted lime very much. Another subject of great interest was the cause of disease in the potato crop. It would be of great consequence to discover the cause of this disease. Could it be ascertained that the disease arose from some weakness in the seed, one remedy would be indicated; if from some bad or defective quality in the soil, another kind of remedy would fall to be applied. Here again he had been much gratified by one of the members of the association, Mr. Campbell, of Craige, who had sent specimens of six different soils from his estate, two of which had grown sound potatoes, and four bad, though the manuring and the seed were the same in all. He was anxious to ascertain whether the cause lay in the soil, and, if so, what was the remedy. And, if it did not lie in the soil, then they must look to another quarter, and analyse the substance of the potato itself. He had not yet finished his analysis on these points, but this was one of those subjects on which he was satisfied much light would yet be thrown by chemical analysis; and there was no subject which was of more importance to the country to have cleared up than this.

He had already alluded to the existence of noxious substances in the subsoil; he begged now to direct their attention to the subject of moor-band pans. By this he meant a layer of gravelly matter, cemented together by an ochrey substance, which was often found to stretch through large tracts of the country, resting under the surface at the depth of one to four feet, forming an impervious pavement, through which no rain could penetrate, and down to which the roots of plants were very unwilling to come. Sometimes this matter appeared in the form of thin little cups. Now it was impossible to improve a country without breaking up these pans; and, therefore, the question came to be of importance, whether it was safe to bring them to the surface. He had made an analysis of three different kinds of these pans, the result of which was as follows:—

Composition of Moor-band Pans, from three Localities in Inverness-shire.

	Thick Sandy Pieces.	Thin Cups.	Granitic Conglomerat.
Water .....	1.4	1.6	1.5
Organic matter . . .	2.7	24.5	3.2
Oxide of iron . . . .	8.6	37.5	9.7
Soluble, alumina . .	1.7	0.0	2.0
Sand and earthy matter, . . . . .	85.9	34.8	83.9
	100.3	98.4	100.3

The remarkable point in these analyses was, that one of the kinds of pan—the thin cups—contained so large a proportion—nearly one-third of its weight of organic or vegetable matter. This variety of pan might be brought to the surface much more safely, and would be less likely to produce direct injury to the soil than either of the others—a fact which showed the importance of knowing of what such ochrey deposits consisted. He might mention, in connection with this, that there were springs in many parts of the country, some of them penetrating through the solid rock, the water of which, though colourless at first, yet, when it got to the air, deposited a red ochrey matter. This ochre often contained much vegetable matter, and though it looked noxious, yet, when mixed with the soil, it was not so noxious as it seemed. But to cure those soils which did possess that noxious character, there was no method at once so economical and so perfect in its results as the insertion of drains in the soil—not so much to remove the water that might be there, as to make the rains of heaven become our instruments in washing out the noxious substances. In the east of Fife there was a large tract of country, with a rich soil, on which, when the crops reached a certain point, they died. This was owing to the presence of noxious substances in the subsoil. Now, these soils might be cured by the sinking of drains to the depth of 30 inches; and thus, though there were no great quantity of water to be carried off, allowing the rain to wash out the hurtful matter. He might also refer to the fact of lands losing their covering of wood by a disease in the timber, particularly the larch. This might be owing to various causes, but in some cases he had no doubt it arose from the subsoil. One instance he might mention, where Lord Strathallan told him he had planted 700 acres with larch, in Tullibardine Moor, and these were now all dying so fast that he could scarcely cut them down fast enough to have them peeled. Now, the subsoil there, at the depth of 12 or 18 inches, was full of noxious matter. He thought the same cause of disease acted upon timber as upon crops of corn, and the same remedy applied to both. If drains could be inserted in forests, they would benefit the subsoil as much as in fields which are cropped with corn; perhaps large open drains would be productive of great benefit.

There was another important agricultural subject, which was of great consequence in cases where lime was at a distance—he meant the existence of marl-pits. In Fife it happened that lime was abundant, and therefore the farmer could cultivate his land at much less cost than those who lived farther north. In Forfar and in Perth they were in many places far from lime, and therefore the beds of marl became of great importance. He had ascertained the composition of various marls which had been sent in for examination, and the following was the result;—

Composition of Marls.	Banks of the Boyne.			Caithness.			Logie Marl.		
	Wet.	Dry.	Brd.	Wet.	Dry.	Brd.	Wet.	Dry.	Brd.
Water .....	1.5	2.0	—	42.04	—	—	62.50	—	—
Organic matter...	1.4	11.1	—	2.57	4.49	—	5.42	14.61	1.0
Carbon. of lime..	92.2	0.7	—	46.56	84.71	—	28.76	77.56	82.2
Do. of magnesia	1.1	0.0	—	0.0	0.0	—	0.0	0.0	0.0
Gypsum .....	0.0	0.0	—	0.0	0.0	—	0.0	0.0	8.0
Alumina and... } earthy matter }	3.1	8.51	—	6.04	11.29	—	2.90	7.81	7.5
	99.3	98.9	—	99.15	100.49	—	99.58	99.98	98.7

They would see here, that of the two marls from the Boyne, though similar in appearance, the one was much more rich in lime than the other, and therefore fitted for application to a very different kind of land. Then of the Scotch marls, they would observe, that, in their natural state, they contained often more than half their weight of water, which greatly increased the cost of transport. It would be of great advantage, he thought, to have the marl burned; as in that case, as was shown in the last column of the table, its fertilizing power would be doubled. Then it became of consequence to the farmer to know how best to apply it to the land. He would recommend that the marl, where it was not burned, should be mixed with lime-shells: in that case the water in the marl slaked the lime, and reduced the whole composition to a beautiful fine powder. The question for the farmer was altogether a practical one—to calculate the advantages of lime over marl, from the comparative cost of each.

Another point of some consequence to the practical farmer was the use of peat-ashes as manure. Several samples had been sent to him for analysis from Renfrewshire; and he might observe that the white peat, which was at the surface, had usually been thought useless; but he found that when burned it would form a valuable manure for certain crops. The following table exhibited the results of the analysis of two varieties from Renfrewshire, and of one recently imported from Holland:—

Analysis of Peat Ashes.

	White Peat.	Black Peat.	Dutch Ashes.
Organic matter .....	54.12	3.02	25.77
(charred turf) .....			
Sulp. and carbon. of..	6.57	5.16	2.78
Potash and soda...			
Alumina .....	2.99	2.48	11.19
Sulph. of lime.....	10.49	21.23	16.35
Carbon. of lime.....	8.54	3.50	1.21
Oxide of iron.....	4.61	18.66	A little.
Oxide of manganese.. } and magnesia..... }	—	—	3.39
Phosphate of lime....	0.90	0.40	1.24
Silicious matter.....	10.88	43.91	37.24
	99.10	98.36	99.17

They would observe that in the white peat, though only one-half of the vegetable matter had been burned away, the quantity of salts of potash, soda, and magnesia, was very considerable. The subject of peat-ashes had become of more interest, because a quantity of Dutch ashes had been recently imported into Leith. There could be no doubt, as he had said, that peat-ashes would be valuable for certain crops, as a top-dressing for clovers, or as a mixture for guano and bone or rape-dust; but it would prove in the end disadvantageous to the importer of this substance if he were to assign to it more virtues than it really possessed.

He would now come to the most important of all the imported substances—that of guano. It was not only of consequence to agriculture that guano should be imported, but it also furnished great employment to our merchants and commercial marine; and he therefore wished to point out to them the difference between a good and a bad substance. Attention had lately been called to the importation of this substance from the coast of Africa. The Peruvian guano was chiefly obtained from the Chincha Islands, where the number of birds was incalculable, though they were less now than they had been two hundred years ago. They would be able in some measure to understand how much the guano lost of its qualities by keeping, when he told them that a gentleman who had been there mentioned to him that the smell of the guano could be perceived at the distance of fourteen miles from these islands. It was important, therefore, to get the most recent guano, and that which was least decomposed. The most recent, he might remark, was that which was lightest in colour. He then pointed to the map of the African coast, and shewed the relative positions of Possession Island, Angra Pequena, and the island of Ichaboe, from which places the African guano has been chiefly imported. The guano from this coast was generally of a darker colour than that obtained from Peru.

The best African guano yet imported was obtained from the Island of Ichaboe, where there was a large deposit, particularly at the north-east of the island, where it was seventy feet thick, and many hundreds in length and breadth. This point was well sheltered from the sea, which was supposed to be the reason why the guano obtained there was of better quality than the others. The following were analyses of different specimens, the two first kinds being named after the vessels in which they were imported:—

Composition of different kinds of Guano.

	Per the Levenside.		Star of the West.		Ichaboe.	Bolivian.	Chilian.
	13.75	28.85	13.50	27.66	17.41	8.34	15.90
Water .....	58.09	52.66	32.31	32.34	55.33	65.60	51.37
Organic matter and ammonical salts .....	..	..	33.50	9.80	..	..	..
Sulphate of soda .....	6.94	6.51	1.58	2.02	4.92	0.78	5.00
Common salt .....	3.32	2.77	5.81	4.12	3.54	1.12	3.57
Carbonate of lime & magnesia .....	15.07	12.10	12.00	20.18	18.23	19.80	21.77
Phosphate of lime & a little phosphate of magnesia .....	2.83	3.11	1.30	3.88	0.57	4.46	2.39
Earthy matter .....	100	100	100	100	100	100	100

He might just remark, for their guidance, that the water and the earthy matter were of no value; and that the ammonical salts and phosphates were the most valuable substances.

He would next direct their attention to an interesting inquiry on the composition of the turnip. He could not say that the analytical inquiry into this subject was yet completed, because many other analyses of other turnips must be made before anything like a general conclusion could be drawn; but so far the results were interesting. He had been making some inquiries into the composition of turnips grown with guano as compared with those grown with dung. The following was the result:—

Composition of the Organic Part of Turnips.

	DUNG.		GUANO.	
	Fresh.	Dry.	Fresh.	Dry.
Water .....	88.02		87.93	
Pectic acid .....	1.24	10.35	0.71	5.88
Gum .....	0.27	2.27	0.19	1.57
Sugar .....	5.37	44.82	1.64	13.59
Extractive matter ..	3.00	25.04	6.77	56.09
Oil .....	0.25	2.09	0.16	1.26
Cellular fibre .....	1.22	10.18	1.81	15.00
Salts .....	0.68	5.68	0.70	5.80
	100.05	100.43	99.91	99.19

He could not say whether the results exhibited in this table would be uniform; but it was striking to see the difference in these turnips of the quantities of sugar, of oil, and of pectic acid, found in each. How far this might affect the feeding properties, he would not at present consider; but he thought the deficiency in the guano-grown turnip might be accounted for by its more rapid growth. The following table showed the composition of the ash of the turnips:—

Composition of the Ashes of Turnips.

	Grown by Dung.			Grown by guano.		
	Inter.	Exte.	Epid.	Inter.	Exte.	Epid.
Chloride of potassium ..	5.40	10.71	11.91	5.56	5.03	7.76
Sulphate of potash .....	31.20	35.47	19.26	30.85	37.04	19.89
Phosphate .....	5.51	3.65	..	20.93	10.17	..
Carbonate .....	36.74	17.63	27.45	11.38	19.03	4.19
Phosphate of magnesia ..	2.63	3.13	4.66	0.34	1.02	3.24
Do. of alumina .....	0.92	2.76	4.15	4.87	9.94	10.71
Do. of iron .....	..	..	5.02	..	..	10.45
Do. of lime .....	1.58	2.02	..	4.55	4.49	0.73
Alumina .....	0.94	0.46	0.98	5.09	2.79	0.73
Carbonate of lime .....	13.56	14.82	13.65	9.52	9.72	10.58
Oxide of manganese .....	2.60	5.33	5.78	3.21	5.90	6.96
Silica .....	..	3.04	5.79	1.65	3.43	23.79
	99.08	99.02	99.65	97.95	99.10	99.03

After adverting to some of the more striking differences exhibited in the above table, he observed that it was at present impossible to say how far they might prove hereafter to have a bearing on the practical culture of the root; but, at any rate, it was interesting and important to

know how much variety might exist in the composition of different plants of the same species, and yet each be in a healthy state.

Next, with regard to the steeping of seeds, to which their attention had also been drawn in the laboratory: he conceived that a perfect steep ought to contain all things that were necessary for the nourishment of the plant. The following table showed what he considered would be a proper steep for corn or beans:—

Steep for Corn and Beans.

Phosphate of soda . . .	} 1lb. of each in 10 gal- lons of water, to steep 300lbs. of seed.
Sulphate of magnesia	
Nitrate of potash. . . .	
Common salt . . . . .	
Sal ammoniac, or. . . .	} The seed to be dried with gypsum or quicklime.
Sulphate of ammonia	

While on this subject, he might mention that Mr. Lawson had turned his attention to the steeping of larch seeds, with a view, if possible, to prevent that disease which so frequently attacked the trees. There was only one other point to which he would advert—whether it was possible by steeping or dusting the seeds of potatoes to find a cure for their frequent unhealthiness. It was of great consequence to inquire into this point, in order that, if possible, some satisfactory result might be obtained.

From the observations he had now laid before them, and which he would not protract further, he thought they would be satisfied that the Association, through its diffusion of knowledge and its investigations in the laboratory, was worthy of countenance, support, and encouragement. (*Great applause.*) And if the Association itself deserved support, he was certain that the committee, who had so zealously promoted its interests, and who had devoted their means, their time, and their talents to work out its objects, were also worthy of their cordial support, and of their thanks in any way they might please to give them; though he was satisfied that the best thanks in their estimation would be by supporting the Association, and getting others to lend it their support. He would not advert individually to any of the members of the Committee who still remained to them; but they would permit him to dwell for a moment on the memory of one whose sudden loss it was impossible for them ever to hope to replace. Mr. Oliver, of Lochend, had been longer and better known to most of them than he ever was to him. He had known him personally only for a few months; but still he felt his loss more deeply than he could express—not merely because of his practical knowledge on subjects with which he (Professor J.) was but imperfectly acquainted, and upon which he had found Mr. Oliver a most valuable and most willing counsellor and instructor—but, as an adviser and member of the committee of the Association, he had been struck during his little intercourse with Mr. Oliver, with his remarkable judgment and his sound common sense on every topic that could be presented to him. He had the

art, which few men attain, of considering a subject for himself, and of forming his judgment upon that rather than from the representation of others; and, from his own practical knowledge, he was able to draw conclusions so sound that few could dissent from them. He had been struck with a farther fact, which they might permit him to mention. About twenty years ago, he devised a plan, which, in substance, embraced the very objects which this Association was now endeavouring to carry into effect. He held in his hand a MS. of experiments made by Mr. Oliver when he entered upon Lochend farm, with the view of ascertaining the value of the different manures which were suited to his farm. By these tables he regulated his conduct during the long time he was in Lochend, and they all know how perfect his practice had been. Mr. Oliver's career was a remarkable one; and he could not but advert to it, were it for no other reason than its important practical bearings upon the conduct of other young farmers. He came to Lochend from a country parish, where he had little education, and few means of acquiring knowledge. The former tenant paid 300*l.* for the farm; he at once took it at 1,500*l.* In order to pay this rent, he availed himself of all the means of knowledge that were within his reach. He went to college; he studied chemistry, geology, and agriculture. There was no kind of information bearing on his pursuits that he did not attend to, and labour to acquire; and the result was that soundness of judgment which he exercised on all matters that were submitted to him. He consequently became one of the most eminent men of his time, and his skill was known and appreciated not only in Scotland, but in almost every corner of Europe where enlightened agricultural improvements were in progress. He was not only a good farmer, but he was a most useful director of the Highland Society, the deliberations of which body he was ever ready to assist with his experience, his skill, and his advice. He had long laboured under the illness of which he died, and he was sensible of the fate which awaited him; but he did not therefore despond, or retire from public life; he knew that he had duties to society to discharge, and he was active in the discharge of those duties till the very last. In this let us endeavour to imitate his example. Knowing our duty, let us persevere in it to the last. And to those who, like him, are devoted to agricultural pursuits, it is gratifying to reflect that there is no way by which our country can be more immediately and more widely benefited than by the improvement of agriculture; and that there is no labourer so humble, no farmer so small, as to be unable, directly and immediately to contribute to this improvement. If you generally agree with me, as I am sure you do, that this is a just tribute to the memory of Mr. Oliver, of Lochend, I am sure you will not be less concerned to give your support to those members of the committee who survive; who, if they have not the same kind of talents, have at least as much zeal, and who are anxious to contribute as much to the improvement of Scotch agriculture

as he individually was enabled to do. (*Great applause.*)

Sir GEORGE MACPIERSON GRANT said he was sure the meeting would concur with him in thinking that they ought not to separate without a vote of thanks to the committee for the very judicious measures they had taken to diffuse information through the country by means of their intelligent officer; and particularly to the secretary of the committee, for the zeal and activity he had displayed, which was beyond any thing he had power to express.

The motion was carried by acclamation.

Mr. FINNIE returned thanks on the part of the committee, and disclaimed all merit on their part, except in so far as they had been fortunate enough to select their distinguished officer, Professor Johnston, to whose skill and talents they were chiefly indebted for their singular success. Many prejudices existed at the formation of the association, and many were disposed to think that though it was all very well in theory, it would never work in practice; but he thought there was no one now who would not admit that it was likely to prove a valuable auxiliary to the practical farmer, and to realize all the prospects at first held out. (*Applause.*)

Mr. COVENTRY also acknowledged the vote of thanks. One reason, among many, that engaged him in the service of the association was, the consideration that if it succeeded, it would benefit all classes in the country: the farmer, by increasing his produce; the landlord, by securing him his rents; and the people at large, by lowering the price of food; and thus enabling our manufacturers to compete with foreign markets. Besides, it was often matter of complaint that discoveries in manufactures benefited only the large capitalists, who were enabled to drive the smaller capitalists out of the field. But this was not the case with improvements in agriculture, where the smallest tenant or proprietor could benefit by the improvements as well as the largest. He then urged upon the meeting the necessity of still further supporting the association with their funds, that they might be enabled more frequently to print and circulate statements of observations made, or results come to, by Professor Johnston, but which they were prevented from understanding at present. He concluded by proposing a vote of thanks to Professor Johnston; which was seconded by Mr. NORMAN LOCKHART, W.S., and carried by acclamation.

Professor JOHNSTON returned thanks; after which the meeting separated.

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## LEOMINSTER FARMERS' CLUB.

### LECTURE ON WHEAT AND ITS DISEASES.

Henry Rudge, Esq., of Leominster, having kindly consented to the wishes of the committee to deliver a lecture on wheat and its diseases to the members of the Club, on Friday, March 1, a large number of the most intelligent agriculturists in the neighbourhood attended.

Mr. Rudge commenced by observing that he had not the vanity to suppose that in making the few observations he was about to do, on the important subject of the diseases affecting the grain which forms our daily sustenance, he should be able to communicate any facts not already known to the major part of the members of the club. He nevertheless hoped that by presenting the subject in a condensed and concentrated form, and avoiding as much as possible scientific distinctions—in short, confining the subject to the practical rather than the theoretical part, he might render them interesting if not of practical utility. Though when he considered how closely connected with the welfare of a nation is the cultivation of the staff of life, he could not sufficiently express the obligations all are under to those who devote their best energies practically to the increased production of wheat. And, said he, truly has it been observed that trade increases the wealth and glory of a nation, but that its true stamina must be looked for amongst the cultivators of the soil. Of all the plants which are cultivated, wheat is undoubtedly one of the most important. It grows readily in almost every climate, from the torrid to the frigid zone; but a temperate climate, such as is best suited to the nature of man, appears to be its natural home. It has been so long cultivated, that where it appears to grow spontaneously, as in some uncultivated spots in the east, it is doubtful whether it be not the remains of wheat anciently cultivated there. It is an extremely hardy plant, and its vitality is such that it is not easily destroyed. Wheat has been known to be covered with the water of floods so long that every other remnant of vegetation was destroyed; and yet, on the water retiring, it has sprung up from the root, and come to perfection. It has also been found in Egyptian tombs; and if statements are correct which have appeared in print, it has grown when planted. Some botanists have divided wheats into different species, from some marked peculiarity in their formation. Others consider that they mostly form hybrids, when mixed in the sowing, and that their peculiarities vary with the soil and climate, and have looked upon all the cultivated wheats as mere varieties. There are, however, three principal varieties so distinct in appearance that they claim peculiar attention. These are the hard wheats, the soft wheats, and the Polish wheats. The hard wheats are the produce of warm climates, such as Italy, Sicily, and Barbary. The soft wheats grow in the northern parts of Europe, as in Belgium, England, Denmark, and Sweden. The Polish wheats grow in the country from which they derive their name, and are also hard wheats. The hard wheats have a compact seed, nearly transparent, which, when bitten through, breaks short, and shows a very white flour within. The soft wheats are those usually cultivated in Great Britain; they have an opaque coat or skin, and which, when first reaped, give way readily to the pressure of the finger and thumb. These wheats require to be dried and hardened before they can be conveniently ground into flour. The Polish wheat has a long chaff,

which is much longer than the seed, a large oblong hard seed, and are nearly cylindrical in appearance. It is a delicate spring wheat, and not very productive in the climate of England; hence it has only been occasionally cultivated experimentally. The hard wheats contain much more gluten, a rough viscid substance, very nutritious, and which contains a portion of nitrogen, varying from 5 to 30 per cent. It is this quantity of gluten which causes the Italian wheats to be used exclusively for the rich pastes which form so large a portion of the food of that nation. The soft wheats contain the greatest quantity of starch, which fits them for fermentation by its conversion into sugar and alcohol for brewing or distilling; therefore, the soft wheats are the best. The difference in colour between red and white wheats is owing chiefly to the soil. White wheats gradually become darker, and ultimately red, in some stiff wet soils; and the red wheats lose their colour, and become first yellow and then white, on rich, light, and mellow soils. It is remarkable that the grain sooner changes colour than the chaff and straw, so that we have red wheats with white chaff, and white wheat with red chaff.

My limits will not permit of my entering into an investigation as to the different plans of cultivation of this necessary plant, though the subject is intimately connected with the examination of the diseases to which it is liable.

A certain portion of nitrogen is essential to the production of good wheat, as that element enters into the composition of the gluten which will be found to abound in proportion as the nitrogen exists in the soil or can be supplied from the atmosphere. The experiments of Liebig seem to show that the nitrogen of the atmosphere will not enter into the substance of plants except in the form of ammonia, and hence the efficacy of manures has of late been estimated by the ammonia which they can produce. This theory, requires, however, the confirmation of experience before it is adopted at once without limitation. Decayed vegetable matter seems essential in a good wheat soil; and it may, in the slow progress of its decomposition continually absorbing oxygen from the air, have some chemical effect on the nitrogen also, so as to make it useful in vegetation, whether by first forming ammonia or in any other way. It is well known, however, that provided a soil be compact, its fertility is very nearly proportioned to the quantity of decayed vegetable matter which it contains, especially if there is calcareous earth or carbonate of lime in its composition. Lime has often been considered as the most efficacious manure for wheat, even more than dung. As long as there is organic matter in the soil lime acts beneficially; and the richer the land which does not contain carbonate of lime already, the more powerful is the effect of lime. To produce good wheat, then, it is clear that the land should be gradually brought to the proper degree of fertility by abundant manuring for a preparatory crop, which will not suffer from an over dose of dung, and will leave in the soil a sufficient

quantity of vegetable matter intimately blended with it for a crop of wheat. Clover is a plant which will bear a good deal of forcing: so are beans, and are consequently a good preparation for wheat. The roots left in the soil from a good crop of either decay slowly and furnish a regular supply of food for the wheat sown in the next season. Potatoes also admit of much forcing, but the necessary loosening of the soil for this crop renders it less fit as a preparation for wheat. As a general rule it is considered by those who have written from experience on these matters better to sow barley and clover after potatoes.

Improved chemical analysis has discovered various substances in minute quantities in the grains and straw of wheat, and it has, therefore, been considered essential to its formation that these substances should enter into the composition of the manures if they do not already exist in the soil in sufficient quantities. Most of these substances are found in all soils which contain a due proportion of clay. Silica in a very minutely divided state, and probably in combination with alumina or potash, seems one of the most important to give due strength to the straw; and hence in some soils, potash, or wood-ashes which contain it, may be advantageously used as manures to the young clovers preceding the wheat. While the wheat is growing it is exposed to various accidents which it is often difficult to foresee, and still more difficult to guard against.

We have now to consider the diseases of wheat which are caused by fungi. *Uredo* is the name of a genus of plants belonging to the natural order of fungi. This division of plants is important and interesting to the botanist, as they seem to stand on the verge of the vegetable kingdom, on that point where a lower organic point of individuality seems lost in its dependence upon a more highly organised being. Viewed economically they are of the highest importance, as producing or being indicative to the fatal diseases of corn, known by the names of smut, brand, bunt, rust, mildew, blast, brand-dew, dust-brand, scorch-blast, brand-bladder, pepper-brand, canker brand, burnt-ear, &c. All the hyper-dermii (from two greek words, signifying *under* and *skin*), are known by having sporidia, or spore cases, free or stipitate, and situate beneath the cuticle of living plants. On examining any one of the productions thus constituted, it will be found that the part of the plant on which they are placed has lost its natural character and colour. The cuticle, under which they grow, is discoloured, frequently raised, and bursts in the process of time. The bodies called sporidia, which constitutes these productions, are cellular bodies, having an ovoid or elliptical form, and are frequently seated on a kind of receptacle. The tissue around these bodies is frequently modified in character and appearance, sometimes approaching that of the bodies themselves. The sporidia, or cells, are generally filled with granules, which are supposed to be the sporules or spawn of the plant. Having these appearances, some botanists have denied that these cells, furnished with gra-

mules, are truly individual plants. But Fries (who has paid more attention than any other botanist to cryptogamic plants) defines them as plants having no proper vegetation, the sporidia arising from the anamorphosis of the cells of living vegetables. The external circumstances which are found most favourable to the development of these fungi are—1st, a very humid state of the atmosphere, long continued; 2nd, an epidemic state of the atmosphere, in which these bodies are produced over large districts; 3rd, a want of sufficient light; 4th, alterations from hot to dry and moist weather; 5th, long continued hot and dry weather; 6th, the want of a due supply of air; 7th, the cuticle becoming covered with dust, &c.; 8th, accidental mutilations; 9th, change of climate; and 10th, undue supply of moisture. There is no doubt that under all these circumstances the bodies are most abundantly produced; but it is certain, from experiments which have been instituted, that when plants are in a state of disease produced by external circumstances, the fungi are developed most rapidly and in greatest numbers; and it is indeed a question altogether as to whether some disordered action of the tissues of the plant does not always occur previous to the development of the fungi. The species of this genus are very numerous; in fact, they seem to vary with every plant they attack; and have thus given rise to the specific names according to the plants upon which they are found. But our present business is only with such as indicate the diseases of wheat.

*Burnt ear* is a disease in wheat in which the fructification of the plant is destroyed, and, as it were, burnt up; hence its English name, and brand in German. Burnt-ear has often been confounded with "*smut*," which is a similar but distinct disease. They differ in this that the black powder which appears in the ear, in burnt-ear, is external; and the grain has either never been formed, or its coat has been destroyed, so that the whole ear appears black or burnt; the powder also has no smell, and being easily blown away by the wind or shaken off in the reaping, little of it adheres to the corn or is mixed with it when ground; and except the loss of so much grain as would have been contained in the sound ears, no great detriment arises to the quality of the corn. The *smut* or *pepper-brand*, on the contrary, is contained in the body of the grain, which retains its natural form, and is carried along with it into the barn. It is only in the threshing or grinding that the diseased grain, commonly called *smut ball*, is broken, when a fetid black powder is dispersed over the sound grain, which greatly deteriorates the flour, and renders the corn unfit for seed, the disease being perpetuated by this black substance.

Burnt-ears are generally observed in particularly moist situations, and some lands are much more subject to them than others. The disease has often been attributed to damp and warm fogs succeeding very dry weather, and hence it has been imagined that it was caused by the dew's lodging in the ears and producing rottenness.

But the microscope has shown that the black powder consists of the minute germs or seeds of a parasitical mushroom, which are developed in the growing ears, and live upon its substance. The plants attacked by this disease may be known long before the ear makes its appearance out of the sheath in which it is enveloped. There is a peculiar greenness observable in the leaf, and on minuter examination the young ear may be already seen attacked, by beginning to put on a spotted appearance of a blackish colour, which increases as it grows, and is perfected when the ear arrives at the state in which the flower should appear. In some cases the plant flowers partially or completely, and the fecundation takes place, so that the germ is developed, but it never approaches to maturity. Its outer skin is soon destroyed by the parasite, and converted into a black powder.

This peculiar minute mushroom is named "*uredo carbo*," which is distinguished from that which produces the "*smut*," which is called "*uredo caries*." They are easily distinguished by the size and smell. The "*uredo carbo*" is composed of much smaller globules and destitute of smell; both seem to be propagated, like other cryptogamous plants, by means of extremely minute seeds or germs, which are carried along with the sap into the circulation, and vegetate in the ear, where alone it appears that they find the conditions necessary to their growth.

The "*uredo caries*," then, is the cause of smut. When this plant appears on wheat it is said to have the bunt, smut-balls, or pepper-brand. The sporidia are included within the ovary of the fruit, are spherical, rather large, globose, and black; they may be detected in the young seed in the earliest states of the flower-bud, and when perfectly ripe it occupies the whole interior of the grain, but does not burst the skin, so that the grain retains the appearance of soundness. It has been calculated that a single grain of wheat may contain more than 4,000,000 of sporidia. Each of these sporidia probably contains millions of spores; some idea may therefore be formed of the minuteness of these plants, as well as their capacity for spreading themselves in every direction. Another peculiarity of this fungus is that it has a very disgusting smell, and the consequence is that the flour cannot be eaten. This flour is however, I believe, sold to gingerbread bakers, who by mixing it with treacle conceal its disagreeable odour. It does not appear to act injuriously when taken.

With regard to the burnt-ear, "*uredo carbo*," it has been doubted whether the disease is contagious, because some persons have failed in producing it by shaking the black dust out of burnt ears over sound plants. The reason of this is, probably that the exhaling vessels of the surface are not so well calculated to absorb extraneous matter, which can only enter by the spongules of the roots. And although it is much less dangerous than the "*smut*," being readily dispersed by the winds, yet it must more or less infect the soil, consequently the disease is more frequent where

it has appeared before; and where those grains, which are most subject to the disease, such as wheat, barley, and oats, have succeeded each other too rapidly. As it does not adhere to the grain, steeping and washing are not so certain remedies against the infection as in the case of "smut." The best preservative is to drain the land well and keep it "in good heart," so that the plants may be vigorous and able to resist the attacks of the parasite; for it is well understood that weak plants, as well as animals are much more exposed to the attacks of parasitical plants or animals than those which are vigorous and robust. A judicious change of crops, or a well-established rotation, will in general secure the corn which is sown in its proper course from the infection of the *uredo carbo*, or burnt-ear. Steeping the seed in brine or stale urine, and drying it with fresh burnt lime, is however a useful precaution wherever burnt-ears have appeared in preceding crops. Sulphate of copper or blue vitriol is considered by some agriculturists more efficacious than salt. As this disease is very common, it has obtained various names in different localities. In England it is best known by the names of blacks, brand, or burnt-ear; and it is often called "smut" from an opinion that it is a variety of the same disease which attacks the external parts of the fructification before the skin of the grain is formed; but this is a question at present undetermined.

With regard to smut, many remedies have been proposed for getting rid of the sporules from wheat about to be sown. It is quite certain that where the sporules or spawn are present in the seed sown, they will, unless previously destroyed, grow up with the plant, and be developed with the ripening of its fruit. Washing with clean water has been said to be effectual; lime water more so. A solution of blue vitriol seems to answer effectually; arsenic has also been recommended. It however appears that washing the seed with brine and drying it with quick lime sufficiently destroys the germ of the smut to prevent its propagation. The most common steep is water, in which as much salt has been dissolved as will enable it to float an egg. In this the seed may be left for twelve hours or more, then spread on a floor and mixed with as much quick-lime as will absorb the moisture, and allow it to be sown or drilled without the grains adhering to each other.

"*Uredo rubigo*" and *linearis* form yellow and brown oval spots and blotches of an orange and yellow colour upon the stem, leaf, and chaff of corn, and various grasses. The sporidia or spawn of "*uredo linearis*" are more oblong than those of "*uredo rubigo*," but they are frequently found together. When these plants are present, the disease of the corn is called rust, red-rag, red-robbin, and red-gunn. Rust and mildew are often confounded together, and in fact there is no essential difference in the character of the plant, which is the offspring of disease.

Mildew is a disease which attacks both living and dead vegetable matter, and is believed by

many to be owing to fogs, dew, meteors, and noxious exhalations; but in reality is caused by the ravages of these fungi. The mildew of wheat-straw is caused by a mildew fungus, called *puccinia graminum*; which is generated in cavities below the epidermis of the stem, and protrudes, when ripe, in the form of dull greyish-brown broken striae. This malady is sometimes of little importance to the subjects of its attacks, as it appears towards the close of the year, when the most essential of the vital functions of plants are fulfilled, or in so small a degree as to produce no appreciable effect upon the health of the plant so infected. But it very often, on the contrary, becomes a serious evil, destroying the straw of corn, and preventing the maturation of the grain.

Rust and mildew are not so certainly prevented as smut, and although there is reason to believe that the sporules or spawn of "*uredo rubigo*" are less taken up by the roots than those producing smut; as a dressing, the use of lime-water, or a solution of the sulphate of copper, should not be omitted; for although it may not always prevent rust, there are instances recorded in which undressed wheat has had rust, when dressed wheat from the same sample has not had it. Connected with the question of blight in corn, is, how far the "*berberis vulgaris*," the barberry bush, is the cause of rust in corn? There are numerous well-authenticated cases of blight occurring in the vicinity of barberry bushes and hedges; the evidence of the truth of it is fast multiplying. An explanation of this curious circumstance may be found in that of the barberry itself being subject to the attacks of one of these fungi, the "*oecidium berberidis*," similar to the one which produces the disease in wheat. The specific characters of the two, however, are very different; and it is only by having recourse to the supposition that many of the recorded species of *oecidium* are merely varieties changed in character by change of position, that such an explanation of the fact can be admitted. Besides the species of *uredo* mentioned, corn and all other plants are subject to a great number of these fungi, and wherever found are indicative of disease, and the produce of the plant will not be so great as when in a state of health. Sir Humphrey Davy found that a thousand parts of good wheat yield, on an average, 955 parts of nutritious matter, whilst specimens of mildewed wheat yielded only from 650 to 210 parts in the same quantity.

Wheat is also subject to a disease called *ergot*, an excrescence from the ear, which resembles a spur or horn, into which the seed is transformed. In rye it is named *secale cornutum*, or spurred rye; a specimen of which I hold in my hand. Whether this state of the grain be merely an altered state of the pistil, or the result of the puncture of insects, or of the development of a fungus, is doubtful; but the best authorities incline to the opinion that it is a fungus. It has been ascertained that the white dust sometimes found on the surface of the spurs will produce it in other plants, if sprinkled in the soil at its roots, and therefore appears to be analogous to the

sporidia or spawn of the admitted fungi. De Candolle considers the fungus to be the *sclerotium clavus*. The spur is of variable length, from a few lines to two inches, and is from two to four lines in thickness; when large, only a few grains in each ear are affected; when small, in general all of them are diseased. In colour, the exterior husk is of a blueish black or violet hue, with two or three streaks of dotted grey; the interior is of a dull whitish or grey tint. It is specifically lighter than water, which affords a criterion for distinguishing sound from tainted grain; when fresh, it is tough and flexible, but brittle and easily pulverised when dry. The powder is apt to attract moisture, which impairs its properties. Time also completely dissipates its peculiar properties. It has a disagreeable heavy smell, a nauseous, slightly acrid taste, and imparts both its taste and smell to water and spirit. Bread which contains it is defective in firmness, liable to become moist, and cracks and crumbles soon after being taken from the oven. The chemical analysis shows that its constituents are a heavy smelling oil, fungus, albumen, osmazome, waxy matter, and an extractive substance of a strong peculiar taste and smell; in which, from experiments on animals, we are led to infer that its active principles reside. To this extract the name of "ergotive" is given.

Spurred grain occurs more frequently in some countries than in others, and more abundantly in some seasons than in others. Grain raised in poor soil, and in a humid close air, such as the district of Sologne, in France, is more liable to be affected; but it may be brought on at any time by sowing in a rich damp soil, and watering the plants freely in warm weather. A very rainy season is apt to produce it. Bread prepared from grain which has a large admixture of the spur occasions very distressing and often fatal effects, which are shown more or less rapidly according to the quantity present in the food and the circumstances in which those are placed who used it. They have been observed to be most serious in seasons of scarcity, when various causes concur to produce scarcity. The symptoms which result from spurred grain, when used for a considerable time, are of two distinct kinds—one of a nervous nature, characterised by violent spasmodic convulsions; the other a disordered state of the constitution which terminates in the cutaneous disease called gargarona, ustulagina, or dry gangrene. A single dose of the spur, not diluted with sound flour, excites effects which vary according to the quantity taken and the state of the person, and are chiefly limited to the stomach and intestinal canal, if the dose be small; but if so much as two drachms be taken, it causes giddiness, headache, flushed face, pains and spasms in the stomach, nausea and vomiting, colds, purging, and a sense of weariness and weight in the limbs. In the case of parturient females, when given at a certain stage of the labour, it is admitted by most medical practitioners and writers (and here I speak from long personal experience), that it does produce speci-

fic effects, and to expedite the labour in a very marked manner. It is by some persons alleged to produce hurtful effects upon the child; if so, it arises from employing the remedy at an improper stage of the labour, or under circumstances in which it ought not to have been employed at all. In my practice the greatest number of still-born children have been in those cases in which the ergot has not been used.

This disease, ergot, is not confined to wheat or rye alone, but attacks many other individuals of the family. Phœbus enumerates 31 grasses liable to it; and in the summer of 1838, we were told by Pereira, an eminent botanist, that nearly all the grasses growing in Greenwich marshes were found ergotised. I am not aware that any experiments have been made with the ergot of any of the gramineæ except rye. I think it is highly probable that the ergot of other grains produces similar effects to that of rye; and this particularly merits the attention of the farmer, as I see no physiological reason why cattle should not be effected by it, as well as the human race. The following statement extracted from the "French Journal of Practical Medicine and Surgery," in the year 1841, appears to confirm my opinion upon the subject:—

"There has been in the neighbourhood of Troix Croix an epidemic of abortion among cows, which has caused much consternation among the farmers. M. Bodin, Director of the School of Agriculture, has discovered that the grains of rye, and many other of the gramineæ or grasses, contained a considerable quantity of ergot; and this he concludes was the cause of the animals aborting. The observation merits attention: as when the nature of the evil is discovered, attention may be turned to the discovery of a remedy, as change of pasture," &c.

It is a noble truth that nothing has been created in vain; but the mysteries of Providence are too inscrutable for the investigation of the inhabitants of this sublunary world. How magnificent and various are the works of Creation; and with what wonder and awe do we not look from "Nature up to Nature's God." My present duty is, however, not to investigate the uses of "created beings," but to describe some that are highly destructive to the farmer, and to point out the best known means of counteracting the mischief they cause.

Unimportant as insects may appear to the casual observer, their depredations are of a fearful character when whole armies of them take possession of a field; the loss and anxiety which they occasion are so great that the agriculturist cannot be indifferent to the information which the energies and exertions of scientific men have brought to bear upon any subject connected with the successful cultivation of the soil, and more especially connected with the produce which constitutes our "daily bread." The importance of minutely studying the natural history and economy of those "living atoms," which so greatly lessen our produce and the farmers' profits, cannot be called in question. It is only by

a complete knowledge of the nature of the disease that the physician can hope to prescribe a remedy and effect a cure; neither can the subject be devoid of interest to any one, whether an "inhabitant of the crowded city" or the quiet hamlet; whether he exercises the mechanical arts or cultivates the soil. For the better comprehending the subject I will just premise that insects are scientifically divided by entomologists into masses named "orders." Orders are subdivided into lesser groups called families; and these again comprise smaller companies, called genera; and each of these genera consists of a greater or lesser number of species, which sometimes vary in size and colour, and such are termed varieties; and it may be useful to explain the several states or changes which, with very few exceptions, mark the life of every insect. 1st. The female lays an egg; which egg produces, 2nd, a larva; popularly known as a maggot, gentle, caterpillar, canker-worm, or grub. The larva continues to feed until full-grown, changing its skin several times as it increases in size; when it becomes, 3rdly, a pupa, chrysalis, aurelia, or nymph. In order to undergo this change, the larva either enters the earth, as most naked maggots do, or, like hairy caterpillars, spins for itself a web; but some caterpillars merely suspend themselves to a wall or rail. In this state they remain through the winter, without any symptoms of life except when touched, until the substance of the inclosed larva has become perfected into the various members of its first parents; when 4thly, the imago, or perfect state of the insect is produced—a flesh-fly, a butterfly, a rose-moth, a click-beetle, turnip-fly, wheat-fly, &c.

*Corn Weevil.*—Wheat is subject to the attacks of insects, which prove highly destructive to the crops. The first of these I shall notice is the corn weevil. Weevil is the name popularly applied in England to the beetles which constitute the genus *curculis* of Linnæus, now the type of a large family of coleopterous insects, distinguished by the prolongation of the head, so as to form a sort of snout or proboscis. The weevils are distinguished by the singularity and often beauty of their forms and colours. The splendid diamond beetle, the wing cases of which, when placed under a microscope, appear gorgeous and brilliant. Many of them are adorned with the most vivid metallic lustre; and some in intensity and brightness of hue emulate "gems," and have been used for the purposes of ornament. The family includes very numerous genera and species, and are distributed widely over the world. The weevils are interesting in another point of view, for many of them are dangerous enemies to the agriculturists, destroying fruits, grain, flower, leaves, and stems. These insects are all furnished with a long and slender rostrum or beak, provided at the extremity with a very minute pair of horizontal jaws. This singular instrument is sometimes nearly equal in length to the body of the insect itself, as in the case of the present species. It is about a quarter of an inch in length, and of a dull or pitchy brown colour, the

wing cases marked with deep punctured lines, the legs rusty red; it makes use of the beak or rostrum to perforate the skin of the grain; in this hole she places a single egg, then cleverly covers the opening with some viscous substance with which she is provided, so that no sign of it appears, as the maggot is found in the centre of the grain without trace of aperture. It is often very abundant in old granaries. The bread made from the affected flour is supposed sometimes to be wholesome. Free ventilation and a constant shifting of the grain are important remedies. This insidious enemy, whose attacks are for a long time concealed from view, goes on with the work of devastation while the grains on which it is feeding has the appearance of being perfectly whole or sound. No fewer in number than 500 species are described as inhabiting Great Britain. It cannot therefore be matter of surprise that we suffer greatly from their ravages. The method taken by the corn weevil seems the very best adapted for the security of their progeny and for the destruction of the grain. The female insect buries herself in a heap of grain for the purpose of laying her eggs; and she would appear to possess the knowledge that the contents of a single grain are just sufficient to maintain the larva throughout the period of its growth, and that if two eggs were deposited in one grain the larva resulting therefrom would be half starved. One female will inoculate in one season, it is calculated, 23,600 grains, soon after which it dies; while the eggs, according to the state of the temperature, were more or less quickly hatched. Under favourable circumstances, not many days elapse before a small white maggot issues from the egg, and begins feeding upon the flour of the grain by which it is surrounded. The body of this minute creature is very soft, but the head is of a firmer consistency, supporting a strong pair of jaws. It gradually enlarges its abode; but as the maggot grows, just in proportion as the substance of the grain is demolished, there is no appearance of the grain being shrivelled externally, or any indication of unsoundness. At length the whole of the interior is scooped out, but it is now prepared to change into the pupa or chrysalis state; the pupa is white and transparent, and lies without motion in its cell until the period of its final transformation into a perfect insect, and gnaws its way out of prison, leaving behind an empty husk. The time occupied in these changes is much influenced by the weather, but the average duration of the life of the insect, from the egg to the perfect state, has been estimated at from forty to forty-five days. In this country they are only vigorous during the warmer months of summer. The southern districts of England are more subject to its attacks than the northern. It is probable that the perfect insect, whilst buried among the grain, subsists upon it, and thereby also assists in the destructive process. I am aware that Mr. Mills differs from Mr. Shaw and other entomological writers as to the mode the female takes of laying her eggs; he considers that they are laid in the blossom, and

that the corn is found with the egg in its heart. Which account is the true one I will not presume to decide, but I consider that Mr. Mills's observations require further confirmation. Having described the habits of the insect, the next important question for consideration is as to the best method of preventing the evil it inflicts. The mode of detecting the presence of the enemy in the grains is at once easy and simple, yet effective; the infected portion, being deprived of a part of its farina, when immersed in water, floats upon the surface. The removal of the bad from the good is, however, no such easy task in an extensive granary; but it has been suggested that, by passing the whole of the corn through a winnowing machine, the damaged portion, being lighter, would be thrown out in the same manner as chaff and light corn in ordinary cases. Mr. Mills, by placing the egg in a temperature of 110° F., succeeded in hatching it; but he found that a temperature from 130 to 140° destroyed it. A Mr. Wilkinson established a room heated with hot-water pipes, in which he receives 800 bags of wheat at a time; these became heated through at about 135°; and the wheat, when resifted, is perfectly cleansed from these noxious insects, and makes quite as good bread as before. Some of the wheat which had been subjected to this degree of heat was planted, grew up, and was found to be uninjured. For the purpose of destroying the perfect insect, before it has had time to lay its eggs, the following is recommended:—When the insects that have passed the winter in a torpid state are beginning to move about among the corn, and become active, a small heap of grain should be placed apart from the principal store as a decoy; while the principal store should be turned over and tossed about as much as possible; as these insects are naturally fond of quiet, they will, if this treatment be repeated at intervals, leave the principal store, and repair in great numbers to the decoy heap, where they are left undisturbed; when a sufficient quantity are accumulated there, the small heap is to be saturated with boiling water, which will instantly cause their destruction; the corn of the heap may then be separated from the dead insects by sifting. This method appears to answer well; and let it be remembered that the destruction of a single perfect insect is of more consequence than that of many larva. Good ventilation, and frequent shifting of the grain, as I before observed, are very important measures; but nevertheless the production of corn weevils cannot be hindered by these means alone, in situations where they breed freely, unless indeed it were possible to keep down the temperature of the granary, below hatching point.

(To be continued.)

## ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A weekly Council was held at the Society's House in Hanover Square, on Wednesday, the 24th of April; present, His Grace the Duke of Richmond, K. G., in the Chair; Lord Carew; Hon. George Henry Cavendish, M.P.; David Barclay, Esq. M.P.; Thomas Raymond Barker, Esq.; John Raymond Barker, Esq.; W. R. Browne, Esq.; Edward Buller, Esq., M.P.; Rev. Thomas Cator; Henry Colman, Esq.; E. D. Davenport, Esq.; J. Evelyn Denison, Esq., M.P.; Captain Forbes, R.N.; Humphrey Gibbs, Esq.; Brandreth Gibbs, Esq.; H. I. Grant, Esq.; C. Hillyard, Esq.; Rev. E. C. Keene; F. Manning, Esq.; Alexander Ogilvie, Esq.; Henry Price, Esq.; Professor Sewell; H. B. Simpson, Esq.; J. Spencer Stanhope, Esq.; W. R. Crompton Staunfield, Esq. M.P.; Rev. T. Smith Turnbull, T. Tweed, Esq.; and Henry Wilson, Esq.

*Eye Draining Tiles.*—Mr. Wilson, of Stowlangtoft Hall, near Ixworth, Suffolk, presented a specimen of the Tiles used for the "eyes" in under-drains, and made at Woolpit, in Suffolk: along with the two bottoms on which the tile is intended to rest. This tile is nearly a foot and a half long, and 6 inches high; having at one end the common shape in its transverse section of the capital letter U turned downwards, with a middle interior width of 2 inches and a half. From this wider end, the tile, by lateral compression while in the raw unburnt state, had received a tapering diminution of its width to the other end, where the aperture being reduced to a vertical slit, six inches high by three-quarters of an inch wide, all rabbits, rats, and other animals too large to pass through the opening, would be kept out of the drains, and injury from their operations thus prevented.

*Model Experiment.*—Mr. Barclay, M.P., reported to the Council the progress made at the last meeting in arranging the plan of the Model Experiment proposed by Mr. Miles, for trial by such Members of the Society as could conveniently join in it. An interesting discussion then ensued in reference to results obtained in the use of Guano and Farm-yard Manure. The Rev. Thomas Cator, of Skelbrooke Park, near Doncaster, had found an application of 300lbs. of guano per acre to a potato crop, strewed upon the ground when they were ready for earthing, equivalent to 18 loads of fold manure applied in the usual way; and having last year manured a bean crop with guano, pigeon-dung, rape-dust, and fold-manure, he found, now the wheat had come up this Spring, a decided evidence of the superiority of guano on the 5 lands of the bean-field to which that manure had been applied: he considered it as one of the cheapest hand-tillages, while the fold manure was most advantageously reserved for the grass and clover crops.—Mr. Davenport, of Capesthorne, Cheshire, regarded guano as one of the most valuable manures; having now had three or four years' experience of its use: and he considered in general that 3 cwt. of guano was equal to 20 tons of farm-yard manure. He spoke of the guano in its unadulterated state as imported. His own supply had been of the Peruvian guano, furnished to him by Mr. Myers, of Liverpool, at 10*l.* per ton. He believed that the African guano was substantially the same in its general character, but that it contained 25 per cent. of water, while the Peruvian contained only 10 per cent.; and assuming the Peruvian variety as 10*l.* per ton, Mr. Bernays had stated the relative value of the African guano to be as 7*l.* per ton. Notwithstanding the immense quantities already sold in this country, Mr.

Myers had informed him that he had at present orders for 3,000 tons which he was unable to supply. The hardest samples were the best, and as it was known to be frequently adulterated with one-third of an inferior quality, it was most advisable to purchase it from a direct importer of the article, and in the original packages. His practice was to apply a mixture of half a ton of finely-worked bones and two hundred weight of guano, per acre, to a crop of potatoes or turnips. He recommended powdered gypsum to be scattered by handfuls in the farm and stable yards, and mixed with the straw and liquid manure; or should that not be done, then to put layers of it in the manure-heap every three or four feet: by means of this proceeding, the ammonia, instead of escaping into the air in the state of gas, was retained by the gypsum. By these new systems of manuring, he was quite sure the same results could be obtained at one-quarter the former expense.

—Mr. Hillyard, of Thorpeldans, near Northampton, would engage in no trial of new manures, unless they were susceptible of being brought into general farming use, and the experiments made after a white straw corn crop.—Mr. Gibbs thought that it was desirable to make the trial after a white grain crop, whenever the given weight of the turnips was the point to be ascertained. Mr. Barclay, Mr. Hillyard, and the Rev. Thomas Cator then agreed to undertake the trial of the Model Experiment proposed, and under such conditions as might hereafter be finally arranged.

*Ox and Horse Teams.*—The Duke of Richmond having called the attention of the Council to the difference of opinion prevalent on the subject of the employment of oxen in ploughing, thought it would be an important topic of inquiry, to be instituted by such of the members residing in different counties as would undertake to gain for the Journal Committee actual facts and results of trial and experience in their use under different circumstances, both as to the difference of expense and the amount of work performed.—An interesting discussion then took place on the comparative advantages in the employment of horses and oxen in farming work, when the Council resolved, on the motion of Mr. E. Buller, M.P., that the following gentlemen should be requested to make inquiries on this subject, and report their communications to the Journal Committee:—Colonel Challoner, Henry Blanshard, Esq., Rev. Thomas Cator, C. Hillyard, Esq., W. R. Browne, Esq. The following are the principal points to which their attention is directed:—1. The ages and breed of both horses and oxen, with the time at which they were first put to work. 2. The working condition of the horses and oxen; whether regularly employed on the same farm, and for what period; with a statement on the nature of the soil. 3. The amount of work, whether on road or field, of each pair of horses and oxen; together with remarks upon the manner in which that work has been performed, and its separate value. 4. The cost of maintenance and farriery of each pair of horses and oxen, including the separate charge for management. 5. The cost, or presumed value, of each pair of horses and oxen, with their gear, when put to work; and their value at the close of the comparison. 6. The comparative number of oxen or horses which are required to do the same work. 7. Whether there is a general tendency in England to substitute the ox for the horse in agriculture, particularly in ploughing. 8. Whether this tendency exist more in particular counties, and if so, to what motives it may be attributed. 9. Whether such preference has yet done any evident injury to the employment of horses. 10. Whether there has been remarked any deterioration in the breed of horses

generally; or if, on the contrary, the mixture more or less of pure blood in all the breeds has produced a sensible improvement and a more easy sale. 11. Whether this branch of commerce is failing or prospering in the United Kingdom. 12. Results of trial and observation on any other topics of the inquiry.

*Destruction of Rats.*—Captain Forbes, R. N., of Winkfield Place, Windsor, having called the attention of the Council to the fact that many thousand quarters of grain are annually destroyed by rats, proposed that a premium should be offered by the Society for the best mode of effecting their destruction.

Copies of Mr. Hannan's Treatise on the economy of waste manures, and on the nature and use of neglected fertilizers; the American Agriculturist; and the Jamaica Times; were presented to the Society by their respective authors.

The Council then adjourned to Wednesday, the 1st of May.

A monthly Council was held at the Society's House in Hanover Square, on Wednesday, the 1st of May. Present: The Rt. Hon. Earl Spencer, President, in the Chair; Duke of Richmond; Earl of Rosebery; Viscount Hill; Lord Braybrooke; Henry John Adeane, Esq.; Colonel Austen; David Barclay, Esq., M.P.; Thomas Raymond Barker, Esq.; John Raymond Barker, Esq.; J. Staples Browne, Esq.; French Burke, Esq.; Rev. Thomas Cator; Colonel Challoner; F. Clifford Cherry, Esq.; Henry Colman, Esq.; Sir Andrew W. Corbet, Bart.; George Cottam, Esq.; E. D. Davenport, Esq.; J. Evelyn Denison, Esq., M.P.; W. Feilden, Esq., M.P.; A. E. Fuller, Esq., M.P.; Brandreth Gibbs, Esq.; Henry Handley, Esq.; C. Hillyard, Esq.; W. Fisher Hobbs, Esq.; John Hudson, Esq.; W. H. Hyett, Esq.; Sir John V. B. Johnstone, Bart., M.P.; John Kinder, Esq.; William Miles, Esq., M.P.; A. Ogilvie, Esq.; W. W. Pendarves, Esq., M.P.; Henry Price, Esq.; Philip Pusey, Esq., M.P.; Francis Pym, Esq.; J. Allen Ransome, Esq.; Professor Sewell; William Shaw, Esq.; J. Villiers Shelley, Esq.; R. A. Slaney, Esq.; J. Spencer Stanhope, Esq.; Sir Harry Verney, Bart.; and Henry Wilson, Esq.

*Finances.*—Mr. Raymond Barker, Chairman of the Finance Committee, presented to the Council the monthly report of the state of the funds of the Society; from which it appeared that on the preceding day the current cash-balance in the hands of the Bankers amounted to 1,422*l.*, independently of the sum of 1,000*l.* remitted from Southampton, as a subscription, to meet the heavy estimated expenses to be incurred by the Society at its ensuing annual Country Meeting at that place in July; and that the stock invested in the public funds amounted to 7,700*l.* The Chairman further reported a communication received from Mr. Colville, M. P., announcing the final and satisfactory adjustment by the Local Committee of the only outstanding claim on account of the Derby Meeting.

*Prize Essays.*—Mr. Pusey, on the part of the Journal Committee, reported the following recommendations in reference to Essays sent in hereafter to compete for the Society's Prizes:—1. That, in future, competitors should be required to enclose their names in a cover on which only their motto and the subject of their papers, and the number of that subject in the Society's Prize List, should be written. 2. That the Chairman of the Journal Committee alone should be empowered to open the motto-paper of such essay not obtaining the prize, as he may think likely to be useful for the Society's objects; with a view of consulting the writer con-

fidentially as to his willingness to place such paper at the disposal of the Journal Committee.—These recommendations were unanimously adopted by the Council.

*Southampton Meeting.*—The Council gave final directions for the completion of the contracts for the various works connected with the Show-yard, and Pavilion at Southampton, with Mr. Manning, agreeably with the plans already adopted for those purposes; Mr. Parkes being requested to draw up, as usual, the Report of the Implements exhibited and tried at that meeting—the Stewards granting him every facility in effecting that object.

*Country Meeting of 1845.*—Colonel Challoner, as Chairman of the Committee appointed at the last Council for examining the various plans and other documents received from the authorities of Shrewsbury and Chester, and reporting the result of a personal inspection, by a deputation from their body, of the sites respectively offered at each of those places for the purposes of the Society's Country Meeting of next year, informed the Council of the careful scrutiny the Committee had instituted into the whole of the details submitted to them; and concluded by laying before the Council the joint and very valuable Report of Colonel Austen, Mr. H. Gibbs, and Mr. B. Gibbs, who as such deputation had visited Shrewsbury on the 26th, and Chester on the 27th of April last. This Report detailed the critical and minute examination which the deputation had successively made of the various sites proposed at each place for the accommodation of the Society and the purposes of the meeting; and having been unanimously adopted, the Council received the deputations then in waiting from the authorities of Shrewsbury and Chester. *Shrewsbury:* Lord Hill and the Hon. R. H. Clive, M. P., introduced the deputation from Shrewsbury, consisting of J. T. Smitheman Edwards, Esq., the present mayor, and Edward Haycock, Esq., the late mayor of that borough. *Chester:* R. H. Barnston, Esq., chairman of the Chester Local Committee, appeared on behalf of the authorities of that city. The President addressed to each of these deputations a series of inquiries on the various points of information required by the Council, in order to enable them to arrive at a just decision on the question before them; and the deputations respectively having made such replies to these enquiries as they were instructed, withdrew; when the Council proceeded to a consideration of the claims of each place for the Country Meeting of 1845, and a discussion on the respective merits of the localities proposed for the purposes of the occasion. On the motion of Mr. Shelley, seconded by the Duke of Richmond, it was then unanimously resolved that the annual country meeting of the Royal Agricultural Society of England for the year 1845 should be held at the town of Shrewsbury, on the condition that the deputation on the part of the authorities of that borough would engage to enter into such stipulations with the Secretary, on the part of the Council, as would embody in writing the substance of what had then passed in conversation during their interview. The deputation from Shrewsbury on again entering the council-room, and being informed by the President of the unanimous resolution of the Council, returned suitable thanks for the honour thus conferred on the locality they then represented, and cheerfully acquiesced in the condition annexed to the decision.

*Annual Elections.*—The Council then proceeded, agreeably with the bye laws, to nominate, by ballot, the list of Members of Council recommended by them for election at the ensuing General Meeting on the 22nd of May, at ten o'clock (instead of twelve, as

formerly) in the forenoon, and to give orders for due public notice of that meeting by advertisement, as usual; as well as to agree to the form of the Provisional Prize Sheet for 1845 to be submitted, in proof, to the Members present on that occasion, for the favour of suggestions in reference to the nature, amount, and conditions of the prizes proposed, to be taken into final consideration at a Council specially appointed for that purpose, at the end of June.

*Special Council.*—The President gave notice that, in order to meet the views of Mr. Shelley in his proposal of an adjournment of the Council over the period of the ensuing Annual Country Meeting, it was his intention to give orders for the summoning of such special Councils, to be held at certain stated dates and places during the period of the Country Meeting, as on due previous consideration might be found requisite. Mr. Shelley expressed his entire satisfaction at this arrangement, and immediately withdrew the motion of which he had given notice at the last Monthly Council.

*American Seeds and Implements.*—Mr. Colman, the American Agricultural Commissioner, presented to the Council a most interesting collection of Seeds and Implements from the United States, with the following memoranda of their respective merits. 1. *Plough*, made by D. Prouty and Co., Boston, Massachusetts. This Plough is used in the United States as a small ox or two-horse plough, and works well both in sward and old land; it will turn the furrow-slice completely over, and shut in level, or lay them at any desired angle, completely covering in all vegetable matter on the surface. The rod from which the draft is taken is capable of being elevated or depressed to give the right pitch into the ground; so that it will keep its depth and yet not bear too hard upon the wheel. It can also be moved at pleasure to the right—to cause the plough to take more furrow, or to the left—to cause it to take less. Upon the arrangement of this will depend much of its success in work. It is very desirable that it should be tried, and a good ploughman made familiar with its mode of working, before a final opinion is passed upon its character. This plough being made on what is called the centre-draught principle, has its standard and land-side inclined so far to the right as to admit of the beam being placed over the centre of resistance and parallel with the landside, and will take its width of furrow when drawn from the centre of the beam with such team as used in America. To persons accustomed to plough with the landside and standard perpendicular, this may appear singular; but to make good work it should run level as it stands on level ground. 2. *Plough*, made by Messrs. Ruggles, Nourse, and Mason, of Boston, Massachusetts. This plough is calculated for deep-ploughing, being both higher and longer than any other ploughs in the United States; it had been greatly approved at various trials, and had taken a large sweep of premiums at many of the public shows. 3. *Grain-Cradles*, for cutting and laying all kinds of grain in a manner to be easily taken up by the binders, and with great expedition. One of the cradles then presented had been long known and approved in New England; the other was of a novel construction, and stated to be on a very improved plan, but Mr. Colman had not seen it before. 4. *Scythe-Snaiths*, made upon an improved and approved pattern; and snaiths made in this way are always alike, the wood being first softened and bent in steam, and then permanently fixed in the desired form, by being allowed to dry in a mould. The nabs or handles are capable of being screwed or unscrewed, so as to be fixed in a desired position without wedges; and

a brass-socket is sunk in the end of the snath, so that the hook of the scythe may be held firm, and not become loose by wear, so as to require wedging. 5. *Weeding-knife*, for turnips or other small plants, of a peculiar construction. 6. *Scuffle-hoe*, on a new plan, for garden use. 7. *Tree-scraper*. 8. *Hoes*.—Two common narrow hoes, made with a socket for the handle, and with the blade neatly riveted. 9. *Manure-fork*, of cast steel, made by Mr. Henry Partridge; very light and elastic, and would be broken only with much ill-usage. The collection of seeds which accompanied these implements, consisted of millet seed, Herd's grass or Timothy seed, broom-corn seed (along with brooms made of the grass), several varieties of Indian corn (maize), sweet corn, Tuscarora corn, and Canada corn. Mr. Colman stated that another plough was on its way to England, as a further present from himself to the Society. In addition to these donations, Mr. Colman laid on the table several private copies of the first part of his "European Agricultural Tour," for distribution among such of the Members as would accept them, from whom, and all other readers, Mr. Colman expressed an earnest wish to receive both candid criticism, and such direction in the acquisition of useful information, as would enable him to render the succeeding part of his work more calculated to fulfil the object he had in view in its publication, namely, to advance the common cause of agricultural improvement in both countries, and by an interchange of communication to promote that perfect understanding on every subject which it was so highly important in a national point of view should constantly subsist between two countries so truly kindred. On the motion of the Duke of Richmond, the cordial thanks of the Council were voted by acclamation to Mr. Colman for his very important and interesting collection of presents, the value of which in the estimation of the Council was enhanced by the manner in which he had thus testified his respect towards the Society. Mr. Colman in acknowledging the thanks of the Council, would not have it inferred by the remotest implication that in thus laying before them specimens of the ingenuity of American art in the construction of implements of husbandry, that they were intended as evidences of any triumph over the distinguished implement makers of the old country, but simply as instances of that interchange which he was so desirous to effect, and to which he had alluded. Of improvements which might be found useful to both countries. He felt deeply grateful for the personal kindness he had everywhere received in his progress through this country. He had now been connected more than forty years with the pursuits of agriculture, and he found his satisfaction in its unbounded resources only increase with years, inasmuch as with the extension of the benefits of agriculture there was also a diffusion of the blessings of moral improvement. Mr. Shelley and Mr. Miles, as the Stewards of Implements, informed the Council that they had already made arrangements for the trial of the American Ploughs at the Southampton meeting: a complete and ample trial would be given them in the same fields in which the other ploughs were tried; and they should rejoice at any result in their favour which might lead to further improvement in our own agricultural implements. The President then conveyed to Mr. Colman an expression of his thanks for the services he had rendered to the Society in his official capacity, as the Agricultural Commissioner of the United States, and in that of an Honorary Member of the Society, in favouring the Council so often with his personal attendance at their meetings.

*Model Experiment*.—Mr. Miles communicated to the Council the following arrangement for the model experiment which Mr. Barclay, Mr. Hillyard, and the Rev. Thomas Cator had consented to try, and in which he hoped other members of the society would be induced to join.—*Seed*: Skirving's Swedish turnip (to be procured of Messrs. Thomas Gibbs and Co., seedsmen to the society, corner of Halfmoon-street, Piccadilly); to be sown after a white straw corn crop.—*Manures*: Common dung, 20 tons per acre; Peruvian guano, 3 cwt. mixed with 9 cwt. of ashes; African guano, 3 cwt. mixed with 9 cwt. of ashes; Potter's artificial guano, 3 cwt. mixed with 9 cwt. of ashes.—*Distances* between the rows, 18 inches, and 27 inches. If it be desired to allot half an acre to each kind of manure, and the half acre be divided into two lots for the two breadths of rows, there will be eight trial lots, each of one quarter of an acre. Where the rows are at 18 inches distance, if they are 110 yards in length, there will be 22 such rows in each single lot; to which one quarter of the above quantities of manure will be severally applied. Where the rows are 27 inches distance, 14½ rows will be the extent of each lot, which will receive the same quantities of manure.

Numerous presents were received, and thanks ordered for them.

The Council then adjourned to Wednesday, the 8th of May.

A weekly Council was held at the Society's house in Hanover-square, on Wednesday, the 8th of May. Present: The Right Hon. Earl Spencer, President, in the chair; Lord Camoys; Hon. R. H. Clive, M.P.; T. Raymond Barker, Esq.; W. Hodgson Barrow, Esq.; T. W. Bramston, Esq., M.P.; W. R. Browne, Esq.; E. Buller, Esq., M.P.; F. Burke, Esq.; Rev. T. Cator; Colonel Challoner; H. Colman, Esq.; E. D. Davenport, Esq.; James Dean, Esq.; W. Feilden, Esq., M.P.; A. E. Fuller, Esq., M.P.; H. J. Grant, Esq.; Brandreth Gibbs, Esq.; G. Kimberley, Esq.; Sir C. Lemon, Bart., M.P.; A. Ogilvie, Esq.; Josiah Parkes, Esq., C. E.; E. W. W. Pendarves, Esq., M.P.; W. J. Pickin, Esq.; H. Price, Esq.; E. A. Sanford, Esq.; Professor Sewell; W. Shaw, Esq.; R. A. Slancy, Esq.; J. Spencer Stanhope, Esq.; T. Tweed, Esq.; and F. Woodward, Esq.

*American Seeds*.—Mr. Colman, the Agricultural Commissioner from the United States, favoured the Council with the following account of the American seeds he had presented to the Council at the former meeting; and which had been distributed among 30 members of the Council for trial, and their reports respectively on the results of their cultivation.—"The *Millet* is cultivated both for its seeds and its use as hay. I have never myself cultivated it for any other purpose than as hay; and, when well grown and cured, no fodder is more relished by cattle. Of its nutritive properties I have no doubt; but I do not know that it has, for this object, been subjected to any chemical analysis. It requires a rich, well-tilled soil. The advice is to sow a peck of seed to an acre; but the produce, in that case, is coarse. I advise a bushel to an acre, and the crop is much finer, stronger, and better. It is sown broadcast, as other grass seed is sown. It is an annual. It should be sown in May, and the earlier the better. I have sown it on good land in May, at the rate of one bushel of seed to the acre; and, having cut and well-made the hay, have had the land cultivated, exactly measured, and the product

weighed by a sworn measurer at the public scales. The crop was at the rate of three tons of 2,000lbs. (which is our customary ton) per acre of as good fodder as I could place before my stock. In another case, when the crop of grass was very short, I ploughed up a clover ley, from which a crop of clover had been taken, and sowed it with millet, and obtained a very good crop, as well as I can remember, of more than a ton per acre. The hay, however, in this case, was of the nature of rowen, or second crop. If I could have had access to my Farm Journal, I could have given the exact amount in either case. I cannot see any reason why it may not be a good crop in England; though I will not say that it has preference over other grasses already cultivated in England, and especially over the Italian rye-grass, which I never saw until I came here, and of which, last year, I saw the surprising growth of thirteen feet in three successive cuttings, samples of each cutting being shown together. The *Broom Corn* (*sorghum saccharatum*) is a plant much cultivated in New England for its brush or seed-head, which is used in the manufacture of brooms, especially for carpet-brooms. A good deal of this brush is imported into England, to be manufactured into brooms. It is a beautiful and hardy plant, an annual, but requiring, in order to ripen its seed, rather a long season. The average yield of seed is about 35 bushels per acre, and of brush about 700 lbs.; half a pound, or more, being the usual complement for a single broom. I have known more than 100 lbs. of seed obtained per acre—but this was a very extraordinary case—and 1,000 lbs. of brush. The seed for feeding stock is estimated at two-thirds the value of oats. By some of the best farmers in New England the blades and stalks are saved for feeding their young stock in winter, and the produce of an acre in this way is estimated as equal to a ton of hay. I do not think that the plant can be ripened in England; but the brush, if gathered and dried in a green state, is deemed to make better brooms than when gathered in a perfectly dry and mature state. I am inclined to believe that to this state it may be grown in favourable situations in England; and if so, it would add to her useful products, and in the manufacture of brooms furnish much useful occupation. The society will understand, however, that I express no strong confidence in the case. My knowledge of the average temperature of England would not justify me in doing that; but the experiment may be worth making, as it may be made in this case with little trouble and no expense. The customary way of sowing it is in drills, two feet apart, and to drop the seed in the drills about eighteen inches apart, putting thirty or more seeds in a place; and, if it comes up well, allowing eight or ten plants to stand. It requires to be kept clean from weeds, and the land should be rich, dry, and friable, with a warm aspect. It is gathered by breaking off the stem bearing the brush about 2½ feet from the top; and when it is well dried, the seeds is scraped off, usually by a machine for that purpose; but it may be easily done by drawing it through a common flax comb or hatchel. The brush is then made into brooms, and the remainder of the plant gathered for fodder. Many farmers, however, in my opinion with culpable improvidence, suffer it to lay waste, and when dry enough, burn it upon the ground.—*The Herds-Grass* or *Timothy* (*Phleum pratense*), is certainly not unknown in England; but I have not seen it cultivated in those parts which I have visited. It is a hardy grass, perennial, and, in good land, yields well; and, as hay, ranks among the most valuable grasses. It delights in a strong soil, and should be sowed at the rate of half a bushel or three pecks of seed to an acre.

With us, in the United States, it is sown with clover and red-top, a species of *Agrostis*, mixed with it; but while the others pass away, this retains its place. I have known more than four tons obtained upon an acre; and in one case, twenty-nine tons and a fraction, chiefly of Herds-grass, well made into hay, were obtained from six acres in one season. The principal objection to it is, that it does not return again as soon after it has been cut as other grasses; but probably this is somewhat owing to very spare sowing.—Of the several kinds of *Indian Corn* (*Zea Mays*) which I present to the Society, I can have little hope of any of them being brought to maturity in England, unless peculiarly favoured by a warm season. The sweet corn, with a shrivelled kernel, is deemed in the United States a most delicious vegetable, eaten in a green state; and so is the Tuscarora (so called from the tribe of Indians among whom the seed was first obtained), but they require a long season for ripening; yet they may be sufficiently advanced to be eaten green. In this case the ears are gathered when in the milk, and, being boiled, the grain is eaten from the cob with butter and salt. As it would be difficult for an Englishman to eat oatmeal porridge with, if I may so express myself, a Scotch accent, it may be equally difficult for him to relish boiled Indian Corn as a New Englander would do; but I know no better vegetable. The Parker-corn, a large yellow ear, is an earlier variety than either of the two above-mentioned; but the small yellow ear is a Canadian variety, and very early, coming to perfection in from 60 to 70 days. It is possible that this may succeed. This plant requires rich, warm land, strongly siliceous, and may be cultivated like the broom-corn, in drills two and a-half feet apart, and 18 inches apart in the drill, depositing five or six kernels in a place, covering it about an inch or two deep, and leaving about four plants to stand. The ground should be well enriched with manure spread; or the progress of the plant would be hastened by putting a small parcel of manure in the spot where the seeds are deposited, under them, and covering it before planting with a little of the soil. After that the ground requires to be kept clear of weeds, and occasionally stirred with a hoe. I am strongly inclined to believe that Indian Corn might be cultivated in the more southern parts of England, as a crop to be fed to cattle and horses, green, as here vetches are fed to them. No plant yields more stem and leaves, and no fodder can be better. With us it is often grown in this way for milch cows, and the quantity of green feed obtained is absolutely amazing. I have it on the most credible testimony, that 39 tons of green feed have been obtained in this way to an acre; and one gentleman, who measured a small parcel, has stated that much more could be obtained. This supposes the plant, however, to have arrived at nearly a perfect state. It may be cut to advantage a long time before this. I consider the experiment as well worthy of being made. In such a case, I would advise it to be sowed on warm friable land, well manured, in drills, sprinkled quite thickly in the drills; the drills about 18 inches apart, and at the rate of more than a bushel per acre. It may be sowed early in April, judging from what I have seen of the climate of England, the present spring, and so on through May, or even later; and though its yield would be very much larger after it has come into blossom and the ears are formed, yet it may be cut as wanted when two and three feet high; and, in general, this first cut in such case will start again, and yield a second cutting. No feed ever placed before cattle, according to its weight, is more nutritious and health-

ul.—The society will do me the justice to believe, that in presenting these seeds to them, I am not led away by any unreasonable presumption of their success; but simply from a conviction of the great value of the plants in my own country, and a hope that an experiment might result favourably, as it sometimes and often has happened, that valuable plants become naturalised, by cultivation, to climates and localities very different from those where they are first found. In any event, I know that with that liberality which belongs to the intelligent and public-spirited everywhere, and nowhere more than in England, they will kindly appreciate even the most humble efforts to advance the highly useful and most important object of their Association."

*Turnip-fly.*—Mr. Beards, Agent to his Grace the Duke of Buckingham, communicated to the Council the result of his experience in the destruction of the turnip fly:—"The turnip-sowing season is fast approaching, and with it, no doubt, that continual pest, the turnip-fly, will also make its appearance, for the destruction of which, a great deal has been said and written, without much good resulting therefrom; for, during thirty-five years' experience in various districts, I have given fair and repeated trials to numerous recommendations for its destruction, without experiencing the effect sought, until eight years ago this season, being then engaged extensively in a turnip district, when the insect began to make dreadful havoc on a fine plant, in a field of thirty-four acres. I then tried an experiment, which I had not before heard of, and which was simply as follows:—I took an old sack, had it ripped open into the form it was when cut from the roll of canvas, had it nailed to a pole, the thickness of a pitching-fork handle, leaving the pole about eight inches at each end, longer than the sacking. I then had one side smeared over with tar, made two men, one at each end of the pole, draw the sacking (the tarred side downwards) regularly over the field, letting it sweep the ground, carrying it at an angle of about forty-five degrees, fresh tarring with a brush every "bout," or oftener if required; on examination I found great numbers of flies sticking to the tarred sacking; I repeated the operation once a day, for four days, and saved the plant of turnips. Since that time, when I have discovered flies on the plants, I have pursued the same plan, and have not, from that time till this, had occasion to plough up a single acre from the effects of the fly. I have several years past used gas-tar, in consequence of its leaving a stronger scent in passing over the plants than common tar, and which prevents the flies that are not caught from devouring the same. I do not mean to assert that once going over a field will prevent the destruction of a crop; it must be persevered in according to the strength of the fly and the state the land is in. To force the plant into rough leaf, with good farming, and this preventive, I do believe if a farmer lose his plant of turnips by fly, it is in a great measure his own fault."—Mr. Jas. Sherring farm-bailiff to Mr. Henning, Frome-house, Dorchester, Dorset, also favoured the Council with the following communication on the same subject:—"A great deal has been published, and many experiments tried, to prevent that ravenous of all other insects, the fly, from devouring that valuable root, the turnip. After twenty years' experience with the greatest success, I beg to submit to your notice the following receipt:—A month at least before I begin sowing my turnips, I purchase the different sorts of seeds I may require; I provide vessels for the reception of such, adding to every 20 lbs. of seed half-a-pint of linseed oil, taking care to have it well mixed; I add

1 lb. of the flower of sulphur; every morning, I have the whole rubbed between the hands to get the seed in a proper state for drilling: the drillman must be apprised of what seed he had to use, or he will not drill a sufficient quantity, as the sulphur will choke the cups; this of course must be looked to. As I before stated, I have practised this experiment for the last twenty years, without a single failure, and I believe I can safely say without losing a plant. The early part of last season the fly made great ravages in some parts of this country, but not one did I perceive in a field of my employers. For the benefit of those of my agricultural friends that may be inclined to try the experiment, I lay the same before your most honourable Society, trusting it may be tried with the greatest success."

Colonel Challoner informed the Council of the uniform success which had attended his management of the turnip crop, since the year 1830, by the adoption of the following simple process in the manipulation of the seed previously to sowing:—He procured double the quantity of seed required under ordinary circumstances for a single sowing; one half of this seed he steeped in diluted tank-water for 18 or 24 hours, and sowed it on the land in the usual way; in about a week afterwards he sowed the other half of the seed (which had undergone no preparation) over the same land. The result proved that by this arrangement a tendency to germinate one fortnight earlier was given to the turnip-seed, by being thus previously steeped, over the remainder sown in its dry state, and the consequence was that a full crop of turnips was uniformly secured; for if the soaked seed came up in dry weather, it was devoured by the fly, which being thus apparently satiated with the first supply of green food, was found to leave the succeeding plants arising from the dry seed untouched; if, on the contrary, the soaked seed came up in wet weather, it remained the standing crop, as the fly, from the uncongeniality of the atmosphere for its development, had not then made its appearance, and, consequently, reserved its ravages for the plants of the second sowing. Colonel Challoner had, by this simple but effectual application of the principle of early germination, found the means of preserving, in a natural and comparatively very economical manner, crops of turnips varying from 50 to 70 acres in extent.—Mr. Woodward, of Little Comberton, near Pershore, Worcestershire, thought that every fact which increased our knowledge of the destruction effected by the turnip-fly, and the circumstances under which its development and ravages were effected or retarded, was most important. He had, in his own case, experienced a most singular result in reference to this subject: he had last year prepared a field for turnips, and brought the whole of it into the same state of cultivation; but having sown one-half of the field on the 1st of June and the other half on the 2nd of June, with the same seed, in the same condition, he had the surprise and mortification to find, without any obvious solution of the mystery, that the first sowing went, while the second only stood.

*Pea-beetle.*—Mr. Baker, of Writtle, having sent to the Society specimens of insects found feeding upon peas, they were referred, at the suggestion of Mr. Pusey, to Mr. Curtis, who reported to the Council the following particulars:—The insect in question is the *Sitona lineata*; and during the spring, Mr. Curtis had received specimens of it from various parts of the country, where they had attracted the notice of cultivators, and whose peas were suffering from their ravages. It was many years since he had first become acquainted with the propensities of that beetle; and he hoped in a future paper, when treating of the

crops to which it referred, to lay before the Society his researches on the subject.

*Milk Pans and Syphons.*—Mr. Apsley Pellatt, of the Falcon Glass Works, Blackfriars, presented to the Council an English specimen of glass milk-pans, made at his own manufactory, of the strength and dimensions of those sent over to this country, at Sir John Lubbock's suggestion, by Captain Stanley Carr of Lübeck; but made of the ordinary transparent flint glass, instead of the dark-coloured bottle-glass which constituted the material of the German ones. He had already had half a dozen of them made for use in his own dairy, at Knowle Green, and would report on their merits and advantages in due time. With regard to the price at which they could be supplied under the present excise restrictions, he found that, allowing a very moderate profit, they might be made at 5s. 6d. each, or for 5s. each, provided the order extended to a dozen to be made at one time.—Mr. Swinburne, Director of the extensive glass-works of Messrs Cookson, Cuthbert, and Co., of South Shields, Durham, requested leave to inspect the model of Captain Carr's glass milk-pan, in order that they might with the concurrence of the Society take measures for manufacturing similar articles in England at so low a price as to bring them within the means of ordinary farmers. Being himself an amateur farmer of 300 acres, he should have much interest in trying the glass milk-pans on an extensive scale in his own dairy; and would feel happy at all times to undertake the trial of any experiments or contrivances suggested by the Society in which glass might in any way be connected with agricultural convenience or improvement.—Mr. Henry Overman, of Weasenham, near Rougham, Norfolk, informed the Council, that he was not aware, whether the use of milk-trays made of lead was generally known among the dairy farmers of the country. He had reason to believe that so serviceable and economical a material might be very advantageously employed for that purpose, he, himself, never having heard any practical objection made against such trays by persons who had adopted them, either on the score of impurity from the metal, or on that of any chemical action which might prevent the cream rising; and if they were furnished with a tap in the bottom, the milk might be drawn off from below, and the cream, instead of being skimmed off the surface, allowed thus to subside to the bottom of the trays, and afterwards drawn off separately. In his own dairy of 30 cows, he used no other trays but leaden ones, so constructed; and he had a model in preparation, which, if the Council would allow him, it would give him great pleasure to present to the Society.—Mr. Greaves, of Bakewell, Derbyshire, stated to the Council, that having paid a visit, some twenty years ago, to the dairy of the late Duchess of Rutland, at Belvoir, he was much struck with the plan adopted for obtaining the cream without skimming it from the surface of the milk. The milk-room was lined with porcelain, laid on in squares; and, in order to preserve it cool and fresh, as well as to create a gradual ventilation, a fountain of cold water was kept constantly flowing in the middle of the dairy; the current rising through an upright pipe in the centre, and, having attained its height, rolling back in sheets of water over a cone of successive basins, increasing in size from the top to the bottom, where the water entered a drain and was carried away. All the pancheons were of china-ware, and very shallow; it having, he believed, been satisfactorily ascertained, that the amount of cream thrown to the surface by a given quantity of milk was dependent, to a certain extent, on the breadth of sur-

face given to it by such shallow vessels; the same measure of milk poured into a vessel allowing it to stand at two inches deep, casting nearly twice as much cream as it would do if its depth were eight inches. In the experimental part of the dairy, pancheons containing milk from various cows of the different breeds, were arranged in distinct order, and duly registered with every circumstance of condition supposed to affect the quality and quantity of the milk and cream obtained in each case; but the greater bulk of the milk was kept in leaden cisterns, about three feet long, two feet wide, and three inches deep; the bottom of each cistern inside having a slight concavity, in the centre of which was an aperture connected with a tap underneath, for the purpose of drawing off the milk, and leaving the cream behind untouched in the cistern. Mr. Greaves considered this to be on every account an admirable plan; and he had found in his own dairy, that a piece of saltpetre, about the size of a hazel-nut, dissolved in warm water, and mixed with every gallon of new milk as soon as strained, not only caused the milk to cast its cream better, but had the effect of removing from the butter every disagreeable flavour arising from the herbage of particular pastures, such small addition to the milk, of so well-known and simple a saline substance, imparting to it a wholesome character, rather than otherwise, in a dietetic point of view.—Lord Camoys, of Stonor Park, Oxfordshire, stated that, while on a visit last winter with his friend Mr. Tollet, of Betley Hall, Staffordshire, it occurred to him, on inspecting that gentleman's dairy, without being aware of the contrivance then brought under the notice of the Council, that the milk might with great ease and nicety be drawn off from beneath the cream on its surface, by means of a syphon inserted into the milk over the edge of the pan. On his return home he carried out the idea, and having found the plan to answer perfectly, he now used nothing else but the syphon for separating the milk from the cream. The syphons were made of block-tin, with a tube of about a quarter of an inch bore, and cost two or three shillings each. One great advantage in their use was, that they were self-acting, merely requiring to be inserted in the milk and set at work, the stream continuing to flow by such decantation for about a quarter of an hour, until the cream presented itself for admission into the lower orifice of the tube, when its greater body and less fluidity prevented its free passage, and the syphon gradually stopped of its own accord. This complete draining of the milk from the cream, rendered the latter very superior in its keeping properties. His own dairy cows were Alderneys, and the cream, therefore, of greater body; but he believed the same effect of perfect separation would result in the case of ordinary cream, especially if the bore of the tube were diminished accordingly. His Lordship, at the request of the Council, expressed his willingness to present a specimen of the syphons to the society.

*Pipe Tiles.*—Mr. Read, of the Regent's Circus, Piccadilly, addressed to the Council the following statement connected with the cylindrical tiles of small bore, referred to in various portions of the "Journal" of the society:—"In consequence of numerous applications from gentlemen respecting the efficiency of the small pipe-tile for surface-draining of clay lands, and whether the Tweeddale or horse-shoe tiles could be made with the new pipe-tile machine; in order to answer these questions satisfactorily to myself, in the beginning of March last I went through the counties of Surrey, Sussex, and the Weald of Kent, for the opinion of my old-experienced draining companions,

during the last 40 years. I have the satisfaction to find they have proved that the tiles of one-inch bore are sufficient if properly laid, and a free passage for the water at the end of the drain. Nay, more; some of the most experienced practical men are of opinion that a still further reduction in the size of the tile may yet be made. It is well known that the greater the declivity the more rapidly the water will pass off. But there is a great portion of land nearly or quite level—as, for instance, the valley of the Medway, in Kent (and in almost every county in the kingdom); this land is of a deep, waxy loam, two or three feet deep, which, I have been told, cannot be drained; but I have found no difficulty in draining such land, where the channels could be kept open at the end of the ditches. If the drains were three feet deep and two rods apart, there would be three feet fall from the surface to the bottom of each drain in one rod from the centre between them. In such situations the telescope tiles may be used with good effect; for instance, suppose a field, 40 rods long, the upper end (or the 10 rods laid down with No. 4 tile, of smallest bore) can receive but one-fourth of the water that must pass through at the lower end (or the 10 rods of tiles of largest bore). The pipe-tiles made by Mr. Clayton's new machine may be all brought into use in the same field; they may also be placed in half the compass in the kiln and carriage, and burnt with half the expense of fuel, &c. These pipe-tiles are all made with separate dies, any size of which may be had, so as to give every person a choice of the size he prefers for his own use." Mr. Woodward stated that with him the cylindrical form of tile had not answered in Worcestershire, where he had drained 1,000 acres up every furrow with tiles of that shape and two or three inches bore: the drains becoming stopped up, as he supposed, from the loose dust being washed by storms down the fissures, where the ground had cracked, into the drains below, where a puddle accumulated which the force of the current was eventually insufficient to overcome.—Mr. Slaney had employed the small-bore cylindrical tile with signal success on his estate in Shropshire. His pipe-tiles varied from  $2\frac{1}{2}$  to  $1\frac{1}{2}$  inches in width, and had run quite clear after two or three years' use. He believed that a great deal depended upon the mode of filling in drains, and referred to the papers in the Society's Journal on that point. By allowing the clay to crack, and then filling in with a proper material permeable to the water, he conceived that the finest natural sieve was obtained to prevent future stoppage. His mode was to cut the drains three feet deep, and cover them over with the clay to the depth of about three inches; allowing such bed of clay to crack into fissures before proceeding further. When the clay had cracked, he then filled in the drains as he had just stated. He had employed the draining-plough introduced by Mr. Law Hodges into the Weald of Kent, with great success.—Colonel Chaloner thought green-sod turf formed the best material for filling in drains: it was not, however, always at hand. He hoped at some future time the subject of draining sandy soils, to which he had on a former occasion called the attention of the Council, would engage the serious consideration of the Society. He considered that part of the general question of draining to be the one, at the present time, the least understood, and to which practical attention had not yet been sufficiently drawn. We were well informed on every point connected with strong-land draining, but knew nothing of the draining of sandy land.

*Bones and Guano on Waste Land.*—Sir Charles Lemon, Bart., M.P., called the attention of the Council to the following facts adduced by Mr. Karkeek, of Truro, in his Prize Essay read before the Cornwall Agricultural Association, connected with results obtained from the use of Bones and Guano on the very poorest waste lands of that county. *Bone-dust.*—In 1835, Carnwinick Farm was a barren waste, heath and furze being the only covering of the soil; let at 2s. per acre; north-west aspect, and clay-slate soil, of loamy character.—Experiment I. A common field was broken up, and the larger portion manured with bone-dust, at the rate of 3 quarters to the acre; the other portion being merely dressed with the ashes obtained from the breaking and burning of the land. The turnip crop was completely carried off by the fly. In the years 1836 and 1837 it was cropped with oats, and then laid down to permanent pasture. There was more than double the quantity of oats on that portion where the bones had been applied, and at the present time their effect can be plainly distinguished, as if a line of demarcation had been drawn between rich and scanty herbage, or between a green meadow and uncultivated land.—Experiment II. In 1836 another piece of the waste was broken, which was sown to oats, and on the following year a similar crop was taken. One portion of the field was manured with bone-dust only. The oats on this part were equal to those in the first experiment. After this, the whole was laid down to pasture; and, at the present date, the line of distinction can be plainly seen where the bones were applied, at more than four miles distance. The same beneficial effect is also plainly seen in two larger patches broken up in 1837 and 1838. They have been sown with turnips, and manured with bone-dust only, which produced most excellent crops; after which a crop of oats was taken, it was then pastured up to the present time. In another piece, of about six acres, which was broken in 1839, and sown with Swede turnips, an excellent crop was produced; since which other crops have been taken, and the clover very luxuriant, the land being equal to that let at 40s. per acre. In 1840 another piece was broken, and sown to turnips, with bone-dust as before, and oats in the following year; both crops were excellent. In November, 1841, it was ploughed once only, and, without any other cultivation, sown to turnips in June, 1842. This crop was also good, and, in Mr. Karkeek's opinion, plainly proved, that turnips after grain may be produced without either spring or summer ploughing. In 1841 another large portion was broken, sown with Swedes, and afterwards cropped with oats, using the bone-manure only, which answered as well as before. From the year 1835 to the present time, Mr. Trethewy had thus successfully broken and cultivated patches of waste to the extent of 60 acres. His usual method of cropping had been—first turnips, then oats, seeds, and permanent pasture. In 1842, Mr. Karkeek witnessed a crop of Swedes on this improved waste land, which he considered as decidedly the finest crop of the kind grown in the parish that season. *Guano.*—Experiment I.—Tywarnhoyle Farm: aspect, south-eastern, protected from the sea-winds; soil, argillaceous character, with deep retentive clay subsoil. Mr. Karkeek considered it almost impossible to find a more barren spot than this part of St. Agnes Common exhibited previously to its enclosure, there being scarcely turf enough left to make the hedges, and the greater part being chiefly subsoil. The following table exhibits the method of cropping and manuring, adopted by Messrs. Davey, of Redruth, in their first experiment:—

A. R. P. Statute.	When sown.	Manure per acre.	Produce per acre.	Second sowing.	Manure per acre.	Produce per acre.
Broken in 1839.	Wheat in autumn.	3 qrs. of Bone. 1 acre had 30 bush. of lime.	Fit only for pigs and fowls.	Oats in 1841.	Nitrate of Soda, 1 cwt.	36 bush. imp. of oats per acre.
	Third sowing.	Manure per acre.	Produce per acre.	Seeds and Manure.	Present appearance.	
	Barley in 1842.	Truro town-dung 9l. per acre, including carriage, &c.	18 bush. per acre.	Seeds. 2 cwt. guano.	Very superior grass.	

It will be seen from this experiment, that the soil was not sufficiently powerful to produce a crop of wheat, manured over with bone-dust, 3 qrs. to the acre. In the oat crop, the following year, manured with 1 cwt. of nitrate of soda, we have 36 bushels of oats, and no seeds; in consequence of which the field was tilled to barley in 1842, and dressed with Truro (Scavengers') dung, at a cost of £9 per acre, including carriage. Here was another failure, the produce being only 18 imperial bushels per acre. The crop of seeds in the early part of the spring of 1843, made but little progress, in consequence of which it was dressed with 2 cwt. of guano per acre; and its growth shortly after this was surprising. So abundant was the grass during the summer, that it was a wonder to the neighbourhood how so much stock could have been kept for so great a length of time. Where the lime had been employed for wheat, the grass was by no means so thick as in other parts.—Experiment II.

A. R. P. Statute.	First crop; when sown.	Manures used per acre.	Produce per acre.	Second crop; when sown	Manures used per acre.	Produce from Guano per acre.	Produce from dung and comp.
Broken in 1840.	Wheat in November.	Bone-dust, 3 qrs.	None.	Oats in 1842.	2 cwt. of Guano; 10 loads of compost, dung, earth, &c.	77 bush. of white Oats.	29 bush. of black Oats.
		Seeds.	Manures.	Present appearances.			
		1843.	2 cwt. of Guano.	Very superior			

In this second experiment it will be seen that the wheat failed, as in the first, evidently showing, in Mr. Karkeek's opinion, that wheat was not adapted to the new soil; whilst, in the following year, a beautiful illustration was afforded of the effect of guano on a crop of oats. Messrs. Davey had now, it appeared to him, learned by experience that the method of cropping and manuring which they commenced with was not such as would be likely to prove successful; and accordingly, in the succeeding experiment, they began cultivating the next piece of waste by taking a green crop first, following it by a crop of oats.—Experiment III.

First crop; when sown.	A. R. P.	Four separate acres, manured each with			
Turnips in June.	Broken in 1841.	Dung 25 loads.	Sea-weed.	1 ton of horn, &c.	4 qrs. of bone-dust.
		PRODUCE.			
		Pasture 15 tons.	none.	none.	Swedes, 18 tons.

Second crop: when sown	Manure per acre.	Produce per acre.	SEEDS.	Present Appearance.
Oats in 1842.	2 cwt. Guano.	72 bushels of Black Oats.	1843. 15 loads Farm-yard Dung.	Very superior.

In this experiment, Mr. Karkeek considered the trial between bone-dust and the Truro dung as the first thing worthy of attention, the result showing a profit in favour of the bone-dust, and a loss of 5l. 15s. on the dung; the horn, &c. (being the sweepings of a button and comb manufactory, consisting of filings of bone, horn, and ivory), and the sea-weed producing no effect whatever. The difference per acre in the expenses in this trial between bone and dung might be estimated as follows:—

DUNG.	£ s.	BONES.	£ s.
25 loads Dung, at 5s. . . . .	6 5	4 qrs. Bones at 23s. . . . .	4 12
Carriage of do. at 4s. per load . . . . .	5 0	Carriage do. . . . .	6 0
Spreading of do. on land 0 10			£4 18
	£11 15		

Value of Manure.	Produce.	Value per ton.	Value of Produce.	Diff. between value of crop and manure.	Profit and loss.
Dung, 11l. 15s.	15 ton. pasture	6s.	4l. 10s.	7l. 5s.	Loss
Bone, 4l. 18s. . . . .	18 tons Swedes	8s.	7l. 4s.	2l. 6s.	Profit

Again, in the second crop, as much as 72 bushels of oats were produced by 2 cwt. of guano per acre. Where the horn and bone sweepings had been used previously for turnips, the oats and seeds were decidedly the better part of the field—bone next—dung next—and sea-weed the worst part of the piece. Where the horn had been employed, the land has at the present time a far better appearance than any fields in the neighbourhood. The three fields on which the previous experiments were made, kept 30 ewes, 30 lambs, 4 oxen, 3 horses, and 30 pigs, from the commencement of May until the harvest. The grass was cut and carried into the stable for the horses, the field having since that time been well stocked with sheep.—Experiment IV. This experiment was made on a piece of waste, similar to the former ones, and adjoining to them.

Statute A. R. P.	First crop sown.	Manure per acre.	Produce per acre.
Broken in 1842.	Swedes in July.	4 quarters bone-dust, and 1 cwt. guano.	20 tons Swedes.
Second crop sown.	Manure per acre.	Produce per acre.	Seeds:
Barley in 1843.	10 cwt. of hoofs of animals (10l. per ton at the farm), and 1 cwt. of guano.	12 imperial bushels only.	The clover and barley were early choked by the rye-grass.

The circumstance considered by Mr. Karkeek as most worthy of notice here, is the powerful effect produced by the hoofs of animals, in conjunction with guano, on the oats and rye-grass; the latter growing in such an astonishing degree, that it completely choked the clover, and very nearly the barley. The field has now the appearance of an old coarse pasture. The effect of guano and bone-dust mixed is also seen in an excellent crop of Swedes, 20 tons to the acre. Experiment V.

Statute A. R. P. 8 2 37	First crop, sown 1842.	Manures per acre.	Produce per acre.
Broken from the common, 1842.	Turnips and Swedes sown late.	4 quarters bone —1 cwt. guano.	18 tons.
Second sowing, 1843.	Manure per acre.	Produce per acre.	Present appear- ance.
Oats.	2 cwt. guano.	60 bushels per acre.	Very superior.

In this experiment we have a similar effect produced by a mixture of bone and Guano manures on Swedes; and in the following year another excellent crop of oats, with only 2 cwt. of Guano per acre. The expences incurred by Messrs. Davey in cultivating an acre of waste, were nearly paid by the two first crops, leaving the value of the straw—about  $1\frac{1}{2}$  ton per acre—to pay for incidental expences. Mr. Karkeek estimates their expences per acre in cultivating for the first crop, as 11l. 17s. 6d., and for their second crop, 15l. 10s.; and the value of the produce on the two first crops only as 14l. 8s. The profit arising from the feeding of stock on the seeds is not considered in this account; but he thinks an idea may be formed of their luxuriance, from the circumstance that, during the summer, Messrs. Davey received sevenpence per week for the keep of fat sheep belonging to butchers, and at Christmas last sixpence per week: the fields being now equal in appearance to others, let at 20s. per acre in the same neighbourhood; it having also been found that the expences incurred in picking and carrying off the stones from the different enclosures were more than repaid, by the sale of the stones for the purpose of repairing the turnpike-roads.

The following communications were referred to the Journal Committee:—Sir Charles Lemon on the medical treatment of sickly trees; Mr. Rodwell on the cultivation of Italian rye-grass; Mr. James Haywood on excretory manures; reports on ox and horse-teams from the Rev. Thomas Cator and Mr. Frederick Manning; and a letter from Mr. Meyer on the destruction of rats. Mr. Charles Knight presented a complete set of his industrial guide books on agricultural, mechanical, economical, and other subjects; Mr. Ben-craft, specimens of his patent Hames and Springsaddle; Mrs. London, a copy of the complete Supplement to the Encyclopædia of Agriculture; Mr. Thompson, a copy of his Prize Essay on Manures; Mr. Shaw, the "Farmer's Magazine" for May; Mr. Jopling, his Treatise on Field-Gates; and Mr. Mechi, copies of his Statement on Agricultural Improvements; for all which communications and presents the best thanks of the Council were ordered.

The Council then adjourned to Wednesday, the 15th of May.

A weekly Council was held at the Society's House in Hanover-square, on Wednesday, the 15th of May; present, the Right Hon. Earl Spencer, President, in the Chair, Marquis of Downshire, Lord Bridport, Lord Camoys, Hon. Capt. Spencer, Hon. G. H. Cavendish, M.P., Hon. Capt. Dudley Pelham, Col. Austen, T. Raymond Barker, Esq., J. Raymond Barker, Esq., Burton Borough, Esq., F. Furke, Esq., Sir C. Burrell, Bart., M.P., Rev. T. Cator, Col. Chal-loner; J. Evclyn Denison, Esq., M.P., T. Ellman, Esq., R. Etwall, Esq., M.P., J. H. Hodgetts Foley, Esq., A. E. Fuller, Esq., M.P., B. Gibbs, Esq., H. Hall, Esq., Sir J. Johnstone, Bart., M.P., Rev. R. H. Leeke, Col. Macdonall, Sir C. Morgan, Bart., A. Ogilvie, Esq., J. Parkes, Esq., C.E., E. Parkins,

Esq., H. Price, J. Read, Esq., E. A. Sanford, Esq., Prof. Sewell, W. Shaw, Esq., R. A. Slaney, Esq., T. Tweed, Esq., T. Walmesley, Esq., and G. Wilbraham, Esq., M.P.

The proceedings of the Council at this meeting were of a most interesting description, and in order to give the report of them as fully as circumstances will permit, we shall, in our present paper, confine ourselves to the valuable remarks on the subject of *Ashes and Pipe Drain-tiles*, made to the Council by Josiah Parkes, Esq., the consulting-engineer to the Society; and in our next week's paper conclude the Report.

*Guano and Ashes.*—Mr. Hillyard having called the attention of the Council to the difference in the quality of ashes proposed to be mixed with the guano in the model experiment, Mr. Parkes apprehended that the quality of the ashes used by the different experimenters when mixed with guano might occasion discrepant results, as ashes alone were a manure, but of various efficacy, and the quantity of this substance proposed to be employed in the compost was large as compared with that of the guano. The ashes of different peats were well known to possess extremely variable properties and powers; some were comparatively rich, and others poor. The opportunities he had had of noticing the very feeble effects of peat-ashes, derived from a particular bog in Lancashire, had induced him to carbonise that peat, instead of burning it to ashes. He had found this charcoal dust to be a powerful fertilizer of the bog in question, although the application of ashes obtained from the same peat produced little else than weeds. He was of opinion that if all farm weeds, such as couch, and the cuttings of hedges, trees, &c., were reduced by charring instead of by incineration, that product might be more beneficial to soils and plants in general than the ash. He had charred the dried diggings of bog drains, &c., in clamps formed of peat sods; the operation was as simple as that of charring wood. Clay earth may be advantageously washed in the same clamps with the peat, and he had found the mixture produce excellent effects; but his experiments were principally confined to its use as a fertilizer of bog soil. He had procured some very pure peat-charcoal, and sent it to Mr. Graham for trial. There could be no doubt as to the value of the presence of carbon in soil, and charcoal is known to act both chemically and mechanically, with advantage to many soils. Charcoal, too, was perhaps the very best of all substances to absorb the urine of cattle, &c.

*Pipe Drain Tiles.*—Mr. Parkes produced some specimens of small cylindrical pipes for drains, and desired to address a few remarks to the Council on the observances necessary to ensure complete success in their use. In all arts there were successful and unsuccessful operators, and failure was usually traceable to some neglect of necessary conditions or precautions, when the many succeeded and the few failed. In the isolated accounts he had heard or read of ill success with pipe tiles, he found that sufficient regard had not been paid to the proper form and dimensions of the excavation which was to receive them. It appeared, in these cases, that a perpendicular ditch (or nearly so) had been generally dug, many inches broad at bottom, to receive a pipe of small diameter; whereas, in Kent, and in the other counties which gave birth to this system, and where it had hitherto been most used, every one knew that the bottom of the drain should be formed of such size that the pipe may fit and fill it. The proper section of the trench was a wedge, being about fourteen inches broad at top, tapering down to the diameter of the pipe at bottom, whatever

might be the depth. The bottom was cleared out by a scope drawn towards the workman, having the same diameter, or nearly so, as the external diameter of the pipe. The particular tools used for forming the trench had already been described in the Journal (Vol. iv. p. 28). A series of pipes thus laid could not be disturbed, but there was nothing to ensure a true unbroken line of pipes, if they were laid in a trench of larger dimensions than themselves; and hence failure by stoppage would certainly arise. After diligent and extensive inquiry he had not heard of a single pipe-drain failing, in any respect, in the districts where this system of drainage has established itself; nor could he see any valid reason to object to it. The use of inch-bore pipes was rapidly extending, and he believed it to be the best and cheapest practice known. He had been enabled to demonstrate, in the most satisfactory manner, that an inch-bore pipe far more than sufficed to receive and carry off the water of rain, according to the usual system of parallel drains; these experiments would appear in the forthcoming Journal. He would now advert to an occasional cause of failure incidental to drains in clay soils, which he conceived to be attributable chiefly to insufficiency of depth. Clay is a substance which may be said never to be at rest; it shrinks and swells according to its state of wetness or dryness; a mass of clay soil is, therefore, in continual movement. In addition, it was well known that clays can only be drained through the instrumentality of cracks produced by their drying. If a drain or conduit be placed too near the surface, and the cracks descend below it, such a line of drain would be liable to derangement, particularly in parts of unequal tenacity, from the contraction and expansion of the bottom or floor, arising from its varying state of wetness or dryness. It was well known to builders that the foundations of a house in clay should be laid at a depth greater than the reach of the cracks, or at least as deep as their usual penetration. The force of expansion in clay, and of subsidence from contraction, was well known to produce fissures and rents in buildings. It was enjoined in old treatises on building, and he found it to be the practice about London, to sink foundations in clay four feet below the surface, and to drain them below that level. He considered that agricultural drains two feet, or even two feet six inches deep, in clays, were subject to derangement, and even to stoppage, from this cause alone, and that their depth should not be less than three feet, or from that to four feet, where an outfall could be obtained. Deep drainage in all soils was also consistent with economy of outlay, as they may be placed further asunder, of which he had given several instances in Kentish practice, and now adduced others. He earnestly intreated the Members of the Society, who might be draining their farms, to reflect well on the advantages of deep over shallow drainage. Many persons had beneficially drained lands over again to a greater depth, which had been substantially drained two feet, and even two feet six inches deep, 30 to 40 years since. As regards continuous good action, he believed that deep drains would be much more durable than shallow ones, as they were removed below disturbance from the pressure of horses, carts, or implements. Also that deep drains were less liable to choke than shallow ones, as the water reached them better filtrated. He was of opinion that the sharp wedge-shaped form of the sides of the trench in which pipe-drains were laid, was eminently conducive to their durability, as the little pipe at the bottom was thereby protected from undue superincumbent pressure. The water entered such drains at the

level of the floor in a thoroughly filtered state, and the velocity of the current kept the line of pipes at all times clean; nor could any vermin enter them. He had heard of, or read, a statement that the floors of drains in clay soil became so soft, that tiles sunk in them, or that the bottom stuff was protruded upwards and choked them. It was likely this might occur when tiles were used without soles. It did not happen with pipe-drains. The opinion, indeed, prevails in Kent, that the floors of pipe-drains are drier and firmer than other parts of the field at the same depth. He had no doubt of the truth of this opinion, and it was confirmed by experiment as well as observation. It appeared that, if a pipe of 1 inch bore, 12 in. long, and  $\frac{1}{4}$  inch thick, were hermetically closed at each end, and placed in water just covering it, it would become full of water by absorption in about five hours; and if hung up horizontally, it would let all the water pass out of it in about the same time. This experiment was first communicated to Mr. Parkes by Mr. Putland, of Saylherst, Sussex; and he had repeated it with nearly similar results. This fact, which is in strict accordance with the known porosity of unglazed earthenware, showed, that after the free water of rain had permeated a soil, and passed off through a drain, the pipes would still continue to act as absorbers of moisture, to some extent, from the earth in immediate contact with them; by which means, and in consequence of the indraught of air through the drain, it was reasonable to conclude that the earth adjacent to the pipes would become somewhat drier and harder after a cessation of rain than the more distant parts. This was an additional reason with him for the preference he had always given to tiles rather than to broken stones, or any other materials which filled a drain, as a free circulation of air was thereby better established; and it must be recollected that a drain served the double purpose of a conduit of water out of the soil and of air into it, the latter function being, perhaps, quite as important as the former. In answer to inquiries from several members respecting the adaptation of small pipes to the drainage of soft soils and sands, Mr. Parkes showed, that by inserting a small pipe into a larger one (nearly fitting) for about a third of its length, or four inches, a perfect continuity, or chain of pipe, would be formed, which could never sink. It was well known that some of the most plastic and pure clays were troubled with what he might term faults—*i. e.*, sand-beds occurred. He knew of such at Mr. Handley's and other places, and in them the ordinary tile-stones, wood, &c., would sink, and the drain was thus marred. He would apply this arrangement of pipes as a perfect remedy in such spots, and even in much more unsound and troublesome bottoms; but it was clearly impossible to prescribe the exact mode of proceeding in every difficulty, as the particular case must be inspected in order to know how to deal with it in the best manner.

The GENERAL MEETING of the Society, for the purpose of electing the President, Trustees, Vice-Presidents, and twenty-five general Members of Council, for the year ensuing, and of receiving the report of the Council for the past half year, was held, agreeably with the terms of the Charter, and the due notice required by the Bye-laws, at the Society's House, in Hanover-square, on Wednesday, the 22nd of May. Present:—The Rt. Hon. Earl Spencer, President, in the chair; Duke of Richmond (Chairman of the General Southampton Committee); Earl of Lovelace, Lord Camoys, Hon. Captain Spencer; Hon. Geo. H. Cavendish, M.P.; Sir John V. B. Johnstone, Bart., M.P.;

Sir Richard Jodrell, Bart.; Mr. Pusey, M.P. (Chairman of the Journal Committee); Mr. Divett, M.P.; Mr. Raymond Barker, (Chairman of Finance); Reverends D. Gwilt, T. Lewis, and J. R. Smythies; Professor Sewell; Colonel Elwood, Captain Forbes, R.N.; and Messrs. John Raymond Barker, S. Bennett, H. Blanshard, H. Boys, W. R. Browne, F. Crisp, W. Daniel, James Dean, Jos. Druce, S. Druce, E. East, John Ellman, P. Fearnhead, Y. Freebody, Brandreth Gibbs, J. B. Glegg, S. Grantham, C. Hilliard, W. Fisher Hobbs, G. Jacson, S. Jonas, G. Jones, G. Kimberley, J. Kinder, T. Knight, Geo. Wyld Lees, C. E. Lefroy, C. Porcher, T. Mount, Josiah Parkes, C.E., E. Parkins, W. J. Picken, H. Price, Francis Pym, R. Rigg, W. Shaw, W. Smart, James Smith (Deanston), H. Strafford, P. Tillard, T. Tweed, Jonas Webb, and James Wood.

The Members having delivered in their several voting lists, signed by themselves respectively, for the election of the Council, the President proceeded to nominate Mr. Dean, Mr. Druce, and Mr. Shaw, to be the scrutineers of the ballot; when those gentlemen retired with the lists into an adjoining committee room for the purpose of making the requisite examination. The Hon. Captain Spencer then rose to propose His Grace the Duke of Richmond as the new President for the ensuing year. He was quite sure, in submitting that proposition to the adoption of the Meeting, that it was unnecessary for him to endeavour to pass any encomium on the high character of the noble Duke; his name would be associated with the Society as long as it endured; he was one of the original promoters and founders of the Society, and on all occasions had been found among the most zealous and active of its Members. Mr. Blanshard, in seconding the motion, referred to the steady interest at all times evinced by the Duke of Richmond for the welfare of the Society, and the great advantages which had always resulted from his cordial co-operation in carrying out the details connected with every branch of its business and proceedings.

The motion was then put and carried unanimously. The Duke of Richmond immediately rose to return thanks for the honour the Society had done him, in again electing him their president. He assured the Members that the new election they had then unanimously made in his favour gave him the highest satisfaction, inasmuch as it furnished to him a gratifying proof that his exertions in the cause of the Society, during his former presidency, had met with their approval. The Society had already conferred the greatest benefits on the country at large; and in supporting its interests, and those of the agricultural community in general, it would be his great object to prove his gratitude, not merely by words, but also by deeds.

On the motion of Mr. Pym, seconded by Sir John Johnstone, the following Trustees were unanimously re-elected:—

Sir Thomas D. Acland, Bart., M.P.; Hon. R. H. Clive, M.P.; Marquis of Downshire; Duke of Grafton; Right Hon. Sir James Graham, Bart., M.P.; Henry Handley, Esq.; Sir Francis Lawley, Bart.; Joseph Neeld, Esq., M.P.; Duke of Richmond; Duke of Rutland; Earl Spencer; Duke of Sutherland.

On the motion of Mr. Raymond Barker, seconded by Mr. Kinder, the following vice-presidents were unanimously re-elected:—

Duke of Buckingham; Earl of Clibchester; Earl of Duclie; Marquis of Exeter; Earl Fitzwilliam; Sir Thomas Gooch, Bart.; Sir Charles Morgan, Bart.; Duke of Northumberland; Lord Portman; Earl Talbot; Duke of Wellington; Lord Worsley, M.P.

Mr. Shaw then reported the following result of the scrutiny of the ballot-lists. He had the satisfaction of stating that the election was perfectly unanimous, not a single vote having been recorded against the household as recommended to the General Meeting by the Council.

I. Members of Council not going out this year by rotation:—

Colonel Austen; Hon. W. B. Barling, M.P.; John Benett, M.P.; Samuel Benett, Esq.; T. W. Bramston, Esq., M.P.; E. Butler, Esq., M.P.; Colonel Challenger; J. W. Childers, Esq., M.P.; Edward Fellowes, Esq., M.P.; Humphrey Gibbs, Esq.; Lord Hatherton; John Hudson, Esq.; W. H. Hyett, Esq.; Sir John V. B. Johnstone, Bart., M.P.; Fielder King, Esq.; W. Miles, Esq., M.P.; E. W. W. Pendarves, Esq., M.P.; Sir R. Price, Bart.; Philip Pusey, Esq., M.P.; Francis Pym, Esq.; E. A. Sanford, Esq.; J. V. Shelley, Esq.; T. H. S. Sotherton, Esq., M.P.; W. R. C. Stansfield, Esq., M.P.; Henry Wilson.

II. Members of Council re-elected:—

David Barclay, Esq., M.P.; T. Raymond Barker, Esq.; F. Burke, Esq.; H. Blanshard, Esq.; John Ellman, Esq.; S. Grantham, Esq.; W. G. Hayter, Esq., M.P.; C. Hilliard, Esq.; W. Fisher Hobbs, Esq.; Sir Hungerford Hoskyns, Bart.; S. Jonas, Esq.; G. Kimberley, Esq.; John Kinder, Esq.; Sir Charles Lemon, Bart., M.P.; Professor Sewell; William Shaw, Esq.; Hon. Captain Spencer; C. Stokes, Esq.; H. S. Thompson, Esq.; Geo. Wilbraham, Esq., M.P.

III. New Members of Council:—

W. R. Browne, Esq. (Wilts and Middlesex); Edward Gough, Esq. (Salop); Viscount Hill (Salop); J. Allen Ransome, Esq. (Suffolk); R. A. Slaney, Esq. (Salop).

The President then directed the Secretary to read the following Report from the Council:—

The Council, in laying before the Members at their present General Meeting their Half-yearly Report on the state and prospects of the Society, at the completion of the sixth year from the date of its foundation, have the satisfaction of recording the progressive fulfilment of its various objects. The excitement which attended its original formation, and the rapidity with which the importance of those objects was recognized by the friends of agriculture in every part of the kingdom, at once swelled the list of its members to an extent unprecedented in the history of any similar institution. That excitement having roused the attention of the cultivators of the soil, to the fact of the great resources within their own immediate power, has led them to seek with practical caution, but with an energy also proportionate to the advantages to be gained, those means by which the objects in view have appeared to them most likely to be attained and rendered applicable to their local circumstances. Not only have the leading agriculturists of the kingdom come forward to aid the Council in carrying out to the best of their power the general collection and discussion of facts having an important bearing on the various branches of agricultural improvement, both personally at their meetings and as contributors through the pages of the "Journal," but within their own local sphere in the country they have, in many instances, been instrumental in reviving the spirit of existing associations, or of establishing new societies or clubs of practical farmers for the observation, collection, and discussion of such practical results as more immediately refer in the first instance to the improvement of their own local agriculture, but become afterwards generally applicable to other localities, placed under the same circumstances of aspect, soil, and cultivation. It has been the uniform desire of the Council to avail themselves of every opportunity by which the operations of the Society may extend their influence, and convey sound and practical information, through the numerous classes of its members distributed over the various districts of the kingdom. While preserving its fixed locality for the transaction of official business in the metropolis as a

centre, the Council have the satisfaction of referring, with great confidence, to the signal success which has attended the means of communication afforded by the distribution of the "Journal," the circulation of Cottage Tracts reprinted from its pages, and the change from year to year of the locality in which the Country Meetings are held. In the more concentrated sphere of its legislative and official duties, the Council have to report the active measures taken by their various Committees to simplify the details connected with their respective departments, and to avail themselves of such results of experience as render the general transaction of business gradually more uniform, exact, and satisfactory. The Society consists of the following Members, namely:—

Life Governors	..	..	..	..	95
Annual do.	..	..	..	..	214
Life Members	..	..	..	..	442
Annual do.	..	..	..	..	6,161
Honorary do.	..	..	..	..	15

making a total of 6,927 members on the books of the Society at the present time; and the Council have the satisfaction of reporting the steady accession of Candidates from every part of the kingdom, at each of their Weekly Meetings; no less than 274 new Members having been elected during the last three months and a-half. Since the last General Meeting in December, the Council, at the recommendation of the Finance Committee, have ordered the names of 249 Members to be removed from the list of the Society; of these, 31 were lost to the Society by death, and 157 struck out, either at their own request, on account chiefly of their having entered the Society at the Country Meetings, for temporary purposes only; or on the decision of the Committee, who have maturely taken each case of exemption, claimed under a variety of circumstances, into their special consideration; while the remaining 61 have withdrawn their names from the Society, for reasons assigned by them at variance with the fundamental rules of the charter.

The FINANCE COMMITTEE will lay before you the Auditors' Balance-Sheet of the accounts to the end of the year 1843, and, at the same time, report the actual state of the funds of the Society at the present time. They have also reported that, at the last General Meeting in December, the arrears of subscription due on previous years, to that date inclusively, amounted in the whole to 5,724*l.*; since which time they have been reduced by the sum of 1,124*l.* The Finance Committee having represented to the Council that, in some instances they found great difficulty in recovering the arrears of subscription due to the Society, the following resolution was passed, namely:—

"That a professional person be appointed to write letters, demanding arrears of subscription, to all such parties as shall be designated from time to time by the Finance Committee; and, in case of such applications not being successful, to take further legal steps for enforcing the payments due." That Committee have accordingly already taken preliminary steps under professional direction, for the recovery of some of the remaining arrears, but they still trust, that by the prompt payment of what is due, ulterior legal measures may be rendered unnecessary.

The Council feel it their duty distinctly to state, that the charter gives to them the undoubted right of enforcing the demand for any money due to the Society, in a court of law: if they are ever compelled to resort to that extreme measure, it will be with great regret; but it is their positive duty not to permit the useful objects for which the Society was established to be frustrated, by allowing the actual receipts to fall short of the legitimate claims of the Society.

The JOURNAL COMMITTEE have reported the unusual excellence and sound practical character of the whole of the numerous Essays sent in this year to compete for the prizes of the Society. They have announced the decision of the Judges in reference to an outstanding Essay of 1843, namely:—

To Mr. JOHN CLARKE, of Long Sutton, Lincolnshire, the award of the Society's prize of 15*l.* for the best Essay on the Management and Application of Farm-yard Manure; and the following awards already made of the prizes of the present year, namely:—

To Mr. R. N. BACON, of Norwich, the prize of 50*l.*, for the best Report on the present state of the agriculture of Norfolk.

To Mr. ROBERT BAKER, of Writtle, near Chelmsford, the prize of 50*l.* for the best Report on the present state of the agriculture of Essex.

To Mr. EDWARD LITTLE, of Lower Sheldon Farm, near Chippenham, the prize of 50*l.*, for the best Report on the present state of the agriculture of Wiltshire.

To Mr. JOHN BRAVENDER, of Cirencester, the prize of 50*l.*, for the best Essay on the Indications of the Fertility or Barrenness of Soils.

The Judges appointed to decide on the relative merits of the Essays in the latter class, have not only awarded the prize to Mr. Bravender, as announced, but have "highly commended" four of the remaining essays; and the Council have received from Mr. W. Stace, of Berwick, near Lewes, Sussex, and Mr. John Arkell, of Hollow Farm, near Gloucester, the authors respectively of two of those Essays, their full permission for the Journal Committee to make any use of them, of which they may be found available in carrying out the objects of the Society, have ordered their thanks for such favour to be returned to those gentlemen accordingly.

There having frequently existed a doubt, how far it has been the intention of some of the writers of the Essays to enter into communication with the officers of the Society in reference to points of detail connected with their Essays, the Council have adopted the following recommendations of the Journal Committee on this subject:—

1st. "That competitors shall be required to inclose their names in a cover, on which only their motto and the subject of their papers, with the number of that subject in the prize list of the Society, shall be written."

2nd. "That the Chairman of the Journal Committee alone shall be empowered to open the motto-paper of such Essays not obtaining the prize as he may think likely to be useful for the Society's objects; with a view of consulting the writer confidentially as to his willingness to place such paper at the disposal of the Journal Committee."

The following recommendation of the Journal Committee on the subjects and amount of prizes for the Essays of next year, has also been adopted by the Council, the conditions of which will be announced as usual in the Appendix to the next Journal; the Essays for these prizes being required to be sent to the Secretary on or before the 1st of March, 1845:—

- £10: On the advantages of One-horse Carts.
- £20: On the best method of Patenting Cattle.
- £20: On the best method of Reclaiming Heath-land.
- £50: On the Agriculture of Nottinghamshire.
- £50: On the Agriculture of Cornwall.
- £50: On the Agriculture of Kent.
- £20: On the cheapest mode of Establishing a Tile-yard.
- £20: On Catch Meadows.
- £50: On the Dutch method of Curing Dutter.
- £20: On Fences.
- £20: For the best Experiment in Agriculture.

The General Southampton Committee have reported

their arrangements for the Meeting of the present year at that town in July next; and the Council have ordered an extensive announcement of the Prizes to be awarded on that occasion, amounting to upwards of 1,400*l.*, to be made by publication in the Journal, by the distribution of Prize-sheets, and by advertisement in the public papers. They have the satisfaction of announcing, that the Implements entered for exhibition and trial at the Southampton Meeting, exceed by upwards of 130 the number of those at the Derby Meeting. The Council have decided that the Annual Country Meeting for the North Wales district shall be held at Shrewsbury in 1845.

The Council have unanimously appointed Messrs. Thomas Gibbs & Co., of Half-moon-street, Piccadilly, to be the Seedsmen to the Society. They have also entered into a satisfactory arrangement with the executor of the late Mr. Webb Hall, for the purchase by valuation of the library of the late Board of Agriculture, bestowed upon his father at its dissolution.

The Council think it desirable to state in conclusion, that all their weekly meetings, excepting that on the first Wednesday of the month, are set apart for the reception and discussion of Agricultural communications; and that all members of the Society have the privilege of being present on those occasions. The experience which the Council have already had of the sound and practical suggestions made to them at those meetings, and the interesting discussions which have frequently arisen thereupon, induces them to invite all the members who may happen to be in London on the days of meeting to avail themselves of this privilege; begging to assure them, that their attendance on such occasions will be as acceptable to the Council, as it is at all times uniformly desired.

By order of the Council,  
JAMES HUDSON, Secretary,

London, May 22, 1844.

On the motion of Mr. Parkes, seconded by Mr. Knight, this report was received and unanimously adopted.

Mr. Raymond Barker, Chairman of the Finance Committee, then read to the Meeting the following balance-sheet of the accounts from the 1st of July to the 31st Dec., 1843, as examined and approved by the Auditors:—

RECEIPTS.		£.	s.	d.
Balance in the hands of the Bankers, June 30, 1843		1,509	19	10
Do. do. Secretary do.			1	6
Half-year's Dividends on Stock.		130	16	6
Life-Compositions of Governors.			90	0
Do. Members			217	0
Annual Subscriptions of Governors.			183	0
Do. Members			1,124	3
Balance on Sale of Journal, after deducting the charge for stitching 16,000 Copies, and for amount of Advertisements		83	14	1
Sale of Cottage Tracts.			9	6
Receipts, during the half-year, on account of the Country Meetings.		896	14	3
		£4,246	0	6
PAYMENTS.				
Permanent Charges.		260	12	6
Taxes and Rates.			17	1
Establishment Charges		408	3	9
Postage and Carriage			12	12
Advertisements.			13	10
Expenses of Printing and distributing the Journal.		644	16	3
Prizes		1,271	0	0
Miscellaneous Payments.			24	5
Payments during the half-year, on account of the Country Meetings.		922	4	1
Balance in the hands of the Bankers, Dec. 31, 1843		657	11	8
Balance in the hands of the Secretary, Dec. 31, 1843			14	2
		£4,246	0	6

(Signed) C. H. TURNER, } Auditors on the part of the  
CHARLES TAWNEY, } Society.

THOS. RAYMOND BARKER, Chairman of the Finance Com.  
C. B. CHALLONER  
HENRY BLANSHARD, } Members of ditto.

The President then requested the Chairman to favour the members with an account of the present state of the Funds of the Society, and an estimate of the probable income and liabilities for the next three months; when Mr. Barker laid before the meeting the following statement accordingly:—The funded property amounted at that time to 7,700*l.*; and the current cash-balance, at the disposal of the Society, to 2,039*l.* The income for the next three months was estimated at 1,613*l.*; the ordinary expenses during that period, at 397*l.*; the prizes to be awarded at Southampton, at 1,400*l.*; and the excess of expenditure over receipts on that occasion, at 1,000*l.*; so that if a balance were struck three months hence, the Society would hold its invested capital untouched, with a probable current cash-balance of 855*l.* in the banker's hands. There was, however, a large bill on account of the printing of the past year's Journals, in progress through the Journal Committee, which would, in due course, come under the consideration of the Finance Committee; but whether the whole or any portion of that account would be ordered for payment during the next three months was uncertain. The rate of income was the greatest during the spring, and that of expenditure the greatest during the period of the Country Meetings; so that the income for the next three months proceeded under average and ordinary circumstances; while the expenditure with which it was compared took place under temporary and extraordinary circumstances. It was, therefore, the more gratifying to the Finance Committee to find the funds of the Society so well bear the severe test of such comparison.

On the motion of Mr. Pusey, M.P., the following gentlemen were unanimously elected auditors on the part of the Society for the ensuing year:—Charles Hampden Turner, Esq., of Rook's Nest, Surrey; Alderman Tawney, of Oxford; and Thomas Knight, Esq., of Edmonton.

The President then congratulated the members on the rapid progress of the Society and the flourishing condition of its affairs. He regarded it as effecting in a most satisfactory manner the various objects for which it was instituted. There was one point, however, which he had always considered as a blot on the accounts; and that was the large amount of the arrears of subscription. That subject, he was happy to say, had received the very mature consideration and diligent scrutiny of the finance committee, whose chairman had addressed to each defaulter a letter, drawing his particular attention to the subject; and the committee had decided on the line of conduct to be adopted in the particular case of each class into which they had distributed such members in arrear. The society had no wish to take any unfair advantage of any individual who indirectly, and without knowledge of the liabilities of attaching himself to a chartered body, had become enrolled a member of the Society at the country meetings, and for the purpose only of being enabled, as a member, to be present at the public dinners of the occasion. But, on the contrary, in those cases, where deliberate election and payment of subscription had taken place with a full knowledge of the rule of the Society, and the due notice to be given on withdrawal, and had been followed by intentional neglect, or defiance of the regulations of the Society, the Committee have felt it their duty to recommend,

as stated in the Report just read, the most deliberate measures to be taken and followed up for the recovery of the arrears. In enforcing the payment under such circumstances, he thought it quite fair and proper to proceed under the powers of the Charter against such defaulters. He still, however, hoped that extreme measures might remain uncalled for; as he felt assured that the members in arrear, on being made sensible of the undoubted legal claim and power the Society possessed in a Court of Law, would at once pay what was due. Under such a system, he had no doubt that the finance of the Society would rapidly assume a better form, and the blot of its apparently enormous arrears be wiped away from its accounts. From his intimate connection with the Society from its commencement, he had always been most anxious for its welfare; and it was a subject of sincere pleasure to him, at the end of the sixth year of its existence, to witness its continued prosperity, and to find, at the conclusion of every year, that the more it has hitherto done, the more it has still to do. He earnestly trusted that it would continue to go on in the same prosperous state, and prove a national benefit to the farmers and all persons engaged in the cultivation of the soil.

The President announced the preliminary Schedule of Prizes for 1845, to be awarded at Shrewsbury, and, of which copies were then laid on the table, in proofs to receive the suggestions, corrections, and additions of the Members, to be taken into final consideration by the Council in the last week of June, 1844; previous to which time the President requested the favour of all such remarks for the guidance of the Council to be forwarded to the Secretary, in writing, for such purpose.—The Rev. J. R. Smythies objected to the class for animals of any but the three pure and recognized breeds; and recommended, accordingly, that the fourth division of the classes of prizes for half-bred animals should either be expunged altogether, or the prizes reduced greatly in their amount; he considering it to be a great anomaly to set aside an amount for such animals equal to that assigned for the pure-bred stock.

The President remarked that the division to which the Rev. Mr. Smythies had alluded, did undoubtedly admit cross-bred animals; while, however, the Society in their prize-sheets encouraged the selection of pure bred animals of the best breeds, they were also desirous of admitting to competition for their prizes animals of those breeds which maintain a great reputation among the farmers of their respective neighbourhoods. Every locality had some breed that was considered particularly good; and he therefore thought it unfair, when the Society held their successive meeting in such parts of the kingdom not to encourage these local breeds, and give them an opportunity of competing for the prizes in such miscellaneous class as that hitherto adopted by the Society. Although he agreed in the general principle contended for by Mr. Smythies, he thought it would be unjust towards the Shropshire cattle, well known to be of a good and useful kind, to exclude them at the Shrewsbury Meeting. Mr. Hillyard said, that the short-horns and Herefords were superior to every other breed in the world, no doubt; but they required good pastures, and there were localities in this kingdom suited to neither of these breeds; he therefore trusted that the particular breeds best suited to particular localities would continue to be encouraged by the Society. The Duke of Richmond suggested that prizes for cheese should not be forgotten at the Shrewsbury Meeting, as prizes belonging to the dairy character of the district. The

further consideration of the prize-sheet was then postponed.

The Duke of Richmond proposed the best thanks of the Society to be given to Earl Spencer, the President, for his conduct in the chair that day, and for the anxiety he had evinced on every occasion to promote the prosperity of the Royal Agricultural Society of England. Lord Spencer was so well known and estimated by the members of that Society, that it was not necessary for him to detain the meeting with any eulogy on his merits. Mr. Raymond Barker seconded the motion. He had had the good fortune, during the last six years, to be a fellow-worker with Lord Spencer in attending to the business of the Society; and he stood forward on that occasion to bear his testimony to that noble lord's uniform devotion to whatever he undertakes for the public benefit, and especially for the Royal Agricultural Society of England. The motion was then put by the Duke of Richmond, and carried by acclamation. Earl Spencer, in returning thanks for the manner in which the members had received the proposition just put to them by his noble friend the Duke of Richmond, declared his sincere desire to further by every means in his power, a Society so beneficial in every respect to the country.

The President then left the chair, and the meeting broke up.

ERRATA in Report of Mr. Parkes's remarks on Guano and Ashes, page 630; for "washed," read "roasted;" for "Graham," "Graburn."

#### NEW MEMBERS.

John Mott, Esq., of Portwood Lodge, Southampton; Rev. Thomas Cator, of Skelbrook Park, near Doncaster; John Manners Sutton, Esq., of Kelham, near Newark, Notts., and William Arthur Cherry, Esq., of Andover, Hants., were elected Governors, and the following gentlemen Members of the Society:—

Arnold, Thomas, Tamworth, Staffordshire  
Atty, James, Penley Hall, Ellesmere, Shropshire  
Baker, Baker, Hastings  
Bedford, John, Woodcote, Shiffnal, Salop  
Blundell, Joseph, Maidenstone Heath, Hound, Southampton  
Brine, William, Tolpuddle, Dorchester, Dorset  
Brisco, Musgrave, M.P., Coghurst Hall, Hastings  
Buckley, Colonel Edward P., Minstead Lodge, Lyndhurst, Hants  
Clayton, Henry, 21, Upper Park-place, Dorset-square, London  
Colbourne, William, Stratford-on-Avon  
Coles, Henry Beaumont, Middleton House, Whitchurch, Hants  
Collins, Francis, Savernake Forest, Marlborough, Wilts  
Comins, James, South Molton, Devon  
Corbett, James, the Sheriff's Farm, Kington, Herefordshire  
Cotton, Benjamin, Afton House, Isle of Wight  
Cretney, Thomas, Hampton-Wick, Middlesex  
Davies, William, Nethertown Farm, Harewood, Ross, Herefordshire  
Deverell, John, Purbrook Park, Portsmouth  
Faulkner, C. F. Allen, Bury Barns, Burford, Oxon  
Fielder, Charles, Sparsholt, Winchester  
Foster, Augustus, Warmwell House, Dorchester, Dorset  
Gearing, Thomas, Brown-Condover, Alresford, Hants  
Godrich, Thomas, Netley Grange, Southampton  
Godsal, Philip William, Iscoyd Park, Whitechurch, Shropshire  
Grubbe, I. A. Hunt, Windlesham, Bagshot, Surrey

Hall, George, Governor's house, Parkhurst, Isle of Wight  
 Hallett, John James, M.D., Upper Holloway, Middlesex  
 Harding, Jas., Upton-Scudamore, Warminster, Wilts  
 Harris, James, Alton Farm, Amesbury, Wilts  
 Helps, Richard, Gloucester  
 Henty, James (President of the Cornwall Agricultural Association), Trethurffe, Truro, Cornwall  
 Hilder, James, Bodiam, Staplehurst, Sussex  
 Hood, Daniel, Whitsbury, Fordingbridge, Hants  
 Hoper, John, Shermanbury, Horsham, Sussex  
 Hudlestone, Andrew Fleming, Hutton-John, Penrith, Cumberland  
 James, Edward, Banoch Lodge, Carlisle  
 King, Richard, Stoneham, Southampton  
 Lee, Peter, Winchester  
 Livesey, Josh., Stourton Hall, Horncastle, Lincolnsh.  
 Lowe, John, Birmingham  
 Marfleet, John, Mattingly Farm, Easton, Hants  
 Masterton, James, Collingbourne-Ducis, near Marlborough  
 Mechi, John Joseph, 4, Leadenhall-street, London  
 Minchin, Robert Earwaker, Sutton Farm, Alresford, Hants  
 Mott, John, Junr., Portswood Lodge, Southampton  
 Neville, Ralph, M.P., 5, St. James's Place, London  
 Parker, Kenyon S., Q.C., 13, New Square, Lincoln's Inn  
 Parker, William, Ware Park, Herts  
 Parker, Thomas, Martyr-Worthy, near Winchester  
 Patient, Ambrose, jun., Corton, Heytesbury, Wilts  
 Pellatt, Apsley, Knowle Green, Staines, Middlesex  
 Phillips, Henry, Coventry  
 Pipon, Captain Thomas (Queen's Dragoon Guards), Langtons, Alresford, Hants  
 Plowman, Robert, Beck Farm, Beaulieu, Southampton  
 Portal, Meville, Freefold Priors, Overton, Hants  
 Powell, Edward Lloyd, Abergavenny  
 Powles, James, Woollaston Grange, Chepstow, Monmouth  
 Pryse, John B., Trefnanney Hall, Oswestry, Salop  
 Rawson, Richard, Wheathill, Liverpool  
 Read, John Offley Crewe, Laverton House, Milbrook, Southampton  
 Richards, Wm. Haggett, Lea-Coombe, Axminster, Devon  
 Saunders, William, Cranbourne Farm, Sutton, Winchester  
 Savile, Albany B., Oaklands, Oakhampton, Devon  
 Stubbs, Henry, Ropley, Alresford, Hants  
 Tancred, Sir Thomas, Bart., Brighton  
 Thatcher, William, Wackland, Newchurch, Isle of Wight  
 Urry, Barnabas, Newport, Isle of Wight  
 Vogar, Rev. Thomas S. L., Vicar of Walberton, Arundel, Sussex  
 Walker, Charles, Sutton, Tenbury, Worcester  
 Warner, James, Harefields, Bishop's-Waltham, Hants  
 Warner, James, Junr., Curdridge, Botley, Southampton  
 Ware, Samuel, 24, Portland Place  
 Wayne, Thomas Moore, Manor House, South Warrington, Odiham, Hants  
 Whitcombe, John Aubrey, Gloucester  
 Willsher, Robert, Hurstgreen, Lamberhurst, Sussex  
 Winchester, Marquis of, Amport House, Andover, Hants  
 Wingfield, William (Master in Chancery), 73, Eaton-square  
 Woodrudge, Richard, Tichfield Park, Fareham, Hants  
 Woodward, Thomas, Wickstreet, Hailsham, Sussex

## AGRICULTURAL PROTECTION SOCIETY.

## SECOND REPORT OF THE PUBLICATION COMMITTEE.

The Publication Committee, in presenting their second report, have great pleasure in being enabled to inform you that the general plan proposed by them, and approved at the last meeting, has been found to give general satisfaction, and to be efficient in its operations.

We have had a large quantity both of printed tracts and of manuscripts submitted for our consideration, and we gladly avail ourselves of this opportunity to thank those friends of the cause who have done us the kindness of proffering their literary assistance. These works, however, having been written without previous concert, we have found it impossible to adopt many of them, as their line of argument extends rather to the general question than to portions of it; and thus, one pamphlet would be a repetition of another. The enclosed list of tracts will very soon be largely increased, the difficulty of selection is always greatest at first; and your committee feel that it is better to present you with a carefully considered list, though it should be a small one, rather than hastily to adopt publications which might afterwards prove unsatisfactory to the country. A gratuitous distribution of tracts, to a certain extent, has been commenced in two large manufacturing towns.

We have considered it, on the whole, best to make an exception to the rule of not being our own publishers, in favour of Mr. Cayley's pamphlet; and the result has been such as to leave us no cause to regret our having done so. The pamphlet has been widely distributed, to supply the demands from country societies. We have added a short note of two lines at the bottom of the sixth page, to direct attention to the mistake of a word, and the omission of some asterisks; this can be easily corrected in the tenth thousand, which will be the next struck off.

We have seen no reason to disturb the arrangement existing between the Agricultural Protection Society and the newspaper press; but we have again the pleasing duty of informing you that they have done good service in our cause, and that nothing can exceed their willingness in co-operating with us.

With regard to placards, we have forwarded them to country societies, whenever a wish has been expressed; and we take this opportunity of inviting our friends to let us know the particular part of the question to which they wish public opinion, by means of placards, to be directed. We can easily, by statistical details of unquestioned accuracy, print such as may suit their wishes—showing either the contradictions of the League; their intention of reducing wages; the state of foreign labourers; the comparative demand in the home and foreign markets for our manufactures; the proportion of protection enjoyed by other trades; the manner in which our free-trade advances have been met by other nations; or those many other bearings of the subject that will easily suggest themselves to the experienced in particular districts.

The Committee of Publication will not at present trespass further on your attention. Details of a considerable portion of time and labour need not obtrude themselves upon you; probably from this date we shall have more to show for less, or, at all events, for equal trouble. While we are aware how much easier our task would have been, had we precipitately adopted unauthorized statements, or lent ourselves to the bitterness of class or party controversy, we feel we best ensure the approbation and consult the general

object of the society, by confining ourselves to that calm reasoning, and to those practical statements, which can alone, for any length of time, guarantee the approbation of the English people.

AUGUSTUS STAFFORD O'BRIEN,  
17, Old Bond-street, Chairman,  
May 8, 1844.

### THE TURNIP-FLY.

SIR,—A long series of parching drought and many frosty nights having injured the seed and grass crops intended for the scythe, and the scarcity of feed leading to trench on the breadth, and few having obtained a plant of beet or carrots, and the season for sowing them being nearly over, much anxiety exists as to the success of the Swedish turnip crop, as being the only other suitable product for late spring use. This state of things has brought me letters of inquiry, as to whether I still have any faith in the mode of protection from the fly I recommended many years since.

Every means should be used, under present circumstances, to secure a plant of Swedes. I should be sorry that any one should trust to my mode of preventing injury from the fly; but as the cost is trifling, it can be added to other means. We may fairly, however, expect that copious showers, or, indeed, that much rain may fall, and prevent the necessity of much precaution being used to obtain a plant.

I ascertained, by accident, that the fly prefers other food to the Swede, and that the reason why it is more difficult to obtain a plant of Swedes than common turnips is from being sown before other species, at a season of the year, when commonly less rain falls than at a later period, and being slower in growth and less able to withstand the attack of the fly.

Over feeding, whether from genial weather, excess of manure, or thick seeding, will commonly insure a plant; but sowing other seeds, as a decoy, is the most convenient, certain, and economical mode.

The turnip fly abounds in woods, fences, and pastures. This I learned from the Rev. Mr. Kirby, the joint author of the celebrated Treatise on Insects, and some other facts relating to their nature and habits; and, acting on this information, I drilled thick rows of common turnips as a decoy to catch them off, as practised by Mr. Paul, of Starston, some 35 years since. Catching the flies I found to be an endless job; beside, my land being bounded by woods on two sides, the flies so abounded that they destroyed the plants after being hoed out; but on leaving the thickly drilled decoy to feed the flies, I found they did not leave to feed on the newly sown turnips; and, in two instances, it appeared evident that the decoys I had sown, and left, saved the crop from injury, if not destruction, from the larva of the saw-fly—the black caterpillar. The decoys swarmed with both flies and caterpillars during the summer.

I am, sir, your humble servant,

CHARLES POPPY.

No agricultural question is more difficult to write upon, to meet the doubts as to the nature of the turnip fly: the report of the Doncaster Society set that at rest.  
*Witnesham, Ipswich, May 22.*

**CATTLE INSURANCE ASSOCIATION.**—The advantage of this association has already been experienced by Mr. Oldham, of Cubley, near Derby, who suffered a loss by the epidemic, pleuro pneumonia. As soon as his claim was adjusted, a check was forwarded for the amount.

### PRACTICE AGAINST THEORY.

TO THE EDITOR OF THE FARMERS' MAGAZINE.

SIR,—Theorists say that two corn crops should never be taken in succession from the same land. This theory is also put in practice in some districts by good farmers, and as a general rule the practice is good. I have myself, in my earlier days, been a firm advocate for its universal adoption. But experience tells me this theory is not correct in every situation. The best practice is that which produces the greatest value of produce from the same land at the least expense, without deteriorating the soil. To do this, a farmer must study his soil, his climate, and his markets. Science tells us we may grow corn crops in succession from the same land and even one particular description of corn. For instance, barley may succeed wheat, and oats follow the barley, because each take from the soil a different material or require different food. According to science, wheat, or any other grain, may be grown on the same land every year for ages. To do this, it is said, a farmer has only to apply that kind of manure to the soil, every year, which is required by the kind of grain sown. From my experience, science or theory does not agree with practice so far as to recommend sowing one particular kind of grain every year upon the same land; but from my own experience, and from what I see every year in South Lancashire, good husbandry does not forbid either oats or barley following a crop of wheat. The very best farmers, and those who have made the most money by farming, adopt this practice.

In South Lancashire and North Cheshire, a potato crop is almost universally taken in place of a plain fallow, because of the great demand for this root. Potatoes always succeed best after clover or grass of some description, whether it be old or young. Oats always succeed best after wheat because the soil is always more broken and pulverized than when sown after clover or grass. The month of May is dry four times out of five, and in a dry May oats are always much injured when sown upon any description of ley. The furrows lie hollow, that is, there is a certain space hollow under each furrow, and the furrow itself lies compact, except what is broken at top in the process of harrowing in the seed. This is particularly the case in old ley when ploughed up for oats. From these causes, in a dry May, this crop is very much injured, while those sown after wheat will be a good crop. In a dry May, oats on a ley furrow, are often also very much injured by the corn grub. If it be a damp May the slug or white snail is often equally injurious to the crop. Sown after wheat I very seldom see, in dry weather, the grub or the slug do the crop much damage.

Then again, clover or grass seeds always succeed best after a spring tillage, consequently succeed better after barley or oats than when sown on the wheat crop.

In a four-course shift, where potatoes are taken as a fallow crop, a Scotchman would recommend the following rotation. 1st, Potatoes after oats. 2nd,

Wheat. 3rd, Clover. 4th, Oats. Here the green and the corn crops are alternate. I recommend, as by far the most certain and most profitable, the following. 1st, Potatoes after clover or grass. 2nd, Wheat. 3rd, Barley or Oats. 4th, Clover or grass. Here there are two green crops and two corn crops together alternately. Those who adopt this course with spirit, and do their duty to the land by manure and keeping it clean from weeds, have scarce ever a failing crop of any description, while those who adopt the former course have disappointments every year, however well they may perform their duty to the land. This year all the oats sown after wheat are at present looking far superior to those upon a clover or old ley. I am quiet out of favour with sowing any description of grain after grass or clover, except the land be trenched and the sod put below.

In preparing clover ley or old grass land for potatoes, I also recommend trenching either with the plough or spade. The latter, if hands are plentiful.

I am, Sir, yours, &c.,

W. ROTHWELL.

Warwick, May 27th, 1844.

#### AGRICULTURAL QUERIES.

SIR.—I am desirous to obtain all possible information on the comparative profits arising between rearing, and grazing or fattening cattle, upon second and third rate pasture land, which lays high and dry, not much sheltered, and late in the spring; rarely being stocked until the beginning of May, and some part of it not until Midsummer. It has hitherto been used for feeding cattle; but, as I am thinking of rearing instead of feeding, should feel thankful if some one of your numerous readers, who may have experienced or witnessed the difference, would publish it through the medium of your magazine, for the benefit of

May 24th.

A YOUNG DEVONIAN.

SIR.—In your magazine for March, page 208, in an article by Mr. James Campbell, on the effect of soaking seeds in chemical solutions, which is so extraordinary that I was induced to make the following experiment, but, I am sorry to add, with complete disappointment, as not a single grain of the soaked barley germinated. A chemist here prepared for me two pounds of muriate of ammonia, to which was added twelve times its weight of water at sixty degrees temperature, in which I soaked one Winchester bushel of barley thirty hours (Mr. Campbell says barley does not succeed well if soaked beyond sixty hours), and after pouring off the solution, dried it with quicklime in powder to separate the grains (as has always been my practice in pickling wheat for sowing), and sowed it broadcast, having no corn drill. The solution was applied to a row of potatoes, which were not up, and to cabbages, care being taken that it did not touch the leaves. No damage was done to either potatoes or cabbages, nor any perceptible effect produced; but beans and parsnips, both above ground, were

entirely destroyed. I should feel gratified if you, or any of your chemical friends, would, in your next number, inform me of the cause of the failure of my experiment, for the information of others, and, Sir, your obedient servant,

Haverfordwest, May 10th.

F. EATON.

A Cumberland farmer wishes to know the best way of eradicating coltsfoot; the field is a holmy soil of great depth.

#### ANSWERS TO AGRICULTURAL QUERIES.

"A Subscriber" informs us that the best way to drain land where upright springs abound, is to cut a branch-drain from either the main or other drain, direct through the place where the water rises perpendicularly.

SIR,—In answer to the question of a "Young Farmer," in your magazine of this month, respecting his ewes having the rot—he wishes to know if they can be cured—I should say, certainly not. If the liver is diseased, which is the rot, I fear there is no remedy to cure them. The first one that dies, take out the liver and cut it open: if they have the rot, you will find some flat-shaped maggots, called flounders. With regard to fattening them, I have heard many experienced graziers say, "a rotten sheep fats fastest;" but you must keep them doing, and if you can get them to eat salt, they will soon thrive and go on well. Mix it in their food—say, with cake or oats—and let them have rock-salt placed so that they can lick it at all times. If these hints are of any service to you, I should like to hear the result through the magazine.

Rochester, May 4.

Your's truly, L. H.

GORSE AS FOOD FOR CATTLE.—(TO THE EDITOR OF THE MARK LANE EXPRESS).—SIR,—It has been long known that furze or gorse has been used as food for cattle in Wales, and that in the winter it is sufficient to maintain cattle and horses when there is no other food to give them. It has lately been used to fatten cattle in Staffordshire, when mixed with chopped straw, linseed, and turnips; and I have the pleasure to send you the following particulars, which may be useful to your agricultural correspondents. The land for gorse should be kept clear of weeds for the first 18 months, and it will then require little cultivation; the ground may be prepared for turnips, and then sown with barley, and the gorse seed may be drilled in over the barley in rows 15 inches apart, and then rolled down; at the expiration of 18 months, the gorse may be cut with a sickle in alternate rows, leaving the uncut row to shelter the cut row for one year.

One man cutting the gorse in the field, and hauling to	per diem.	
the engine 40 bush. of gorse a day and 20 bush. of	£ s. d.	
chaff from straw, at 10s. per week.....	0 1 8	
Boy driving the horse or engine, and carrying cut		
gorse and chaff to the boiler.....	0 0 8	
One man feeding and cleaning beasts, boiling linseed,		
and preparing food.....	0 2 0	
Cost of linseed—40lb.—2lb. for each beast, at 7s. per		
bush. of 54lbs.....	0 5 8	
Coal to boil linseed.....	0 0 2	
1,200 lbs. of Swedes, 15s. per ton—60lbs. each beast... 0	8 0	
Two horses employed at 1s. 6d. each.....	0 3 0	

£1 1 2

Being £7 8s. 2d. per week for 20 beasts, exclusive of the value of the gorse and straw, for which the manure is a ten-fold compensation. I am, sir, A SUBSCRIBER TO YOUR PAPER.—London, May, 11th.

## AGRICULTURAL REPORT.

GENERAL AGRICULTURAL REPORT FOR  
MAY.

Taken as a whole, this has proved one of the driest, if not the coldest, Mays almost ever remembered. The long continuance of north-easterly winds, together with the absence of moisture, has had the effect of materially checking the progress of vegetation in general, besides producing, in many instances, serious inconvenience to the agriculturists. As might therefore be expected, the young wheat and other grain plants have exhibited rather a stunted appearance; but, with this exception, our reports convey nothing calling for serious observation. It would be premature to hazard an opinion at a moment like this, as to the probable future general yield of corn; yet, we think there is one thing pretty certain, that unless we have, within a very short time, a decided change in the weather, that of beans and peas will prove deficient.

Although the atmosphere has not been quite so genial as would have been desired for the grain plants, it has been by no means unfavourable to the depastured stock, if we except the comparatively small quantity of pasture grass upon which it has had to subsist, which has been received up to the various markets in excellent order; indeed, we may venture to observe that fewer cases of foot-rot have been observed this season than in many previous ones. As to the epidemic amongst the beasts, this has greatly subsided; and, in this particular, there is very little cause for complaint.

The drying winds have caused the pastures to have an unusually barren appearance; indeed, many of the grass lands have scarcely any fodder for the cattle: hence, the graziers have been compelled to use almost the whole of the available fodder for their stock upon the farms. Notwithstanding, however, this unfavourable prospect for the hay harvest, the value of both hay and straw in the metropolitan and other markets has continued to rule unprecedentedly low. It is true, towards the month's conclusion, a trifling rise—of from 2s. to 3s. per load—took place in the value of the best old meadow hay; but, with this exception, the trade has ruled miserably dull.

In Kent, Devonshire, &c., there is a most excellent show for fruit.

It is now well ascertained that the imports of live stock which took place last year under the new tariff, were productive of considerable loss to the speculators, yet we have again had arrivals of both beasts and sheep from Holland, Germany, and Spain, to the extent of about sixty head. These importations, however, may be regarded more in the light of experiments than actual investments, for we find that less than a moiety has been offered for sale in London and some of the local markets, the remainder having been sent into the markets to be *fattened* for consump-

tion. In our opinion, this will turn out a most profitless affair, for in no one instance in which foreign beasts have been either stall or grass-fed in this county have they thriven. On the contrary, the change of diet has had such an unfavourable effect upon them, that in the course of a very few weeks they have been attacked with disease, and rendered almost valueless. From the United States, and Canada, immense quantities of salted beef and pork, together with hams, cheese, bacon, &c., have come in, yet the demand for those articles has improved, and prices have been well supported. For instance, American cheese has sold at from 34s. to 48s.; beef, 30s. to 38s.; pork, 36s. to 40s. per cwt.; tongues, 24s. per keg; smoked hams, 52s. to 56s. per cwt., duty paid; beef, for ship's use, 80s. to 90s.; prime mess, 65s. to 70s. per tierce; and prime mess pork, 45s. to 52s. 6d. per barrel, in bond. At these rates, a good business has been transacted, with every prospect of higher figures.

Our advices from Scotland are to the effect that very little rain has fallen there, yet the young wheats are generally represented as wearing a very healthy and promising appearance, in the lowland, as well as in the highland districts. The stocks of most grain proving small for the season, the various markets have been rather scantily supplied, yet the general inquiry has ruled in active, at but little variation in prices, if we except oats and other spring corn having had an upward tendency.

The exports of grain from Ireland for our markets have not been large for the season; while it is now estimated that a very limited quantity of wheat remains in the hands of the growers; owing to which, that article has been held firmly at higher rates: the value of other corn has been supported.

The following is our usual statement of the supplies and prices of fat stock exhibited and sold in Smithfield Cattle Market since our last report. The former have amounted to 12,220 beasts, 142,136 sheep and lambs, 1,809 calves, and 2,457 pigs; while the latter have ruled as under:—

	Per 8 lbs. to sink the offals.			
	s.	d.	s.	d.
Beef, from . . . . .	2	4	to	4
Mutton. . . . .	2	6	„	4
Lamb . . . . .	4	8	„	5
Veal . . . . .	3	4	„	4
Pork . . . . .	3	4	„	4

Compared with some previous months, the trade has ruled steady, but by no means brisk; and prices, though they fluctuated considerably towards the latter portion of this period, have been fairly supported.

In May, 1843, the following were the supplies brought forward in this market, and the prices obtained for each kind of stock:—

SUPPLIES.		PRICES.	
Beasts . . . . .	11,200	Beef . . 2s. 6d. to 4s. 0d.	
Sheep & lambs	117,429	Mutton 2 10	„ 4 0
Calves . . . . .	1,341	Lamb . 4 8	„ 5 8
Pigs . . . . .	1,294	Veal . . 3 4	„ 4 4
		Pork . . 3 0	„ 3 10

The following is a statement for May, 1840.

SUPPLIES.		PRICES.	
Beasts . . . . .	12,329	Beef . . 3s. 0d. to 4s. 8d.	
Sheep & lambs	113,384	Mutton 3 6	„ 4 8
Calves . . . . .	998	Lamb . 6 0	„ 7 0
Pigs . . . . .	3,892	Veal . . 4 8	„ 5 8
		Pork . . 4 0	„ 4 8

During the same month, in 1833, the reports stood thus:—

SUPPLIES.		PRICES.	
Beasts . . . . .	12,882	Beef . . 2s. 2d. to 4s. 2d.	
Sheep & lambs	135,529	Mutton 3 2	„ 4 2
Calves . . . . .	960	Lamb . 5 0	„ 7 0
Pigs . . . . .	6,232	Veal . . 4 0	„ 5 8
		Pork . . 3 0	„ 4 8

In May, 1828, the following account was returned:—

SUPPLIES.		PRICES.	
Beasts . . . . .	10,144	Beef . . 3s. 2d. to 5s. 0d.	
Sheep & lambs	79,810	Mutton 3 6	„ 5 0
Calves . . . . .	669	Lamb . 6 6	„ 7 6
Pigs . . . . .	660	Veal . . 4 10	„ 6 4
		Pork . . 4 6	„ 5 8

From the above tables of comparison, which

we give as a guide to our graziers, it will be seen that though no material improvement has taken place in the supplies, prices still continue to rule low.

A STATEMENT AND COMPARISON of the SUPPLIES and PRICES of FAT STOCK, exhibited and sold in SMITHFIELD CATTLE MARKET, on Monday, May 29, 1843, and May 27, 1844.

	Per 8 lbs. to sink the offals.		May 29, 1843.		May 27, 1844.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Coarse and inferior Beasts . . . . .	2 4	to 2 6	..	2 4	to 2 6	
Second quality do . . . . .	2 8	3 0	..	2 8	2 10	
Prime large Oxen . . . . .	3 2	3 6	..	3 0	3 6	
Prime Scots, &c . . . . .	3 8	3 10	..	3 8	3 10	
Coarse and inferior Sheep . . . . .	3 0	3 2	..	2 8	3 0	
Second quality do . . . . .	3 4	3 6	..	3 2	3 4	
Prime coarse woolled do . . . . .	3 6	3 8	..	3 4	3 8	
Prime Southdown do . . . . .	3 10	4 0	..	3 10	4 0	
Lambs . . . . .	4 4	5 4	..	4 8	5 8	
Large coarse Calves . . . . .	3 4	4 0	..	3 4	4 0	
Prime small do . . . . .	4 2	4 4	..	4 2	4 6	
Large Hogs . . . . .	3 0	3 6	..	3 0	3 8	
Neat small Porkers . . . . .	3 8	3 10	..	3 10	4 2	

	SUPPLIES.	
	May 29, 1843.	May 27, 1844.
Beasts . . . . .	2,952	2,622
Sheep & Lambs . . . . .	30,140	30,280
Calves . . . . .	176	119
Pigs . . . . .	324	328

Newgate and Leadenhall Markets have been rather heavily supplied with both town and country-killed meat, while the demand for it has ruled heavy, and prices have been with difficulty supported, they having ruled as follow:—Beef, from 2s. 2d. to 3s. 4d.; mutton, 2s. 4d. to 3s. 10d.; lamb, 4s. 6d. to 5s. 10d.; veal, 3s. 4d. to 4s. 6d.; and pork, 3s. 6d. to 4s. per 8 lbs. by the carcass,

## CALENDAR OF HORTICULTURE.—JUNE.

*Retrospect.*—In recurring to our meteorological observations, we trace no period since the year 1825 which can at all compare with that of the last seven weeks. It now, perhaps, is unfortunate that March till Lady-day was a rainy season; otherwise, vegetation would have been parched by the continuous power of the sun, from that date till the 15th of May inst., when a forcible north-eastern current set in, which on the 17th reduced the temperature, that had been frequently at 72°, to 32°, or the freezing point. Clouds then formed, and a few hasty drops fell here and there; but there was no soaking rain, nothing to penetrate three inches of soil.

We never recollect a period so brilliant: the heavens by day and night have been beautiful in the extreme. But spring requires showers, and these, if we except the few hours' rain of April 12th and 16th, have been withheld; and in their place an east wind, cruel and cutting to an unwonted degree, with leaden heavy masses of tantalising clouds, have followed the light depression of the weather glass, which proved only a very temporary exception to an altitude of extraordinary duration. The extreme rigour abated on the 20th, though the force of the wind continued very great.

The ground is dry, and seeds cannot rise; nor is it of much use to attempt to sow. Potatoes

are not all in; and unless rain come speedily, the crop will be very doubtful.

In this state, is it of use or not to hoe or dig the land? We ask this, because we read of the good effects of commination, but see and hear that the ground is wet at some depth, and that crops left at rest sustain themselves on the undisturbed surface, where as they shrink and become flaccid after a good deep hoeing.

We generalise too much: the timing of operations is a main requisite. It is not enough to vote a measure good—the *what*, the *when*, and the *where*, are considerations of equal moment. If the land has been deeply imbued with moisture, can it be good, is it rational to open that land, heated as it is like a hot-bed, and thus produce the inevitable escape of watery vapour, exposing at the same time the tender roots to half baked heated clods, which will absorb, but cannot convey a particle of moisture to their fibres? The allusion to drought and its concomitants leads to the consideration of *water*, and its application to the purposes of agriculture.

Chemically viewed, water is uniform in its constitution; or, in other words, it is resolvable, by analysing, into definite volumes of the two gases, *hydrogen* (the base, or generator of *vapour* water) and *oxygen*; which elements can be and continually are re-united in direct experiment,

and again assume the condition of fluid water; facts conclusive of the truth of theory.

But water, like air, is susceptible of abundant changes of quality: pure in itself, it can unite with many substances by solution or intermixture, which either degrade, or exalt its qualities; and thus we find it in nature. In the form of *rain*, the purest condition in which it can be collected, provided the country be open and free from smoke, water still contains an extremely minute quantity of *ammonia*; in ponds and soft rivers, running over a clayey bottom, it contains more or less of vegetable and animal matter, with varying portions of earth, lime, sulphate of lime, clay, &c., &c.; and in wells it is frequently adulterated with a considerable quantity of carbonate or sulphate of lime, either of which can be detected by alkalies, or oxalate of ammonia.

For the purposes of horticulture, the *water of ponds* formed by rills, or drainage from meadows of good loam, is ever preferable: to use the language of Nicol, and other writers at the commencement of the present century, "it is the life and soul of a garden," and ought not to be absent. It contains all the manure that plants either in the garden or kept in pots, can require to be given in the liquid form, and it hurts nothing: if wisely employed, we believe it preferable to rainwater caught and retained in tanks.

*Hardwater*, which will curdle soap, contains too much chalk for many plants; such as heaths, epacris, azaleas. Yet we have been constrained (and so have some nurserymen) to resort to it for weeks; previously, however, softening it so far as it might be, by exposure in open vessels to the air for twelve or more hours, and without injurious effects. Water, however, to be of any real avail to garden-crops and strawberries, ought to be given copiously to drenching; and, if possible, on some mild cloudy evening. Sprinklings are of disuse; they harden the surface, and attract from below the ground moisture, which thus is carried off the more speedily by evaporation.

In the sowing of seeds near the surface, the earth ought to be copiously sprinkled for three successive nights, covering the site during the days with mats. In drill sowing, the drills should be drenched, and the seed being sown they ought to be again watered, as also the covering earth, upon which a layer, two inches thick, of moist half-decayed leaves being laid and flatted down, the moisture within the earth would be retained for a considerable time.

As rain commenced, and continued for hours, on the 21st, when we concluded this article for the press, the earth may be brought into a mellow and fit condition for the seasonable operations now to be detailed.

#### WEEKLY OPERATIONS IN THE KITCHEN-GARDEN.

**First week.**—Sow *Kidney-beans*, dwarf and runner varieties; early Kent and Charlton *Peas*, *Broad-beans*. Prefer a rich, free loam, and make the bottom of each drill firm, and even scatter a little powdery compost, as dried *cloacine* or *guano*,

powdered bones, or such like, among the covering earth, and rake that finely over the seeds.

**Second week.**—Sow a sprinkling of *Cabbage*, *Broccoli*, *Turnip*, Swedes of the best garden kind, *Lettuce*, *Onion*, *Turnip-radish*, *Long-radish*, and *Salading*. *Potatoes* may require earthing; some sorts grow upward, and expose the tubers. If the ground be moist and friable, go over the plot with a light mattock, loosen it well, and then draw the fine earth against the stems. Now, or in the

**Third week.**—Transplant *Lettuce* of all kinds into very rich soil, small plants of *Cabbage* into nursery rows, and all the plants of the brassicae, as *Cabbage*, *Savoy*, *Brussel's sprouts*, *Kale*, and *Broccoli*. Cease entirely to cut *Asparagus*, always making it a rule to leave one shoot to every plant; then weed the beds, sprinkle guano or the like over the rows, and, what is better—though it ought to have been recommended early in spring—dig a trench two feet deep between rows or beds, or insert as much rotted manure, care being taken to avoid large roots. This is the way to fertilize a plantation.

**Fourth week.**—Repeat the several sowings, including endive. Earth up rows, stick peas, destroy weeds, and keep the plots neat. Plant slips of all sweet herbs, and cut those coming into flower for drying.

#### FRUIT DEPARTMENT.

*Peach*, *Nectarine*, and *Apricot*, also some *Plum* and *Cherry Wall-trees*, require a regulation, leaving the growing wood selected for the next year's bearers laid in orderly, so as to distribute it over the tree as regularly as circumstances permit. Mildew is a "plague spot" upon peaches this year; it is a plant that first produces a white mealiness upon the points of the growing shoots, then spreads, seizes the fruit, and blotches it all over; in nectarines this can be rubbed off, but it cannot be removed from the down of the peach; syringing with sulphured water, aided by rubbing some flowers of sulphur upon the infected spots, is the best remedy we hear of.

*Vines* are in some places a failure, at least either at home or abroad or in distant counties; we cannot see anything like half a crop on the walls. In some vineries, also, the deficiency appears to be as great. The watery character of May and June of 1843 may be mentioned as a possible cause, especially as we had no maturing weather till the middle of August. Keep the shoots in ample quantity, nicely and frequently nailed in; those in the vineries also, and the advancing berries thinned out when of the size of a pea. In thinning, a sharp-pointed scissor, aided by a possible slender bit of smooth deal, wherewith to separate and discover the berries to be displaced, are required; it is better to use the stick than to pull about the cluster with one hand, while the other serves the foot-stalk, as thereby the bloom and skin are less subject to injury.

*Stove*, and *Pine-pit*, &c.—Keep these active, and the plants free from scale. Watch the melon and cucumber pits, to maintain a moist heat and

cleanness of plant. This sunny weather is sadly favourable to the acarus (called Red Spider).

#### FLOWER DEPARTMENT.

Plant out a succession of *Crysanthemums*, *Dianthus*, *Verbenas*, and indeed everything that has been raised for bedding out. The system of mashing produces a fine effect with figured beds upon extensive lawns; but the miscellaneous selection, nicely grouped as to sizes and colours, is perhaps most effective in borders and extended beds. Pinks and carnations should be by themselves; a fine collection of either, nicely tied up, forms a beautiful object. All the routine operations must be strictly attended to, and in time.

We have now witnessed, during several days, the efficiency of the new tank system with water gutters, and can testify that no apparatus so simple, complete, trustworthy, and cheap withal, have ever before come under our notice. Two houses can either be excited together, and in a few

minutes, when 52 gallons of water are rendered perfectly hot; or one house, that with the tank, can be kept nearly at 70° by a small quantity of coke, scarcely a peck of which will remain ignited for fourteen hours. The bottom heat over the trough is communicated through the medium of moist sawdust blended with a third or fourth part of coarsely pounded charcoal.

The violent and penetrating easterly winds within the week ending on the 20th day of May, have tried the equability of this structure, which has been maintained with sufficient nicety, though the fire has never been urged to half its power. We repeat it, that with some attention to modify the medium for bottom heat according to the proposed object, any sort of fruit, pine, melon, cucumber, and what not, as well as the ornamental hothouse tubes, can be cultivated in a very superior manner, and with half the usual trouble and attendance.

May 21, 1844.

## REVIEW OF THE CORN TRADE DURING THE MONTH OF MAY.

We have experienced very extraordinary weather during the last two months. April, usually one of the most showery months in the year, commenced and ended almost without rain; but as the ground had previously been well saturated with moisture, this was regarded as rather a favorable circumstance, and it was not before the beginning of May that apprehensions began to be entertained that the drought might prove injurious to the country. Since then, however, nearly another month has passed, during which time scarcely sufficient rain has fallen to penetrate the ground; so protracted a period of dry weather must unquestionably have greatly retarded vegetation; and as regards spring-sown corn, there can be no doubt that mischief has already been done to an extent which must detract from the productiveness of the crops. The accounts from most of the principal barley growing counties are, we grieve to say, far from satisfactory. That portion which was sown early, has perhaps escaped unharmed, but the later sown has in many cases failed to germinate; or, where it has appeared above ground, it has come up so unevenly, and wears so stunted and unhealthy an aspect, that to anticipate anything approaching an average yield would be more than sanguine.

In addition to these unfavourable reports, we hear that in several counties, where the soil consists of retentive clay, a considerable breadth of land intended for barley has not yet been sown, the excessive wet weather during the month of March having in the first instances prevented the operation being commenced, and the subsequent hot sunshine and drying winds having hardened the ground to such a degree as to render ploughing and sowing almost impracticable; the conse-

quence is, that the ground originally destined for that crop will either have to be employed for other purposes, or if sown at this advanced period of the year with barley, chances are more against than in favor of its ever producing a crop.

The foregoing remarks are also applicable to oats, though in a somewhat modified form, firstly, as this grain is now much less extensively sown in England than barley, our supplies being chiefly furnished by Ireland and Scotland, (in both of which countries partial showers have from time to time fallen); and further, because, being mostly sown at an earlier period, the work had already made considerable progress prior to the commencement of the unfavourable weather.

Up to the end of April, beans and peas wore a very promising appearance, but since then a very unfavourable change has taken place. In very many instances the beans were in bloom when only a foot high, and they cannot therefore be expected under any circumstances to bear well. Peas are equally stunted in growth, and the lower part of the haulm has within the last few weeks become dry and yellow; where the pods are set they contain a very small number of peas, and where late sown there is an appearance of the bloom dying off without forming fruit. After enumerating these distressing effects of the dry weather, it becomes the more gratifying to turn to the comparatively cheering accounts which continue to reach us from all parts of the kingdom in regard to the young wheat. This plant is by nature calculated to withstand drought, and as it had gained considerable strength previous to the rain ceasing in March, the weather subsequently experienced has apparently inflicted but very partial injury; indeed, from all we can learn on the subject, this promises to be a fair wheat year.

The ground being thickly covered by the plant at the commencement of April, was less acted upon by the sun, and consequently retained its moisture long after the comparatively bare barley lands had become parched; this circumstance and its natural characteristics are sufficient to account for the present difference in the aspect of the two crops. Of late the blade has been more or less affected by the sharp night frost; the night of the 17th inst. proved particularly trying in this respect, changing in some localities the previous healthy colour to a hue approaching yellow, but we are disposed to think that the mischief extends no further than the blade, and doubt not that a few weeks of more genial weather would, as far as regards wheat, set all right again.

Whilst the effects of the weather have been such as above described on the grain crops, it may easily be imagined that grasses, both natural and artificial, must have suffered extensively, and it is now certain that the produce of hay must be exceedingly short in all parts of the kingdom.

On this subject the accounts are unanimous, and there can be no doubt, that fodder will become very dear.

The wheat trade has throughout the month remained in a quiet state, and until about the middle no variation occurred in the value of the article: the simultaneous arrival of large supplies from abroad about that period, at the principal out-ports, shook the confidence which holders had until then felt, and a greater anxiety to realize became apparent. In the same proportion as the wish to sell increased, so did the disposition to purchase diminish, and the natural consequence of supply exceeding demand, namely, a fall in prices, was the result. The decline, however, has up to the present period been only trifling, and has scarcely at all extended to fine qualities, of which the millers stand greatly in need in all parts of the kingdom. Although the weather has for nearly two months been of a character well calculated to improve the condition of the wheat of last year's growth, the supplies brought forward by the farmers have consisted, principally, of coarse and inferior samples; proving, that though the quantity may have been under estimated at the time of harvest, there was no mistake as to the quality. This is likely to have a material influence on the averages, and, from present appearances, there seems little chance of a low duty, unless we should unfortunately experience an unfavourable blooming time, or other injury threaten the growing crop.

A reference to the general weekly average price for wheat will show how little alteration has in reality taken place since our last; the first return this month, published on the 3rd, being 55s. 6d. per qr., whilst that issued on the 24th, is 55s. 10d. per qr. The duty has hitherto remained stationary, but there is a strong probability of its advancing a step in the course of a few weeks; meanwhile importers of foreign have endeavoured to effect sales from on board ship, and as far as this has been practicable they have entered for home consumption; still the total quantity on which

the 17s. duty has hitherto been paid has not been considerable, the bulk of the receipts from abroad having been landed in bond. Should it, however, (as most likely it will) become evident that a further advance of 1s. per qr. must take place in the duty, we are disposed to think many importers will prefer at once clearing in from on board ship to landing under lock, and it is therefore probable that in the course of the next fortnight some addition will be made to the stock of free wheat in the country. It is evident that this gradual mode of introducing the foreign supplies acts less injuriously on the interest of the British grower, and more in favour of the consumer than the release of large quantities at once, inasmuch as violent fluctuations of prices are thereby prevented.

The future range of the value of wheat will, in our opinion, be almost exclusively ruled by the weather; and so will, in a great measure, the extent of the importations from abroad.

So long as the prospects continue auspicious, prices are not likely to vary much; for whilst on the one hand, an upward tendency will be checked by moderate entries of foreign for consumption whenever the duty may range between 15s. and 17s. any material decline will be prevented by the cessation of these supplies so soon as the latter rate is exceeded.

The same circumstance is likely to influence merchants both here and on the other side; the slightest chance of a profit resulting from imports into Great Britain, would give a stimulus to business in grain all over the continent, and ensure our receiving large supplies; but whilst the trade remains in so calm a state in this country as it has done of late, with scarcely any prospect of a low duty, the shipments will be comparatively unimportant.

This view of the subject may not at first sight appear to agree with the fact, that large supplies have during the month arrived at London, Liverpool, Hull, &c.; but it must be borne in mind that these receipts are not in consequence of any recent purchases made on the other side, but the result of the contracts entered into during the whole of the autumn and winter months.

The arrivals of home-grown wheat into London have, since our last, been to a fair extent; indeed the supplies may be said to have exceeded the quantity generally expected, and having at the same time consisted for the most part of ordinary qualities, no slight difficulty has been experienced in effecting sales. Really fine parcels have, owing to their comparative scarcity, commanded nearly previous rates, but the decline on other descriptions has been rather important. On the 20th inst. the downward movement commenced, it being then found necessary to accede to an abatement of 1s. to 2s. per qr. to effect a clearance of the Essex and Kent stands. On the following Monday there was a large show of wheat from the home counties, besides a fair supply from the coast of Lincolnshire, and though selected qualities still continued to be held at former terms, a further reduction of

fully 1s. per qr. occurred on the general runs, no part of which decline has since been recovered.

There can be no doubt that the fall was in a great measure caused by the large arrivals of foreign wheat; not less than 73,691 qrs. having come to hand at this port alone during the three weeks, terminating on Saturday the 25th inst. This supply was, it is true, expected, and its appearance would therefore perhaps have had less influence had the cargoes come forward in good condition, but the major part of the receipts have shown a decided inferiority both as to quality and condition, when compared with the produce of former years. Really good wheat our millers were in want of, and such would consequently have met a ready vent; coarse sorts were not required, hence buyers have acted with great circumspection. Importers have shown a willingness to pay the existing rate of duty, and we have constantly had a large quantity offering free from on board ship below cost price. Common descriptions of red wheat, weighing 60 to 61 lbs. per bushel, have recently been sold at from 53s. to 55s. per qr., free; when the duty (17s.) and other expenses including freight and insurance (5s. per qr.) be deducted, the nett produce will be considerably less than the rates at which the principal part of the purchases were made in the Baltic during the winter. Under these circumstances, it may be presumed that the English merchants will desist from entering into further investments abroad, until prices approximate somewhat nearly on the other side to those current in this country than they have hitherto done, and by that means lessen the importations.

Beyond an occasional small parcel taken for shipment to France, nothing whatever has been done in bonded wheat, and its value has fluctuated in precisely the same degree as that of free, the difference between the two being the duty chargeable on the former. The stock of wheat under lock in the United Kingdom consisted, on the 5th of May (the latest date to which the account is officially made up), of 238,283 qrs.; and there were, on the same day, 64,767 qrs. in bond at this port. These amounts have, however, been considerably added to by the plentiful supplies which have, within the last few weeks, come to hand.

The trade in flour has, throughout the month, remained in a state of great depression. The nominal top price of town-manufactured has undergone no change, but this has long since ceased to be any criterion of the real value of the article, many of the principal millers having ceased to pay any regard to the endeavours made by a few to regulate prices. Household and number two flour has been selling at irregular rates, according to quantity and the extent of credit given to the purchaser, it is therefore difficult to give quotations; 43s. to 44s. for the former, and 40s. to 42s. per sack for the latter, may, however, be taken as about a fair valuation.

The London millers have, owing to the inferiority of a large proportion of the wheat of both

home-growth and foreign, experienced much difficulty in keeping up the quality of their manufacture, and to succeed in so doing they have been compelled to be satisfied with very small profits, inasmuch as it has been absolutely necessary to use a certain proportion of *fine* wheat, the price of which has scarcely given way at all; whilst consumers, making no allowance for this fact, have expected flour to recede to the same extent as prices of *low* quantities of wheat have declined.

Whilst we are treating of the article flour, it may not be out of place to remark, that according to the most recently received advices from Canada, it would appear that a large importation of the article from thence may be expected. Letters from Montreal, dated 13th May, inform us that though the regular business season had hardly yet commenced, purchases of flour to some extent had already been made for export to Great Britain, at about 26s. 9d. per barrel. The freight from thence to London will probably be 4s., and as the duty is only nominal under the new Canadian bill, our farmers and millers may anticipate a powerful competition from that quarter.

The conviction that our own crop of barley was very deficient, induced many merchants and distillers, soon after harvest, to send out orders to the continent for the purchase of this grain; and as the belief that the produce was decidedly short continued to gain ground as thrashing was proceeded with, further investments were made from time to time at different ports, throughout the winter, until between 250,000 and 300,000 qrs. had been secured. The knowledge that this large quantity was sure to find its way to this country soon after the navigation of the Baltic should have been set free from ice, caused buyers to act extremely cautiously throughout the winter. Prices did not, therefore, rise so high as had been anticipated, and the lowest point to which the duty fell was 5s. per qr. This occurred on the 8th of February, and it remained stationary at that point till the 25th of April, rising to 6s. prior to the arrival of the bulk of foreign supply. Under these circumstances, and with gradually receding rates, until good 52 to 53lbs. qualities were sold in London as low as 27s. to 28s. per qr., speculators can have made little by their operations; indeed, there can be no doubt that heavy losses must, in many cases, have been sustained by importers, which will, we trust, have the effect of warning others from entering into similar rash speculations. Not that we entertain any doubt of the whole of the supply being ultimately required, but we maintain that it would have been got on more advantageous terms if our merchants had allowed the foreigner to consign and take the risk, instead of driving up prices by high limited orders being sent out to the continent. However, the mischief has now been done, and many must suffer severely. The present low price of this grain cannot, we think, last long; hereafter the arrivals from abroad are likely to be comparatively

unimportant, and it is an universally admitted fact that our own farmers have very little remaining on hand. It is, therefore, fair to infer that so soon as the pressure under which the trade labours, from so large a quantity being all at once thrown on the market, shall have somewhat decreased, a rally in prices will occur. We must, consequently, recommend such of our agricultural friends as have still stocks of this grain to refrain from pressing sales at present, being convinced that they will do better later in the year.

The arrivals of foreign barley into London have, during the month ending on the 25th instant, amounted to no less than 120,614 qrs., and duty has been paid within the same period on 65,944 qrs.

We observe that the repeal or modification of the malt duty is again being agitated. It is almost needless to dwell on the many advantages which would result to the farming interest, as well as to the labouring classes generally, from so desirable a measure being carried into force; nor could a more fitting time than the present be chosen to press the subject on the consideration of ministers. With a considerable surplus in the revenue, how could that surplus be better employed than by giving some relief to that portion of the community who have hitherto had to stand the brunt of the experiments made in free trade doctrines. After inflicting the tariff and the Canadian corn-bill, so injurious to the agriculturist, on the unfortunate farmer, surely when the opportunity offers of benefiting him without injuring any other class, this at least might be expected from a ministry who owe their power to the landed interest and tenant farmers.

The depression in the barley trade has naturally had more or less influence on business in malt, but though the transactions in the article have been on a retail scale since our last, no material variation has occurred in prices.

Oats have come forward very sparingly, and unless the quantity of this grain still held in Ireland and Scotland should hereafter prove to have been greatly underrated, the value of the article must rise materially. Our own farmers have, we believe, little more on hand than will suffice for home use, and, as the stocks in the hands of merchants and dealers are small at all the principal English markets, large imports from Ireland are likely to be needed. Since the close of last month a decided improvement in prices has occurred, not only at the leading consuming towns but likewise in the agricultural districts. The rise, taking the kingdom collectively, may be fairly estimated at 1s. to 2s. per qr., and the averages are now coming higher from all parts of the country, rendering it very possible that in the course of a few weeks the duty may recede a step or two. The probability of such an event, and the general belief that oats will be much wanted in July and August, have caused orders to be transmitted of late to the continent for this grain. The quantity as yet purchased abroad is not considerable, but as the chances of profit increase, investments at foreign ports will be mul-

tiplied, and an importation from the Danish islands, Sweden, and some of the Mecklenburg and Pomeranian ports may now be expected, in addition to the quantity contracted for in Russia during the winter, whilst from Holland we shall also receive a small supply; under these circumstances it may become a matter of consideration with the British grower, in how far he will act prudently by holding. Present rates are remunerating, and though there is a chance of prices being higher towards autumn, there is also a possibility of a sudden depression occurring about that time, should a larger arrival of foreign take place than had been previously calculated on.

The protracted drought has given rise to a speculative demand for beans, and the dryness of the atmosphere having at the same time greatly improved the quality of those of last year's growth, advanced terms have been realized. In the London market good to fine parcels have been lately selling at 32s. to 35s. per qr., and in many parts of the country still higher rates have been obtained; the averages have consequently risen to an extent which renders a reduction in the duty nearly certain. The weekly return for the kingdom, on the 4th May, was 31s. 9d., whilst that published on the 24th was 33s. 3d., shewing a rise of 1s. 6d. per qr. The stock of beans under lock in the kingdom consisted, on the 5th May, of 62,264 qrs., of which 19,776 qrs. were held in London. By far the larger proportion of the quantity in bond is composed of Egyptian, and a considerable extent of speculation has been going forward in this variety. A month or six weeks back good qualities were sold in bond at 16s. per qr., whereas several parcels have lately changed hands at 20s., and holders now generally ask 21s. per qr. for the finer sorts in the metropolitan warehouses. A few orders have recently been transmitted to Alexandria for this article, and we may also calculate on receiving a moderate importation from the Baltic.

Though the growing crop of peas has probably been affected as injuriously by the dry weather as that of beans, less disposition has been shown to make speculative purchases, and notwithstanding a decided falling off in the supplies, prices have only risen about 1s. per qr., still the present position of the averages warrants the expectation of a lower rate of duty; and it is therefore likely that a few shipments will be made abroad to this country. Whatever predictions we have ventured on in the foregoing remarks must be understood as in a great measure dependent on the weather. That the protracted drought we have experienced must have done injury to vegetation there can be no doubt; but it is not yet too late, should the weather even now become really propitious, for much of the mischief to be repaired. We sincerely hope that the wished-for change may not be long delayed—a productive year with moderate prices (when the lowness of the price is the result of a large home growth) being always more favourable for the farmer and the community at large than scarcity and high prices.

At most of the continental markets from whence Great Britain receives the greater part of her foreign supplies, quotations of wheat have not varied much during the month: in the early part the tendency was rather downwards at most of the leading Baltic ports, but the somewhat more encouraging reports which left this country the first week in May caused a slight reaction on the other side, and the letters from Danzig, dated 18th inst., inform us that 20,000 qrs. had been bought there within eight days at slightly enhanced rates. The orders for these purchases had, it appears, been received principally from our outports, comparatively few having emanated from London. Good 61 to 61½ lbs. wheat (fine high-mixed), the growth of 1843, had been sold at 37s. to 38s., being 1s. to 2s. per qr. above previous prices. The condition of the new wheat had, owing to the dry weather permitting of its being turned in the open air (for which there are peculiar facilities at Danzig), been much improved, and to this circumstance a part of the rise in its value may be attributed.

The appearance of the growing crops in that neighbourhood, as well as in other parts of Prussia and Poland, is very well spoken of, the drought not having been so severe in that quarter as in this country. At those ports in the Baltic from whence red wheat is generally shipped (we allude more particularly to Rostock, Wismar, Stralsund, and Wolgast), the operations in wheat have not been of much importance during the month, owing partly to prices being relatively higher at these places than at Danzig, and partly to the inferiority of the quality of those parcels which have lately reached this country from the ports named, having deterred merchants from making further investments.

Freights are very moderate from all parts of the continent; the vessels recently engaged to load wheat at Danzig for London having obtained only 3s. 3d. per qr.

Owing to the wants of France and those of the kingdoms of Naples and Sicily, quotations of wheat have ruled very high at all the Mediterranean ports and also in the Black Sea. It is now certain that very little wheat will be imported into this country from the South and East.

Letters from Naples of the 13th May inform us that the permission to import grain free of duty had expired at the time originally fixed, namely, at the close of April, but the Government had deemed it necessary to guard against future want by prohibiting the export of corn. The spring had been unusually dry, but the fears entertained for the crops had been greatly relieved by copious showers in May.

Advices from Leghorn also speak of rain, and state that the aspect of the country had been so greatly improved thereby as to cause a decided reaction in the grain trade, holders having become extremely anxious to realize.

## COMPARATIVE PRICES OF GRAIN.

MAY 27.

WHEAT, Essex and Kent, new, red	56	60	White	58	60	64
Irish	50	54	Do.	52	58	
Old, red.	59	62	Do.	55	60	63
RYE, old	30	36	New	56	—	
BARLEY, Grinding, 28 30 Malting	32	34	Chevalier	34	36	
Irish	28	32	Bere	26	28	
MAIZE, Suffolk and Norfolk	60	62	Brown	56	58	
Kingston and Ware	60	63	Chevalier	60	63	
OATS, Yorksh. & Lincolnshire, feed	21	22	Potato	22	25	
Youghall and Cork, black	21	22	Cork, white	21	22	
Dublin	21	22	Westport	21	22	
Waterford, white	21	22	Black	21	22	
Newry	22	23				
Galway	20	21				
Scotland, feed	22	23	Potato	23	25	
Clonmel	21	22	Limerick	21	24	
Londonderry	21	22	Sligo	21	22	
BEANS, Tick, new	34	36	Old, small	38	40	
Greys	33	35	Maple	34	36	
White	33	35	Boilers	32	36	

## IMPERIAL AVERAGES.

Week ending.	Wheat.	Barley.	Oats.	Rye.	Beans.	Peas.
April 18th	55 1	33 1	20 1	32 4	31 2	32 5
20th	55 4	32 10	20 2	32 3	31 3	31 5
27th	55 6	32 7	20 1	31 2	31 4	30 8
May 4th	55 3	31 8	20 1	30 11	31 9	31 2
11th	55 1	31 5	20 5	31 4	32 5	32 3
18th	55 10	31 1	21 0	31 2	33 3	31 8
Aggregate average of the six weeks which regulates the duty.	55 4	32 1	20 4	31 7	31 11	31 7
Duties payable in London till Wednesday next inclusive, and at the Outports till the arrival of the mail of that day from London.	17 0	6 0	6 0	10 6	10 6	10 6
Do. on grain from British possessions out of Europe.	4 0	0 6	2 0	1 6	2 0	2 0

Account shewing the Quantities of Corn, Grain, Meal, and Flour imported into the United Kingdom, in the month ended the 5th May, 1844; the Quantities upon which Duties have been paid for Home Consumption during the same month, and the Quantities remaining in Warehouse at the close thereof.

Species of Grain.	Quantity imported.	Quantity entered for consumption.	Quantity remaining in warehouse.
	qrs. bush.	qrs. bush.	qrs. bush.
Wheat, from British Possessions	63 7	63 7	116 6
Barley, do.	4 1	4 1	—
Oats, do.	—	—	90 4
Peas, from do.	231 5	231 5	—
Wheat, foreign	67997 1	80816 5	238167 4
Barley, do.	97737 5	109261 5	4835 7
Oats, do.	3215 4	6015 3	54812 7
Rye, do.	726 0	1254 0	1852 2
Peas, do.	3109 3	3611 7	24220 2
Beans, do.	2909 5	6380 0	62264 2
Indian Corn, do.	2 3	1245 5	867 6
Buck Wheat, do.	50 0	50 0	—
	cwts. qrs.lbs.	cwts. qrs.lbs.	cwts. qrs.lbs.
Flour and Meal from British Possessions	996 0 7	4349 0 15	4694 2 16
Flour & Meal, foreign	42534 1 19	4733 1 15	153624 1 22

## PRICES OF SEEDS.

MAY 27.

Linseed, English, sowing	54	60		
Baltic	—	—	crushing	40 42 per qr.
Mediter. & Odessa	41	43		
Carraway	—	—	new	57 60 per cwt.
Coriander	15	20	per cwt.	white. 8
Mustard, brown, new	12	17	old.	12 26 new 23 30
Trefoil	—	—		
Rapeseed, English, new	267.	287.	per last.	
Linseed Cakes, English.	97.	10s. to 107.	per 1000	
Do.	Foreign.	97. to 67.	10s. per ton.	

## END OF VOLUME XX.

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# EUROPEAN AGRICULTURE

AND

# RURAL ECONOMY.

FROM PERSONAL OBSERVATION.

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BY HENRY COLMAN.

(OF THE UNITED STATES OF AMERICA.)

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“For, in all things whatever, the mind is the most valuable and the most important ; and in this scale the whole of agriculture is in a natural and just order : the beast is an informing principle to the plough and cart, the laborer is as reason to the beast, and the farmer is as a thinking and presiding principle to the laborer.”—BURKE.

REPORT THE FIRST.

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LONDON :

PRINTED BY JOSEPH ROGERSON, 21, NORFOLK STREET, STRAND.

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1844.

PHILOSOPHY

1. The first part of the paper discusses the nature of the problem and the various approaches that have been taken to solve it. It is shown that the problem is not as simple as it first appears and that a careful analysis is required.

2. In the second part, the author examines the various solutions that have been proposed and shows that they are all flawed in some way. It is argued that a new approach is needed, one that takes into account the complexities of the problem.

3. The third part of the paper presents the author's own solution to the problem. It is shown that this solution is not only more elegant than the previous ones, but also more effective. It is argued that this solution is the only one that can truly solve the problem.

4. Finally, the author discusses the implications of this solution and how it might be applied to other problems. It is shown that the solution has a wide range of applications and that it is a significant contribution to the field.

## P R E F A C E.

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I have the honor of laying before the public my First Report on European Agriculture and Rural Economy. It has been somewhat delayed beyond the time when it was expected to appear by various unavoidable circumstances, and, among others, by a serious accident by which my health was for some time impaired. I have never approached the bar of public opinion with more diffidence and anxiety; but the kindness heretofore experienced inspires the hope of its continuance, and strengthens my confidence that in an intelligent I shall find a candid public. My first report will be, to a considerable degree, miscellaneous, and not so full of that practical information and detail which I design to give hereafter. More than this was not to have been expected; but I trust it will not be found deficient in practical value. Many persons may think that I should particularly point out what is to be learnt from European agriculture; but I understand it to be my province to give an honest account of what I see, premising that there is nothing to be seen from which something may not be learnt, and that it is for others, and not for me, to say what they will learn from that which is placed before them. Where we find ourselves inferior to others, it may be desirable to ascertain how we may reach the excellence to which they have attained; and where the advantage is obviously upon our side, it may be a subject of honest congratulation. In circumstances, even the most different, a sagacious mind will gather instruction from contrast as well as from analogy: and the success of any man, in any trade, pursuit, manufacture, or art, is in itself a powerful stimulus to others to exertion; and, therefore, an instrument of excellence in any and in every other art or pursuit. I know no better way than to record my impressions of what comes under my notice in the field, which I have undertaken to explore, as faithfully as I can and with as much detail as seems expedient; and to do my best, that every one who condescends to read my pages with a just candor, will not close the book without finding something agreeable and instructive, something for improvement in the important art to which my labors will be particularly devoted, and something to make him wiser, better, or happier. These latter are the proper ends of knowledge and of life; and this honest aim will in itself sanctify and elevate the humblest efforts.

The necessity of publishing my reports as I go on, without waiting until the completion of my tour, will, of course, prevent that methodical arrangement of the whole matter which I otherwise should adopt; but this, under present arrangements, is not to be avoided, and my readers will, I trust, make the proper allowance.

The objects of my inquiry are, of course, various and extensive, and embrace everything connected with the cultivation of the earth, the improvements which are now going on in agriculture, and every branch of husbandry and rural and domestic economy.

Among these topics will, of course, be comprehended—

The Soils, and especially in their relation to different crops.  
Manures, and their application.

The Implements of Husbandry, and various Machines for facilitating and abridging the labors of the Farm.

The different great operations of Agriculture, such as Ploughing, Sowing, Cultivating and Cleaning, Harvesting and Preparing the Crops for use or market, with the general application of the Produce of a Farm.

Draining and Irrigation.

Enclosing and Fencing.

Redeeming Moor and Heath Land.

Warping and Dyking.

The Plantation of Forest and Fruit Trees.

The Crops grown; the Grasses, the Cereal Grains, and Esculent Roots for the food of man or beast, and plants cultivated for clothing, building, and fuel.

Live Stock of every description—Cattle, Horses, Sheep, Swine, Poultry; and their different breeds and classes.

The breeding, rearing, and fattening of Live Stock.

The Dairy.

The cultivation of Silk, Flax, Hemp, Hops, Teasels, Madder, Woad, Mustard, Chicory, Olives, Grapes, Figs; the production of Wool and Honey; the manufacture of Wine, Oil, and Sugar; and various other crops and products which may come under my notice, and the production and growth of which may be possible and useful in any part of the United States.

Horticulture, likewise, will come under observation, with the best information of the management of forcing beds, and the forwarding of plants, valuable for use or luxury.

Rural Architecture, and the Construction of Farm Buildings, Conservatories, and Green-houses.

Markets and Fairs—Farming Accounts.

Agricultural Labor; wages, condition, and service.

The Management of particular Farms; arable, dairy, stock, and wool farms.

Agricultural Schools and Experimental Farms.

Veterinary Establishments.

Agricultural Societies, Museums, and Shows.

Agricultural Schools, Education, and Literature.

The Condition of the Rural Population.

Benefit Clubs, Mutual Assurance Associations, Cow Clubs, Friendly Associations for mutual aid or improvement.

Rural Life; Morals, Manners, and Customs.

These are among the topics which will claim my attention, and upon which, in the course of my tour, I hope to collect and to communicate much useful information. The field, I am aware, is a wide one, and no unaided individual could, under any circumstances, give a full and entire view of these various subjects so as to satisfy every inquiry; but I will do what I can to glean that which is most valuable, and to direct to more full sources of information the inquiries of those to whom further information may be desirable.

I have already been through a considerable portion of England, and into some of the southern counties of Scotland; I purpose to complete the tour of parts of England and Scotland not already visited; to go through Ireland, and to visit such portions of the Continent as are likely to afford any valuable information. My Reports cannot be promised, confidently, at any particular time; but, according to my Prospectus, they will be limited to ten, of about one

hundred pages each; and, anxious to tax as little as possible the patience of my friends, I shall use all possible diligence in their preparation, as much for my own interest as for their gratification. It is intended that each Report shall be furnished with, at least, one copper-plate engraving, and with such wood-cuts as may be necessary for the elucidation of the subjects treated.

I do not know in what place, rather than here, I can better acknowledge the kindness and hospitality which I have received from gentlemen with whom it has been my happiness to become acquainted; add to this the utmost readiness and courtesy in rendering every assistance in their power to my inquiries. The kindness is sensibly appreciated; and these acknowledgments are due to many noblemen of the highest rank in the empire; and to many gentlemen of more humble condition, who, if they have not the nobility of rank, have even a higher patent—one without which the most brilliant insignia of external distinction become dim—the nobility of intelligence, wisdom, and most active and extensive usefulness. I should be glad here, if it were proper, to illuminate my page with the names of many distinguished individuals, of whose courtesy and kindness the recollection will not fail, while any record remains legible on the tablet of my heart; but this would be contrary to a rule which, with me, has always been absolute in cases of this nature, lest I should be thought even to approach a violation of the confidence of social life. One may wound almost as much by public praise as by censure that delicacy of sentiment which, satisfied with doing good, shrinks from notoriety and ostentation. Nor would I in any way impair or hinder that frankness of communication and manners which constitutes the charm of social intercourse. This would be sure to be checked if we knew that a reporter for the public were constantly present; and, if the humble expression be allowed, it would hide itself in its burrow, as sure as it perceived that one of the feline or the canine race was always at the mouth of its hole waiting its coming out.

My agricultural tour, therefore, must not be expected to have much of personal and private narrative; though I am aware that, from this very circumstance, it may lack much of that interest which, with a large class of readers, it might otherwise possess. However strong, on these accounts, the temptation, I shall certainly *not* report many interesting conversations to which I have been a party; nor describe the eminent or the more humble individuals to whom I have had the honour of an introduction; nor, after the example of some tourists who have preceded me in this and in my own country, tell of the private visits which I have made, and the charming families whose honoured guest I have been; nor speak of the “accomplished men, and the delightful women, and the beautiful daughters, and the promising sons,” in the houses where, to use the only term by which true English hospitality may be expressed, I have been *domiciliated*, and to do only justice to many of whom, and to a condition of society in the highest degree polished and improved, would not be for me an easy task. I say nothing of the impropriety of stealing for the public the likeness of a friend, without his consent, and without allowing him to choose his position, his dress, or his painter; for, as an agriculturist, this is not the species of live stock which I came to examine, and in which those for whose benefit I travel would be most interested. Yet, while I shall scrupulously avoid all personalities whatever of this description, I shall feel at perfect liberty to give, as far as I am able, a true picture of rural life in England, and of the condition and habits of the rural population; and if, in doing this, I shall, in any case, be thought to go beyond the strict line of what may be called the practical and the useful in an agricultural tour, with the candid, I shall find an apology in my desire to alleviate the dullness of dry details, by occasional topics more light and imaginative. It is not unreasonable for me to wish to attract to my pages, I hope for their benefit, a class of readers who would be certain to be repelled from a mere skeleton, however accurately and

beautifully and wonderfully all the bones were put together, and all the joints and articulations displayed; but who would be delighted to contemplate the same subject covered with flesh, instinct with life, radiant with health, and clothed in the habiliments of elegance and fashion. Every one knows the variety of tastes every where existing. He who caters for the public will be, of course, anxious that each guest at the table should find something which he likes. Though, perhaps, a large portion of mankind might be best satisfied with plain boiled and roast, and content to eat their dinner out of pewter plates, and from a plain and coarse oaken table, without a cloth, such as I have seen at Haddon Hall, nearly two centuries old; there are not a few who would prefer the refinements of modern life, a porcelain dish to a wooden trencher, a silver fork to the natural and unrestrained use of the ten digits, the French *entrées* to the more substantial covers; and who, little as it may do to the actual support of life, find as high a pleasure in the fittings-out of the banquet, its arrangements, its neatness, its order, its beauty, and in the splendid pyramid of flowers which often crowns its centre, as in any mere indulgence or gratification of the appetite. Under any circumstances it would be idle in me to presume to spread an elegant or splendid table for my guests; but while I shall be anxious to furnish that which is substantial and nutritious, I shall be equally desirous that at least the dessert shall be made up of the best fruits which I can gather. Though I am not able to present them in vases of gold and silver, or of diamond glass, or Sevres or porcelain china; yet if the peaches and the strawberries should be seen blushing under a few of the leaves of their own foliage, or if a simple bouquet of the flowers of the sweetbriar and violet, or a handful of the half-unfolded buds of the moss-rose, the queen of flowers, should be sought to relieve the monotony of the table, I indulge the hope that my taste will not be condemned, but will be regarded only as in conformity to the rule sanctioned by a high antiquity, that of mingling “the agreeable with the useful.”

There are other grounds upon which I claim the indulgence of my readers, and to which I have already alluded. We have often heard of the vexation of an artist, who is compelled to paint a picture to order; and, willing or unwilling, well or ill, under the most brilliant spell of poetical excitement, or in an hour of the most sleepy or prosy dulness, he must work at it, and have it completed, and varnished, and framed, and sent home to be criticised, by a certain time. To a degree, similar objections lie to all forced intellectual labor; and in many such cases, a powerfully excited desire to do well, and not to disappoint the wishes and expectations of kind friends, presents, in itself, no small hindrance to success, and, strange as it may seem, is sometimes the cause of failure. It must be obvious to any one what serious disadvantages I labor under in being obliged to give my reports before I have completed my tour. In this case, I yield of necessity to an impatience of curiosity on the part of my friends, which I would neither condemn nor blame, but which certainly presents a strong claim upon their candor. At present, when these first Reports are published, I have been through only a small portion of England and Scotland. Much has come under my observation, which will be interesting and useful; but much more remains to be seen than I have yet seen; and things in other places may be very different from those which I have observed. I can only, therefore, relate such facts and note such improvements as have presented themselves; but it would be entirely premature for me to attempt any very general inferences from such partial views.

I am painfully aware of the greatness of the undertaking, and the sacrifices which, at my time of life, it demands of me, and the difficulties in the case of meeting even my own wishes. But the object being exclusively a public object, and one in respect to the utility of which, however imperfectly accomplished, there can be no dissent—I look confidently for the aid and encourage-

ment, so essential to my success, of the intelligent, disinterested, and public-spirited, among the friends of agricultural improvement. Such aid rendered to me in any form will be most gratefully appreciated.

In whatever light I regard the subject of the improvement of agriculture, my sense of its importance is continually strengthened. In its social, political, and moral bearings—in its connexion with the subsistence of mankind, with their general comfort, and with the progress of civilization—no subject, purely secular, demands more the attention of the political economist, the statesman, and the philanthropist. If the familiar experience of half a century in all the labors and details of practical husbandry, a considerable acquaintance with the agriculture of the United States, and an enthusiastic attachment to rural life and rural pursuits, give me any power to be useful in the advancement of this great cause, that power shall be exerted. I do not know to what object the short remainder of my life can be so rationally devoted.

HENRY COLMAN.

2, *Spring Gardens, Charing Cross,*  
*London, January, 1844.*

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## CREDENTIALS.

As I have been often asked, Is your mission a public one? I have been advised to publish some of the credentials with which I have been honored. If it may, as is suggested, assist in the accomplishment of my object, there is an obvious propriety in doing so; in respect to which, otherwise, I should have had a good deal of hesitation.

---

## NATIONAL AGRICULTURAL SOCIETY.

Whereas Henry Colman, a citizen of the State of New York, United States of America, a distinguished friend of agricultural improvement, member of the Massachusetts Society for promoting agriculture, of the New York State Agricultural Society, of the National Agricultural Society at Washington (district of Columbia, of the American Institute at New York), of the Society of Natural History at Boston (Massachusetts), of the American Scientific Association, and honorary member of the Royal Agricultural Society of England, being about to visit England and the Continent of Europe, on a tour of agricultural observation and inquiry, and especially for examining into the condition of the rural classes and the schools of agriculture and the practical arts, with a view of obtaining such information on these subjects as may be useful to his country—

Resolved, that the National Agricultural Society signify their strong approbation of his enterprise, and commend him to the friends of agricultural and rural and scientific improvement wherever they may be found, as eminently qualified for this important and useful undertaking; and, for his personal and moral character, entitled to all respect and confidence.

In witness whereof, the seal of the National Agricultural Society is hereto affixed.

(Signed)

HENRY L. ELLSWORTH,  
Chairman of Executive Committee.

Washington City, January 30th, 1843.

O. WHITTLESEY, Corr. Secretary.

(Seal)

## NEW YORK STATE AGRICULTURAL SOCIETY.

At a meeting of the New York State Agricultural Society, holden in the City of Albany, on the 18th of January, anno Domini 1843,

The president of the society, James S. Wadsworth, Esq., after stating that Mr. Henry Colman, late agricultural commissioner of Massachusetts, had, at the suggestion of many distinguished friends of Agriculture, proposed a tour throughout Europe, for the purpose of obtaining exact and full information of the agriculture of Europe, and of the condition of agricultural schools and experimental farms, offered the following resolution, which was unanimously adopted:—

Resolved: That the New York State Agricultural Society regard with great interest the proposition of Henry Colman, Esq., to make an agricultural tour through some of the most highly cultivated portions of Europe; and anticipate from this distinguished writer and friend of agriculture, a body of valuable information, which will impart a fresh impulse to agricultural improvement throughout our country.

Mr. Colman is hereby commended to the friends of agriculture and agricultural improvement, as a gentleman worthy of confidence and respect, and eminently qualified for an enterprise, deemed in its execution highly conducive to the improvement of practical and scientific agriculture in the United States of America.

(Signed)

JAS. S. WADSWORTH, President.

LUTHER TUCKER, Secretary.

Albany, New York, U. S. A.,  
January 19th, 1843.

## AMERICAN INSTITUTE, CITY OF NEW YORK, U. S. A.

At a meeting of the American Institute of the City of New York, held at its repository in the said city, on Thursday, 9th day of February, 1843; the following rule was unanimously adopted,—

Whereas, Henry Colman, Esq., late commissioner of agriculture in the State of Massachusetts, and now a resident of the State of New York, and a member of the American Institute, proposes to make a tour in Europe for the purposes of agricultural observation and inquiry, that he may obtain such information as may serve the cause of agricultural improvement and industrial education, and the general usefulness of the rural population; the American Institute deem it proper to express their high respect for Mr. Colman's character as an enlightened citizen and scientific agriculturist, and their strong approbation of this public-spirited enterprise; and they beg to commend Mr. Colman to the kindness and attention of all the friends of agriculture and rural improvement in Great Britain, France, and Germany.

(Signed)

JOHN OVERTON CHOULES,

Secretary of the Board of Agriculture, and the American Institute.

(Seal)

T. B. WAKEMAN, Cor. Secretary.

MUNROE COUNTY AGRICULTURAL SOCIETY, STATE OF  
NEW YORK, U. S. A.

At a meeting of the Munroe County Agricultural Society, holden in Rochester, New York, on the 16th February, 1843,

Whereas Mr. Henry Colman, late agricultural commissioner of the State of Massachusetts, and recently president of this society, at the instance of

several distinguished friends of agriculture, is about to make a tour through several of the countries of Europe, to examine their agricultural improvements and cultivation, and to obtain such practical and authentic information as may be useful to the agricultural interest of the country,

Resolved: That the Munroe Agricultural Society signify their warm approbation of this enterprise to promote the interests of agriculture; and that we take pleasure in commending Mr. Colman to the friends of agricultural improvement in all countries, as a gentleman known by us to be well qualified for the execution of such an undertaking, in a manner to be of eminent service to the practical and scientific agriculture of the United States.

Resolved: That the great interests of agriculture in this country can have no more worthy ambassador in foreign lands; and that we fully confide in him to acquire and communicate such information on this subject as will be found advantageous to this important interest, wherever it is cherished and respected.

Attest (signed)

RAWSON HARMON, Jun., President.

HENRY M. WARD, Secretary.

Rochester, New York, U. S. A.,

February 16th 1843.

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### MASSACHUSETTS AGRICULTURAL SOCIETY.

At a meeting at the Board of Trustees of the Massachusetts Society for promoting Agriculture, held in Boston, October 8th, 1842,

The plan of Mr. Colman for an agricultural tour and survey in Europe having been submitted, it was thereupon voted, that the proposed plan of Henry Colman, Esq., a member of this society, and late agricultural commissioner of this State, to visit Europe for the purpose of acquiring practical information in agriculture and rural economy, and, by imparting the same to the public, to extend the knowledge of agriculture, and to promote agricultural science in this country, is cordially approved by this Board.

Voted: That the treasurer be authorized to subscribe for one hundred copies of the proposed reports of Mr. Colman.

At a subsequent meeting of the Board, held on the 11th day of March, 1843, the trustees, by a vote, expressed their continued interest in Mr. Colman's proposed tour, confiding in his zeal and industry, that his thorough and ample reports of the state and progress of agriculture in Europe would contribute much to its advancement in his own country; and directed a copy of the above votes to be given to Mr. Colman, with the commendations of his enterprise to the friends of agriculture, wherever he may meet them.

(Signed)

JOHN WELLES, President.

(Seal)

BENJAMIN GUILD, Reeg. Secretary,

Boston, Massachusetts, U. S. A.,

March 11th, 1843.

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### BOSTON, MASSACHUSETTS, UNITED STATES OF AMERICA,

March 8th, 1843.

Seventh Legislative Agricultural Meeting at the State House, Hon. Daniel P. King, speaker of the House of Representatives, in the chair. On motion of the Hon. B. V. French, of the Council, the following resolve was adopted:—

Resolved: That the farmers of this Commonwealth here assembled, and who have assembled weekly during the present session of the legislature, for the purpose of discussing and considering subjects pertaining to agriculture, have heard with pleasure that their distinguished fellow-labourer, Henry Colman, Esq.,

late agricultural commissioner of the Commonwealth, intends visiting Europe the coming season. Few in our country have advocated with more zeal and eloquence the farming interests; few have collected such funds of agricultural statistics, or been so industrious in dispensing the same for the public good. Therefore, we most cheerfully recommend him to the civilities and kind attention of European agriculturists.

And it was voted: That the above resolve, signed by the officers of the meeting, be communicated to Mr. Colman, and that such editors of agricultural papers in this country, as may concur with us in sentiment, be requested to publish the same.

(Signed)

DANIEL P. KING, President.

JOHNSON GARDNER, }  
BENJAMIN V. FRENCH, } Vice Presidents.

ALLAN PUTNAM, }  
W. BUCKMINSTER, } Secretaries.  
S. W. COLE, }  
H. C. MERIAM, }

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UNITED STATES OF AMERICA.

COMMONWEALTH OF MASSACHUSETTS,

*Boston, March 21st, 1843.*

Henry Colman, Esq., late commissioner for the agricultural survey of Massachusetts, being about to visit Europe, for the purpose of examining the agriculture and rural economy of Great Britain and the Continent, in order that he may obtain such information as may promote the improvement of agriculture in his own country, his useful project is hereby recommended to the aid of the friends of agriculture, wherever they may be found; and himself as qualified for the duty which he has undertaken, and worthy of confidence.

(Signed)

MARCUS MORTON,

Governor of Massachusetts.

JOHN A. BOLLES,

Secretary of the Commonwealth.

Mr. Colman's address is London; care of Messrs. Baring, Brothers, & Co.

# AGRICULTURAL TOUR.

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## I.—GENERAL FACTS AND CONSIDERATIONS.

Most of my friends are aware of the circumstances which have induced me to undertake an agricultural tour in Europe, and more especially those who have honored me by a subscription to my reports. The enterprise was suggested among some friends at the show of the New York State Agricultural Society, holden in Albany, in September, 1842; and, upon proposals being issued for its accomplishment, the project met with so much favor as to warrant my sailing for England in April, 1843.

Ploughing the sea is somewhat different from ploughing the land; but under an experienced pilot, and with favorable winds, we made a broad, a deep, and a comparatively straight furrow, throwing off continually floods of jewels from the mould-board; and in the short space of seventeen days, completed the brilliant line, and unyoked the team in the harbour of Liverpool. Here, for the first time, I set foot in England, the green isle in the ocean, the sight of which had been so long the object of my desire; the brilliant centre of so many youthful imaginations, the home of my fathers, and the advance-guard—if so it may be proper to speak—among the nations of the civilized world in the march of human improvement, in learning and civilization, in science and the useful arts, and in all the elements of social greatness and prosperity.

It would be impossible to describe my emotions on that occasion. If small things may be compared to great, then, if it were not—as with the bold and adventurous Genoese—the discovery of a new and unknown country, yet it was to me an unexplored country; and it was, in truth, almost the first time I had realized the greatness of the enterprise upon which I had embarked.

Some persons may smile at the application of such language to a mere agricultural tour. Things are great or small relatively, or by comparison; and that work may be considered great to any one which, in its proper performance, demands the exertion of all the talents which he may possess. I cannot but look upon an agricultural tour in Europe, in the present condition of the art and science—for in both lights it has now come to be viewed—as most important: combining a variety of inquiries and observations which would severely tax the highest powers that might be applied to this object. It is for me to assume only the humble office of a pioneer in this great work; and if I can be so happy as to render some essential service to my country, in facilitating the labors of those who shall come after me, in effecting a small clearing that others may more easily bring the field into a state of complete and productive cultivation, I shall be consoled under all the imperfections of my attempt with the conviction that I have done what I could, and have not labored in vain.

I cannot help feeling that there is a high responsibility attached to my undertaking—a responsibility not merely to the kindness of friends on both sides of the water, who, with an extraordinary liberality and good will have

avored the enterprise, but to the great cause itself of agricultural improvement; that the information collected and given might be drawn from authentic sources, selected and combined with judgment, and presented in a condensed, compact, and practical form.

A person, who has had no experience in such a matter, who is not accustomed to such investigations, can form no just idea of the difficulties of accomplishing in this case what one would desire to do; and of the impediments, and, I regret to add, in many cases the vexations and disappointments which, in its prosecution, he will be compelled to meet with. Before I left home, a friend—in many respects highly intelligent and eminent for his sound judgment, and, withal, a liberal and devoted friend of an improved agriculture—said to me, “that there was nothing to be learned in England; that he himself had travelled much in England, by post, and had occasionally alighted and talked with laborers whom he saw in the fields by the road side, but he had learned nothing from them.” And another friend, whose eminent position in the community should have saved him from an immature judgment, expressed an opinion that “the climate of England was so different from the United States, and the cost of labor in England was so much less than in America, that the agricultural practice and experience of Great Britain could have no application to the United States.” Now, entertaining as I do the high respect for these two gentlemen to which their intelligence and position in society entitle them, I have come, not without some reluctance, to an entirely opposite conclusion—a conclusion which my own observation, in the course of my progress, has daily more and more confirmed.

There is a great deal to be learned in England, which can scarcely be said to be known in the United States. There is a great deal of agricultural practice in England which may with advantage be transplanted to America; and although, as is most obvious, every agricultural operation must be modified by the climate of a country and various local circumstances, yet, in respect to many facts of a practical nature, the knowledge that a thing is practicable under any circumstances is often of great importance, as it excites to inquiries and experiments which may evolve many other valuable facts; and inquiries and experiments will often suggest modes of operation by which even the difficulties of climate and situation may be counteracted or overcome. Plants and animals are often naturalized to localities very different and distant from their native homes. If the common history of the plant be true, one of the most valuable and nutritious of esculent vegetables, the potato, is an example of a removal from a warm to a temperate, and even a cold climate; and of a conversion from a root, very inferior in size and quality, to a vegetable most productive in its yield, universally relished, in the highest degree farinaceous and nutritious, and, under the best cultivation, perhaps yielding per acre as much food for man or beast as any other plant which could occupy the ground. Then, again, to suppose that a knowledge of the agriculture of a country is to be acquired by a transit through it on the box-seat of a coach, or in a railroad car, or by a casual conversation with laborers by the road-side, who, especially in England, where labor is so much subdivided that the knowledge of a man in that condition of life seldom extends beyond the particular service to which he has been trained, is a judgment of which, upon further consideration, an enlarged mind would not be tenacious. In respect to any other matter of importance, it would not be the most likely way of obtaining full and authentic information; and why should it be deemed so in respect to agriculture? This art, in its improved condition, combines so many arts and such various subjects of inquiry and observation, that a close scrutiny and long continued inquiry are as indispensable to a thorough knowledge of it as they are in respect to any of the branches of commerce or manufactures.

After travelling many hundreds—and I might add thousands—of miles over

this rich and highly cultivated country, and seeing many of the landlords, and tenants and laborers, in their own domiciles and homesteads, in their stables and fields, and enjoying the most free communications, I feel that I have, as it were, only begun to see what is to be seen, and to learn what is to be known, and that every step of my progress is developing new and valuable objects of inquiry and remark.

## II.—PARTICULAR OBJECTS OF INQUIRY.

What should an agricultural tour embrace? To this the proper answer is—everything connected with the cultivation of the earth, the production of food for man and beast, and the condition of those to whom agriculture is a business and a profession. In my preface I have enumerated generally the objects of inquiry. The various operations of husbandry, the implements by which these operations are carried on and facilitated, the plants cultivated, and the live stock produced and maintained, constitute the principal subjects to be observed and treated; but the sub-divisions into which these great topics spread themselves are very numerous, and it is as important to consider them in detail as in the gross. It may be expected by some persons that I should merely point out in what respects foreign agriculture differs from American husbandry; or, otherwise, that I should only suggest for adoption in the United States such methods of culture as, in my opinion, would constitute an improvement upon American agriculture. This would be assuming too great a responsibility, and would display a confidence in my own judgment with which I would not willingly be chargeable. I design to give, as well as I am able, a full account of subjects which come under my immediate observation. I shall not hesitate to pronounce my opinion whenever I deem it proper so to do, because intelligent minds for whom I write will be no further influenced by it than as it appears reasonable; but I shall, in all cases, endeavour so fully to state any matter in discussion, that they will have the materials before them for making up their own judgment, and with that I shall not any farther willingly interfere. Even agriculture, like every other subject not susceptible of mathematical demonstration, is not without its disputed and disputable points, into which, of course, something of the heat of passion may at times infuse itself. Political agriculture is full of such topics, and will be cautiously avoided by me so far as in any way it presents itself as matter of party feeling and contention. The different breeds of live stock, neat cattle, and sheep, have each their partizans; often influenced solely by their own honest preferences and convictions, founded—as they at least persuade themselves—upon experience and observation; and in some cases, it will not be denied, by private interests, a stimulus which is too seldom absent from most of the disputes and contentions in life. Now, if a man should pronounce a preference over all others for the short-horns, he must expect to be tossed by the long-horns; if he sides with the Herefords, the Durhams will shake their heads at him; and if he advocates, above all others, the claims of the polled Scotch, the Angus, or the Fife cattle, the West Highlanders will be down upon him with a vengeance. So it is with the South Downs and the Leicesters—meek, quiet, placable animals themselves—who may be seen feeding peaceably together out of the same manger, and lying down without passion in the same pen; but not so their owners and breeders. A spirit of rivalry pervades every department of life. Under due restraints and discipline, it is productive of the most useful results; but it too often blinds the judgment, and becomes fierce and vindictive. We are not satisfied with the undoubted good qualities of what belongs to ourselves; but we resolve upon exposing the defects and faults, whether real or imaginary, of what belongs to our neighbours. It is not enough that our own children are handsome, good-tempered, clever, and accomplished; but we insist upon it that those of our neighbours are ugly, morose, and ill-endowed. Perhaps agriculture presents a more limited field

for any ill-natured emulation than almost any other department of life. Here men cannot conceal their discoveries and improvements. Here there cannot be long any monopoly of advantages. Here men perceive how rapidly and widely improvements and discoveries extend themselves. In the present condition of the world, for a man to pretend to keep any distinguished agricultural improvement to himself would be very much like his holding up his umbrella before the sun, so that it might not shine upon other people. All he can be sure of, in this case, is to keep himself in the dark. A liberal and intelligent mind perceives at once, that the light which his knowledge or improvements shed upon others, is always reflected back upon himself.

### III.—SCIENCE AND AGRICULTURE.

It must be admitted, however, that although a good deal of selfishness and bigotry may remain—for, alas! how can it be otherwise as long as human nature is human?—there is a spirit of liberal inquiry abroad in respect to agriculture, blazing in the valleys, and beaming from the hill tops, and everywhere diffusing an invigorating, a stirring, and a healthful radiance. One of the wisest of our race, who applied his heart, as he says, to understand wisdom, has told us that there is nothing new under the sun; what is, has been; and the human mind is not likely to spring suddenly a mine of truth, which has never before been touched; nor may it expect at once to accomplish the solution of recondite problems, which have baffled the most penetrating and puzzled the most sagacious minds. It would be the grossest injustice to many men of the brightest powers, of profound investigation, and of most liberal and disinterested views—who, though they have gone out, have left a brilliant track behind them—to say that agricultural science has never before been prosecuted with zeal, intelligence, and in the spirit of true philosophy.

I am not a believer in the immediate approach of an intellectual millennium; nor can I persuade myself that philosophy has just been born into the world, and that all preceding ages were ages of comparative barbarism. It is true that the natural sciences are now prosecuted with singular advantages and success; that, in a particular manner, chemistry has, in a measure, been created within the last half century; and that it promises to render the most essential aid to agriculture. Excepting, however, the stimulus which it has everywhere given to inquiry and observation, and the exact experiments which it is prompting farmers—even in the humblest departments of agriculture—to make, it cannot as yet point to many positive practical triumphs. Sanguine as I am, in common with others, in its application to agriculture, ultimately and perhaps speedily yielding the most beneficial fruits, it has not yet even approached a solution of many of the profound secrets of nature. Whether this triumph is ever to be achieved by human sagacity; whether, with our present faculties, we are capable of entering into these sacred mysteries, and of lifting up even a corner of the veil which Heaven has drawn over them, it would be idle to conjecture; but they are, as yet, a sealed book to us. In the spirit of the book of books, “let us wait at wisdom’s gates, let us watch at the posts of her doors;” let us knock, humbly hoping that they may be opened to us. Those who have gone before us have done the same, and were favoured with many largesses, which they have bequeathed to their children. Let us do them justice by gratefully acknowledging our debt to them; and not wrap ourselves up, as we are very liable to do, in the vain conceit that they knew nothing, and that we know everything.

We talk about uniting science with agriculture, as if this were the first time of asking the banns, when we may be sure the marriage was consummated years and years ago. A science, technically speaking, is a particular branch of human knowledge, which has been systematized and drawn up in regular form; its particular principles and rules defined, its department circumscribed, and its peculiar vocabulary arbitrarily established. In this

respect chemistry, botany, and mechanics are sciences; but science, in an enlarged sense, is the observation of nature—the accumulation and comparison of facts, and the deduction of inferences from them, either for the acquisition of more knowledge, or for practical application and use. I venture to assert that, without any knowledge of the particular and technical terms of art, whose utility I am not disposed in the smallest degree to deny, wherever the mind is at work there is science; and many men, who hardly know the letters of a book, are yet profound observers of nature, and may be denominated scientific agriculturists; because they are full of knowledge, which they are constantly applying to practice. Now, without any disparagement of former times, I think it must be admitted that the universal mind of the agricultural world was never so powerfully stirred as it is at this present time. We must do what we can to keep it awake and to direct the application of its powers. “Practice with science” is the terse and comprehensive motto of the Royal Agricultural Society of England. Philosophy now comes down from her high places and takes labor by the hand, that they may walk together among the works of God, and with an enlightened and commendable curiosity, “search into the causes of things.” This is the highest office of the human understanding.

Nature proceeds by fixed laws. She is not a confused jumble of things; and to-day one thing, and to-morrow another. All the relations of the different parts of nature are mutual and exact, and everything moves on in a beautiful agreement with every other thing. The ancients were accustomed to speak of the music of the spheres; this refers to the harmony which prevails throughout the universe, so that no discordant note is ever sounded. There is a reason for everything; there is a rule by which everything is directed and controlled. It is not enough for us to say, “This is a mystery, it is in vain for us to inquire;” or, “Here is an arbitrary and miraculous power in nature which we can never understand.” There may be many things beyond our comprehension; there is nothing which should be beyond our inquiry. There is a wonderful power at work always in vegetation. The development and progress of vegetable life, the relations of the soil to the plant produced, the effects of light and air and dew and rain and frost and electricity, the nature of manures, their uses and their results, may all be considered as mysteries as yet, to a great degree, unresolved; but from what we see in other parts of nature which have come under our observation, and where some portion of her laws have been fully revealed, an intelligent mind can have no doubt that all these things rest upon certain determinate principles, and are governed by laws as fixed as any which prevail in other parts of the system of nature. Whoever examines the minutest crystal, will find that in the same classes the laws of aggregation are the same; whoever examines any species of plants, perceives an exact similarity of formation and habit pervading whole classes and tribes. The established principles of gravitation and attraction, and above all that most wonderful discovery of chemical equivalents, all demonstrate the existence, throughout nature, of fixed laws and determinate forces, whose operation is universal and invariable. There is every reason to believe that the laws of vegetable and animal life, and growth and nourishment and decay, are equally well established and equally universal and equally invariable. The ascertaining and discovery of any one of these laws, is positive knowledge—is, properly speaking, science; and any mind, acute, active, and observing, may, in the daily routine of humble life, become familiar with many of these great laws; and read, at first-hand, on the illuminated pages of external nature, the most useful and the most sublime truths, though it has never been taught to read by the alphabet of science, nor been allowed admission into the schools of philosophy.

It is said of one of the greatest of human intellects, a mind whose sublime

discoveries constitute a divine revelation, second only to the written word, that he was led to the discovery of the great principle which binds worlds and systems in one harmonious bond, by the falling of an apple. The cultivator of the earth has before him not merely the fall but the growth of the apple, which, from the germination of the seed to the maturity of the tree, from the opening of the blossom to the ripening of the fruit, is full of lessons of wisdom; and, in every stage of its progress, reveals the power and the skill and the beneficence of that divine agent, who fills all in all.

England presents at this time a more brilliant example than any age or country has before witnessed of the application, I will not say of science, for that would not comprehend the idea which I wish to express, but the application of mind to agriculture. The practice of agriculture, and the philosophy of agriculture, are matters of universal interest. Men of all grades and conditions are laboring in this great cause, and are asking for the how, and the why, and the wherefore. The brightest intellects are directing their talents to agricultural inquiries; and the humblest in their humble, but not inefficient way, are seconding their efforts. So many minds concentrating their rays upon the same point, they must be sure to illuminate it with an extraordinary brilliancy.

Agriculture is now getting to be recognised as the commanding interest of the state: so it must ever be as lying at the foundation of all others. Few persons are apprised of their obligations to agriculture; and it is difficult to estimate the extent of these obligations. Every man's daily bread, his meat, his clothing, his shelter, his luxuries, all come from the earth. The foundation, or, as the French would say, the *materiel* of all commerce and manufactures, is agriculture; and its moral influences are innumerable and most powerful. It will be found likewise, upon an observation of the different conditions of different nations or communities, that a laborious agriculture is, in a high degree, a conservator of good morals; and that those countries are, upon the whole, and on this account, most blessed, not where the fruits of the earth are yielded spontaneously without care and without toil, but where its products come only as the reward of industry, and the powers of the mind, as well as the labor of the hand, are severely taxed in a struggle for the means of subsistence and comfort. Every one recognises labor as the source of wealth. How few things have any value, which have not been either produced or modified by labor? and in what department is labor so productive, so essential, and so important as in that of agriculture?

#### IV.—ENGLISH AGRICULTURE.

I will not dwell longer upon these considerations, with which every intelligent mind must be impressed; and which must, more or less, constantly present themselves to our notice in that field of observation which we have entered. I shall proceed to present some general views of the agriculture of England, and shall descend, in the course of my reports, to such details as may be deemed most useful and practical.

The condition of practical agriculture in Great Britain, as far as I have had opportunity of observing it, must be pronounced highly improved. Many parts of the country present an order, exactness, and neatness of cultivation greatly to be admired; but a sky is seldom without clouds, and there are parts of England where the appearance is anything but laudable, and where there are few and very equivocal evidences of skill, industry, or thrift. We are often told in America, that England is only a large garden, in which art and skill and labor have smoothed all the rough places, filled up the hollow places, and brought everything into a beautiful and systematic harmony, and into the highest degree of productiveness. This is not wholly true; indeed, though there are many farms to be altogether admired for the degree of

perfection to which their cultivation has been carried, yet there are not a few places where the indications of neglect and indolence and unskilfulness are but too apparent; and where, in an obvious contest for victory between the cultivated plant and the weeds, the latter triumph from their superiority both in force and numbers. I shall, however, most cheerfully admit that English farming, taken as a whole, is characterized by a neatness, exactness, thoroughness seldom seen in my own country. An American landing in Liverpool, is at once struck with the amount of labor everywhere expended; the docks, and the public buildings, and the lofty and magnificent warehouses astonish him by the substantial and permanent character of their structure. The railways, likewise, with their deep excavations, their bridges of solid masonry, their splendid viaducts, their immense tunnels, extending in some cases more than two miles in length, and their depôts and station houses covering acres of ground with their iron pillars and their roofs, also of iron, exhibiting a sort of tracery or net work of the strongest as well as most beautiful description, indicate a most profuse expenditure of labor, and are evidently made to endure. He is still more overpowered with amazement when, coming to London, he passes up or down the river Thames, and contemplates the several great bridges, among the most splendid objects which are to be seen in England, two of which are of iron and three of stone, spanning this great thoroughfare of commerce with their beautiful arches, and made as if, as far as human presumption can go, they would bid defiance to the decay and ravages of time. If to this he adds (as, indeed, how can he help doing it?) a visit to the Thames Tunnel—a secure, a dry, a brilliant, and even a gay passage under the bed of the stream, where the tides of the ocean daily roll their waves, and the mighty barks of commerce and war float in all their majesty and pride over his head, exhibiting the perfection of engineering, and a strength of construction and finish, which leaves not a doubt of its security and endurance—he perceives an expense of labour, which disdains all the limited calculations of a young and comparatively poor country. He remarks a thoroughness of workmanship which is most admirable, and which indicates a boldness and bravery of enterprize, taking into its calculations not merely years but centuries to come. We have in America a common saying in respect to many things which we undertake, that “this will do for the present,” which does not seem to me to be known in England; and we have a variety of cheap, insubstantial, slight-o’-hand ways of doing many things, sometimes vulgarly denominated “make shifts to do,” which we ascribe to what we call Yankee cleverness, of which certainly no signs are to be seen here. In front of my lodgings, in London, near Charing Cross, is now in the process of erection the Nelson monument, a Corinthian column of stone, more than one hundred and fifty feet in height, surmounted by a statue of that distinguished man, one of the idols of the British nation, whose name is regarded as the brightest gem in her naval diadem. Now I have been credibly informed that the staging alone, which is a wooden frame, constructed indeed with admirable art, and put together with remarkable skill and strength, cost not less than four thousand pounds sterling, or about twenty thousand dollars. I mention these as examples of the manner in which things are done here; and add, that agricultural operations and improvements are in general conducted and finished in the same thorough and substantial manner.

The walls enclosing many of the noblemen’s parks in England, which comprehend hundreds and, in some cases, thousands of acres, are brick walls, of ten and twelve feet in height, running for miles and miles. The walls round many of the farms in Scotland, called there “dykes,” made of the stone of the country, and laid in lime and capped with flat stones resting vertically upon their edges, are finished pieces of masonry. The improvements at the Duke of Portland’s, at Welbeck, Nottinghamshire, in his arrangements for

draining and irrigating, at his pleasure, from three to five hundred acres of land, without doubt one of the most skilful and magnificent agricultural improvements ever made, are executed in the most finished and permanent manner; the embankments, the channels, the sluices, the dams, the gates, being constructed, in all cases where it would be most useful and proper, of stone or iron. These are only samples of the style in which things are done here. The important operations of embanking and of draining, especially under the new system of draining and subsoiling, are executed most thoroughly. The farm houses and farm buildings are of brick or stone, and all calculated to endure.

I cannot recommend, without considerable qualifications, these expensive ways of doing things to my own countrymen. We have not the means—the capital for accomplishing them; but we might gather from them a useful lesson; for, in general, we err by an opposite extreme. We build too slightly—we do not execute our improvements thoroughly—we have little capital to expend when, of course, no substantial improvements can be effected; and labor, with us, is with more difficulty obtained, with far more difficulty managed, and requires to be much more highly paid than here. I hope I shall be pardoned for adding, as my deliberate conviction, that we are too shy of investing money in improvements of this nature, however secure, because they do not yield so large a per centage as many other investments somewhat more questionable in a moral view, and vastly more so in respect to the security which they offer.

There are circumstances in the condition of things here, which certainly warrant a much more liberal expenditure in improvements than would be eligible with us. Here exist the right of primogeniture and the law of entail, so that an estate remains in the same family for centuries; and a man is comparatively sure that the improvements which he makes will be enjoyed by his children's children. Things are entirely different with us—houses in our cities are continually changing hands, and are scarcely occupied by one life; and in the country, even in staid New England, few estates are in the hands of the third or fourth generation in the direct line of descent. I shall not at all discuss the comparative advantages, expediency, or propriety of one or the other system. I leave those inferences to others—my business is with the fact as it is; and, like short leases, it has an obvious tendency to hinder or discourage improvements of a substantial and permanent character, involving a large expense.

#### V.—ENGLISH CAPITAL.

Another marked distinction, already alluded to, between the condition of the proprietors of the soil here and with us, is in the amount of capital existing here. It is absolutely enormous; and almost distances the system of enumeration which we are taught at our common schools. Let me mention some facts which have been stated to me on credible authority; and let me premise that a pound sterling is about equal to five dollars United States currency. Under a law of the present government, here, levying a tax upon every man's income when it exceeds one hundred and fifty pounds sterling a year, persons liable to taxation are required to make a just return of their income under a heavy penalty. A confectioner, in London, returned, as his annual income, the sum of thirty thousand pounds sterling, or one hundred and fifty thousand dollars, or, six times as much as the salary of the President of the United States; which showed, at least, how skilful he was in compounding some of the sweets of life. A nobleman, it is said, has contracted with a master builder to erect for him, in London, four thousand—not forty—not four hundred—but four thousand houses of a good size for occupation. In some of the best parts of London, acres of land, vast squares, are occupied

with large and elegant dwelling houses, paying heavy rents, in long rows, blocks, and crescents, and all belonging to some single individual. One nobleman, whose magnificent estate was left to him by his father, encumbered with a debt of some hundred thousand pounds, by *limiting*, as it is termed here, his own annual expenditure to thirty thousand pounds, has well-nigh extinguished this debt, and, in all human probability, will soon have his patrimonial estate free of encumbrance. The incomes of some of the rich men in the country, amount to twenty, twenty-five, fifty, one hundred thousand, two hundred thousand pounds sterling—even three hundred thousand pounds annually. It is very difficult for New England men even to conceive of such wealth. A farmer in Lincolnshire told me that the crop of wheat grown upon his farm one year was eighteen thousand bushels. The rent annually paid by one farmer in Northumberland, or the Lothians, exceeded seven thousand pounds, or, thirty-five thousand dollars. These facts, which have been stated to me by gentlemen in whose veracity I have entire confidence, and who certainly are incapable of attempting any “tricks upon travellers,” show the enormous masses of wealth which are here accumulated. A gentleman of distinguished talents and fine classical attainments, and who adds to them a public spirit in agricultural improvement, worthy of his education and his high-standing in the community, has recently added to his property, by the purchase of lands, to the amount of two hundred thousand pounds sterling, that is, a million of dollars; and his estate, now in cultivation, and under his own personal inspection, and, with the exception of about four hundred acres lying in one body, amounts to six thousand acres. Another gentleman of high rank, in respect to whom and to whose amiable family I have a constant struggle to restrain the open expression of my grateful sense of their kindness, and who, an example here not uncommon, to an extraordinary brilliancy of talent and an accomplished education unites the most active spirit of agricultural improvement, has, though not all in his immediate occupation, yet all under his immediate supervision, a tract of more than twelve thousand acres in a course of systematic cultivation or gradual improvement.\*

The income of a single nobleman, from his coal mines, exceeds one hundred thousand pounds sterling a year; and I believe this is not the largest of the coal possessions. With such wealth as this men may make what improvements they please, and attempt what experiments they may deem worth trying; but should such imaginations ever visit a New England or a United States Farmer in his dreams, if Æsop's fable of the frog, who attempted to swell himself to the size of the ox, did not cure him, he might be deemed a fit subject for a lunatic asylum. There are other circumstances in the cases which are to be added, and those are the cheapness of iron, the abundance of coal, and the admirable facility and skill with which the former material is wrought. Wood, and especially the soft woods, which are so much wrought among us, are here scarce and dear, and, therefore, seldom used for building purposes; bricks, and, in many parts of the country, good building stone, of the best quality, are abundant. Most of the cottages which I have seen have brick or stone floors, though many have only hardly-trodden clay and earth; and the entries of the best houses are generally paved and the staircases made of stone. A fence of iron, affording a sufficient protection against cattle, is made here at a less expense than many wooden fences are made with us.

\* I mention these examples—to which, from my own knowledge, I might add many others—in the form I do, for the purpose, by the way, of showing my American friends that agriculture here takes its proper rank among the liberal professions, and that not merely as a recreation but as a business; and in all its minute and practical details, it is not deemed incompatible with the highest distinctions of talent, education, and rank, but rather as a pursuit in which they may all most usefully and honorably lend their combined influence.

## VI.—GENERAL APPEARANCE OF THE COUNTRY.

I may be allowed to put down marks of difference in the general appearance of the country, as compared with my own, as they strike my attention. I need not say that England is entirely devoid of a feature which strongly marks the newly cleared parts of my own country, and that is the stumps of trees which have been cut down, or the large, naked, and dead standing skeletons of trees, which have been girdled, that the pioneer in subduing the wilderness, might have a chance of getting bread for himself and his family, while he was endeavouring to tame the wildness of nature and to convert the forest into a fruitful field. England exhibits, of course, nothing of this, for the days of its youth have long since passed, and its agriculture reckons its patriarchal centuries. But there is another thing remarkable—the cultivated fields are entirely free from rocks and stones, excepting the lime-stone and flint pebbles in the chalk formations. In the clay soils and on the peaty moors they, of course, are not to be looked for; but, where even they once existed, they have been entirely removed or buried, and there is nothing to interrupt or impede the progress of the plough. This is not so generally the case in my own country as is to be desired. It is, indeed, an affair of very difficult accomplishment in many cases where, in a granitic region for example, the stones are often within stepping distance of each other all over a farm, and where every fresh ploughing seems to turn up a fresh crop of stones. On the other hand, there are too many cases where, with equal advantage to the purse as pleasure to the eye, such unsightly rubbish might be removed or buried; yet there are fields, within my own knowledge, where I may say, with confidence, the same piles of stones which were collected for removal, full half a century ago, retain their original position until this day; the plough, whenever they are broken up, being always compelled, at no small expense of time and trouble (as a sailor would say) to give these heaps a good berth; and only going near enough to them to refresh and invigorate the roots of the briars and bramble bushes, by which they are usually ornamented, and which, to my taste, are quite as offensive in a farmer's field as the "mascachios and imperials," so often seen upon the monkey masque, which passes, by the mere indulgence and good humour of society, for a human face. Throughout those parts of England which I have seen, there is, as I have already remarked, an exactness, a finish, and a cleanness in the cultivation, which impress a stranger most agreeably, and deserve the highest commendation. There are, occasionally, immense tracts of unenclosed commons and heaths and moors, where there is no cultivation, where nothing grows, and, in some cases, little can ever be made to grow; or which, otherwise, are abandoned to the growth of furze or gorse for the protection of the game, and for the pleasures of the chase. These are called preserves, and are leased to sportsmen occasionally or, rather, the right to kill game upon them is leased, at a rate which we should deem a high rent, even for purposes of cultivation. An eminent agriculturist has shown that, in England and Scotland, there are full 10,000,000 acres in heath or moor, all susceptible of being brought into productive cultivation. These lands, of course, remain as they are by voluntary neglect or design. But I refer to the cultivated and improved lands, and here there is everywhere a surprising neatness and finish—everything is done, as it were, by line and measure; the corners and the headlands are thoroughly cleaned, the open ditches are kept unobstructed, the crops are drilled in straight lines, and a newly ploughed field resembles a plaited ruffle from the ironing board of a good housewife. Such exactness is exceedingly beautiful, and, though it may appear, at first, to consume a good deal of time, will be found, in the long run, to be more economical than the slovenly way in which things are often done in many places, which I am reluctant to name. There is a pleasure afforded

by such neatness which is very great, and which can be properly appreciated only by those who have been largely endowed by nature with the organ of order.

#### VII.—HEDGES AND ENCLOSURES.

The green fences in England, by which the farms are surrounded and divided, are often a beautiful feature in the landscape. I shall hereafter describe their cultivation and management. Where they are complete, and neatly trimmed and formed, with here and there a single plant left to rise above the rest, which many deem more beautiful to the eye than a democratic level, and when seen whitened with their blossoms in the spring, or blushing deeply with their fruit in autumn, they are exceedingly pleasing to the eye. In general they are formed of the white thorn, and sometimes of the holly, and not unfrequently of these two plants intermingled. But I must confess myself somewhat disappointed in the condition of the hedges throughout England. Of course there are many exceptions, and perhaps the cases to which I refer should be considered as exceptions to the general fact; but in frequent instances they are greatly neglected. There are many vacancies in them; they are not well trimmed; they are intermingled with various weeds and rubbish; and, instead of being confined to a width of four or six feet, they are often seen with their pernicious accompaniments occupying more than a rod in width. I inquired why this was permitted; and why, when the rest of the face was so clear and bright, such dirt spots were allowed to remain; the answer was, "that they were left thus for the protection of the game, and that they made excellent covers for partridges and foxes." When so much care and expense is incurred in the protection of this kind of game, it is to be hoped that it may suggest always the higher duty of taking care of the human game, the hungry and ragged children, which in some parts of England are as numerous, and growing up as wild, and many of them as little taught, as the rabbits in a warren.

The enclosures in England are of various extent, from ten to twenty and fifty acres. There are some farms with scarcely a subdivision, and in these cases the stock are soiled. In parts of England, however, they resemble the divisions of New England farms, and are of various sizes, but generally small and of all shapes, and often not exceeding four or five acres. It is reported of a farmer in Devonshire, that he lately cultivated one hundred acres of wheat in fifty different fields. There must have been here a great waste of land and labor. One of the most competent judges of agricultural improvement in England says, however, that "his tenants never wish to have more than one ploughed field on a farm."

The loss in land by too many fences, the loss of time in cultivating in small fields instead of large, on account of the necessity of more frequent turnings, and ploughing the head lands by themselves, and the actual cost of making and of maintaining the fences, not to add that these fences are a shelter for weeds, and a harbor for vermin, are serious considerations. The statement of an intelligent practical farmer in Staffordshire, on the highly improved estate of Lord Hatherton, whom I had the pleasure of visiting with Mr. P. Pusey, M.P., as given to Mr. Pusey, is well worth recording. Speaking of the farm called the Yew Tree Farm, he says, "The turnip field is sixty-five acres; it was, two years back, at the time I entered upon the farm, in eight enclosures. I have taken up 1,914 yards of fence, and intend dividing it into three fields; it will take 800 yards of new fence. The field in which I was subsoiling is forty-two acres; it was in six enclosures. I took up 1,264 yards of fence; if I divide this field, it will take 300 yards of new fence. The land, Lord Hatherton mentioned on my Deanery Farm was originally in twenty-seven enclosures; ninety-one acres. I took up 4,427 yards of fences; it will now lie in five fields, and will take 1,016 yards of new fence."

“I cannot,” he adds, “really say what land is gained by the different operations; but some of the fences were from three to four yards or more wide, that the plough never touched; my new fences are upon the level without ditches. In the whole of the old fences there was a great number of ash trees, which are all stocked up, as well as a good part of the oak, only leaving a few for ornament and shelter. I think the greatest gain in land will be from getting rid of the trees.”\*

This is the experience and opinion of a sound practical farmer, and is entitled to great weight. In some of the counties large enclosures prevail. In parts of Lincolnshire the enclosures embrace about fifty acres each; and on the best managed farms which I saw, these fields were mostly laid either in parallelograms or squares. In the fens or redeemed lands of Lincolnshire, the ditches around and through the land form sufficient and the only fences. In the county of Northumberland, and in the Lothians, the enclosures are very extensive, and, excepting on the outlines, no fences appear. The plough, in such case, when it starts, takes its course, and runs to the end of these long fields without interruption.

Mr. Pusey, in Berkshire, on one of the best managed estates, which I have visited, has induced many of his tenants to take away the inner fences and leave the fields open. Sheep are, of course, never suffered to graze or roam at pleasure over these large fields, but are fed in enclosures formed of moveable hurdles in different parts of the field, where their manure is required. Cattle never go at large upon them; and the convenience of cultivating where the lands are thus open, to say nothing of the beauty of the appearance, in addition to other advantages already alluded to, is at once obvious and decisive.

#### VIII.—IRON AND SUNKEN FENCES.

I have promised to give an account of the cultivation and management of thorn hedges presently, but I may as well as not speak in this place of two kinds of fences which are common on gentlemen's seats, and one of which may be safely recommended to my own countrymen. The first is an iron fence, called here an invisible fence. This is made of stout iron wire, about one third of an inch in diameter, and consists of four or five bars or rods, with upright pieces of iron, about an inch and a quarter in width, and about one-third of an inch in thickness, placed at about six feet distance from each other. Through these upright and flat pieces of iron the bars or rods are passed, and they serve to keep them secure. Every alternate one of these upright bars has a foot to it, and being sunk in the ground about a foot or more, serves as a post to keep the fence steady; and occasionally these posts, if so they may be called, have side-supports, thus  this, of course, increases the strength of the fence, but they are not indispensable. These fences are very cheap, on account of the abundance of iron and the facility with which it is wrought; and being kept painted commonly of a green colour, they do not appear until you approach near them; but no animals attempt to pass them, and, when well taken care of, they are durable, and, it is obvious, may be easily removed from place to place.

There is another kind of fence often formed, called a sunken fence; or, “ha! ha!” from its generally taking persons by surprise, as it does not appear until you reach it. A trench is dug as deep as it is required that the height of the wall shall be from the bottom of the trench; one side of the trench is perpendicular, and against this side the wall is erected; the other side is made slanting at an angle of about forty-five degrees, and the slanting side is grassed, and may be moved clear to the bottom, so that no land is lost; but, in truth, a small amount is gained. The object is to conceal the fence, so that when

\* Journal of Royal Agr. Society, vol. IV., part ii. page 306, note.

placed round the grounds of a gentleman's house, the prospect of the lawn or field is not interrupted by an unsightly wall; and the grounds within the enclosure may be cultivated or embellished in any way with shrubs or flowers or fruit, and yet the cattle feeding beyond it, whom no visible obstruction appears to keep at a distance, are effectually excluded, as no animal attempts ever to leap such a fence.

#### IX.—THE ENGLISH PARKS.

I may, as well here as anywhere, speak of the extensive parks which are to be seen in many parts of the country, and which constitute a truly magnificent feature in English scenery. These are the open grounds which surround the houses of the rich and noble in the country. By open, I do not mean entirely free from trees, because many of them are exceedingly well stocked with trees, sometimes standing single, at other times in clumps; sometimes in belts, sometimes in rows, and squares, and circular plantations; and more often scattered, as if they were carelessly thrown down broadcast. The ground under them is kept in grass, and depastured by cattle, sheep, and deer; and affords often the richest herbage. With some exceptions, a plough is never suffered to disturb these grounds; and in the neighbourhood of the house, which is generally placed in the centre of them, the portion which is separated from the rest, as I have observed, by an invisible or sunken fence, just now described for the cultivation of ornamental trees and shrubs, is kept so closely and evenly shorn, that to walk upon it seems more like treading upon velvet than upon grass. Nothing of the kind can be more beautiful; and I never before knew the force of that striking expression of the prince of poets, Milton, of "walking on the smooth shaven lawn;" for it seems to be cut with a razor rather than with a scythe; and after a gentle shower it really appears as if the field had had its face washed, and its hair combed with a fine-toothed comb. It is brought to this perfection by being kept often mown; and I have stood by with perfect admiration to see a sward moved evenly and perfectly, where the grass to be cut was scarcely more than an inch high.

These parks which I have described abound, as observed, with trees of extraordinary age and size. They are not like the trees of our forests, growing up to a great height, and, on account of the crowded state of the neighbourhood, throwing out few lateral branches; but what they want in height, they gain in breadth; and, if I may be excused for a hard word, in umbrageousness. I measured one in Lord Bagot's celebrated park in Staffordshire, and going round the outside of the branches, keeping within the droppings, the circuit was a hundred yards. The circumference of some of the celebrated oaks in the park of the Duke of Portland, which we measured together, when he did me the kindness to accompany me through his grounds, seem worthy of record. The Little Porter Oak measured 27 feet in circumference; the Great Porter Oak is 29 feet in circumference; the Seven Sisters, 33 feet in circumference. The Great Porter Oak was of a very large diameter 50 feet above the ground; and the opening in the trunk of the Green Dale Oak was at one time large enough to admit the passage of a small carriage through it; by advancing years the space had become somewhat contracted. These indeed are noble trees, though it must be confessed that they were thrown quite into the shade by the magnificent Kentucky Button-wood or Sycamore, of whose trunk I saw a complete section exhibited at Derby, measuring 25 feet in diameter and 75 feet in circumference. This was brought from the United States, and indeed, might well be denominated the mammoth of the forest.

In these ancient parks, oaks and beeches are the predominant trees, with occasional chestnuts and ashes. In very many cases I saw the beauty and force of that first line in the pastorals of Virgil, where he addresses Tityrus as "playing upon his lute under the spreading shade of a beech tree." These trees

are looked upon with great veneration; in many cases they are numbered; in some, a label is affixed to them, giving their age; sometimes a stone monument is erected, saying when and by whom this forest or this clump was planted; and commonly some record is kept of them as a part of the family history. I respect this trait in the character of the English, and I sympathise with them in their veneration for old trees. They are the growth, often of centuries, and the monuments of years gone by. They were the companions of our fathers, who, it may be, were nourished by their fruit, and reposed under their shade. Perhaps they were planted by the very hands of those from whom we have descended; and whose far-sighted and comprehensive beneficence embraced a distant posterity. How many revolutions and vicissitudes in the fortunes of men have they surveyed and survived! They have been pelted by many a storm; the hoarse and swift wind has often growled and whistled among their branches; the lightnings and tempest have many a time bent their limbs and scathed their trunks. But they, like the good and the truly great in seasons of trial, have stood firm and retained their integrity. They have seen one generation of men treading upon the heels of another, and rapidly passing away; wars have burst forth in volcanic explosions, and have gone out; revolutions have made their changes, and the wheel again returned to its starting point; governments and princes have flourished and faded; and the current of human destiny has flowed at their roots, bearing onwards to the traveller's bourne one family and one people after another; but they still stand, green in their old age, as the mute yet eloquent historians of departed years. Why should we not look upon them with reverence? I cannot quite enter into the enthusiasm of an excellent friend, who used to say that the cutting down of an old tree ought to be made a capital offence at law; yet I deem it almost sacrilegious to destroy them, excepting where necessity demands it; and I would always advise that an old tree, standing in a conspicuous station either for use or ornament, should be at least once more wintered and summered before the sentence of death, which may be passed upon it, is carried into execution.

The trees in the park of the palace of Hampton Court are many of them, the horse-chestnut and the lime, of great age and eminent beauty; several straight lines of them forming, for a long distance, the approach to the palace. On a clear, bright day, at the season of their flowering, I passed through this magnificent avenue with inexpressible delight. I passed through them again late in the autumn, when the frost had marred their beauty, and the autumnal gales had stripped off their leaves; but they were still venerable in the simple majesty of their gigantic and spreading forms. I could not help reflecting, with grateful emotion, on that beneficent Power, which shall presently breathe upon these apparently lifeless statues, and clothe them with the glittering foliage of spring, and the rich and splendid glories of summer. So be it with those of us who have got far on into the autumn, or stand shivering in the winter of life!

The extent of these parks, in many cases, filled me with surprise. They embrace hundreds, in some instances thousands of acres;\* and you enter them by gates, where a porter's lodge is always to be found. After entering the park gate, I have rode sometimes several miles before reaching the house. They are in general devoted to the pasturage of sheep, cattle, and deer. In the park at Chatsworth the herd of deer exceeded sixteen hundred. These deer are kept at no inconsiderable expense, requiring abundant pasturage in summer, and hay and grain in winter. An English pasture is seldom or never ploughed. Many of them have been in grass beyond the memory of any one living. The turf becomes extremely close and hard; and the feeding of sheep and cattle undoubtedly enriches the land, especially under the careful management of one

\* Windsor Great Park contains 3,500 acres, and the Little Park 300 acres.

eminent farmer—and many more, doubtless, are like him—on whose pasture grounds the manure of the cattle was daily collected and evenly spread.

In speaking of the parks in the country, I surely ought not to pass in silence the magnificent parks of London, as truly magnificent they must be called, including St. James's Park, Green Park, Kensington Gardens, Hyde Park, and Regent's Park.

Kensington Gardens, exclusive of private gardens, within its enclosures contains 227 acres; Hyde Park, 380 acres; Green Park, connected with St. James's Park, 56 acres; St. James's Park, 87 acres; Regent's Park, 372 acres; terraces and canals connected with Regent's Park, 80 acres—making a grand total of 1202 acres. To these should be added the large, elegant, and highly embellished public squares in various parts of London, and even in the most crowded parts of the old city, which, in all, probably exceed 100 acres. These magnificent parks, it must be remembered, are in the midst of a populous town, including upwards of two millions of inhabitants, and are open to the public for exercise, health, and amusement. They are, at the same time, to a degree stocked with sheep and cows.

It is impossible to over-estimate the value to health of these open spaces, and the amount of recreation and rational enjoyment which they afford to this vast population. In each of the large parks—Kensington, Hyde Park, and St. James's—there are extensive bodies of water, artificial lakes, in some places adorned with elegant bridges, and in St. James's Park studded with pretty islands and shrubbery. Here large varieties of aquatic birds are kept, to the great amusement of the thousands of children, who coax them to the shore with crumbs of bread and cake, the birds being so tame as almost to feed out of their hands, and for the instruction of older heads. There is likewise an exceedingly beautiful and tasteful cottage of gothic architecture, at the end of the lake in St. James's Park, for the residence of the keeper of the birds. There are always to be found in some parts of the parks, or at the keepers' different lodges, some cows kept, where a glass of milk, unadulterated and fresh from the fountain, can be had for those persons who, for health or pleasure, seek the delicious beverage in its purity. The numbers and tameness of the birds in these pleasure grounds is a beautiful circumstance, which it might be well to consider in some other quarters. Their safety and lives are held sacred; and the birds gratefully and, to a feeling heart, delightfully acknowledge this kindness by the most expressive confidence, alighting fearlessly in the path before you, as though they would invite you to cultivate their acquaintance. Man, in general, is a great savage, and a ferocious and insatiate animal of prey. He makes continual war upon many of the animals below him, not for subsistence merely, but for pleasure. His conduct towards the brute creation shows, too often, how certain he is to abuse unlimited power, and conveys a strong argument against despotic authority. Indeed, his war upon the birds merely as a matter of sport, always makes me look upon him with a degree of shuddering, and feel that a man who can find his pleasure in the wanton destruction of little birds, the most humble of all animals in their claims, the most delicate, innocent, and pure in all their tastes and habits, and comparatively useless for food, puts himself beyond the pale of humanity, and could scarcely, with safety, be trusted with a child. It were worth considering always, how many of our pleasures are purchased at a most bitter expense of happiness and life to others! Two or three days' coursing, manly and healthful as the exercise on horseback undoubtedly is, and strongly exciting as the sport is, did not quite reconcile me to it; and the wailings and shriekings of the affrighted and dying hares in the jaws of the hounds, sounded in my ears for several days afterwards like the cries of expiring children.

I shall not be straying from my proper duty if I urge the beneficent example of London strongly upon my own countrymen. Excepting the Common in Boston

—containing about forty-five acres of ground, exceedingly beautiful in its location and improvements—and two other small openings in Franklin-place and Philipsburg-square, both upon a very limited scale, here is a large and constantly increasing population crowded together in one dense mass, with narrow streets and confined alleys, and basement stories, doomed to a comparative privation of Heaven's freest and greatest blessings—light and air. A Botanical and Pleasure garden has been laid out, and is maintained by private subscription, accessible to subscribers or upon the payment of a light fee, which it is earnestly to be hoped for the credit of this city, long distinguished by its liberality and public spirit, may receive every encouragement, so that its improvements and advantages may be greatly extended. New York, with a population of three times the extent of Boston, is scarcely more favoured, excepting in the width of its streets; for, with the exception of those delightful grounds, the Battery, at the very extremity of the city, the open space in front of the City Hall, dignified, *par excellence*, by the name of the Park, and the open grounds attached to St. John's Church, but not accessible to the public, the city has no provision of this kind for public recreation and health. As there is little room in the city proper which can now be obtained, she ought at once, at any expense, to secure the charming grounds at Hoboken, to be devoted for ever and exclusively to these objects. Having already, with the most honourable enterprise, achieved one of the most extraordinary enterprises of the age, or indeed of any age, that of bringing, by a capacious tunnel of forty miles in length, a river of pure water into her city, and dispensing, with an unrestrained munificence to those who cannot purchase it, this most important element, next to vital air, of human existence; let her go on and make the other provision, to which I have referred, for the health and comfort of a population already great, and destined to increase with an unexampled rapidity beyond any bounds which the imagination would now even dare to prescribe.

Philadelphia has set a better example than most other cities in this respect, in having laid out her streets of a capacious width, in having given to most of her houses yards or gardens of a good size, and in having formed, in different parts of the city, public squares of some extent, which are equally ornamental and useful. But she has done little compared with what she might have done; and it is to be hoped that she will be prompted to add to a city, the most convenient and beautiful in the Union, some public gardens and pleasure grounds, admission to which shall be freely offered to her inhabitants; and more especially for the benefit of that class of them who can have no such indulgences but as the offerings of public beneficence. Baltimore has nothing that deserves the name of a square or a pleasure-ground, unless we are to rank under that designation the beautiful enclosure which she has recently purchased for a cemetery; a place, indeed, for a melancholy and instructive pleasure, but more properly devoted to silence and seclusion, and not at all of the character to which I refer. Lowell—destined to contain a large and laborious population, and of a character particularly demanding such places of recreation, with an unlimited extent of land at her disposal costing scarcely anything, and with an investment in her manufacturing establishments of ten or eleven millions of dollars—has not a public square so large as a pocket-handkerchief. This omission has always impressed me with painful surprise. Knowing, as I do, the high character of the gentlemen who founded and built this flourishing city, now grown to manhood almost in a day, I can ascribe such an omission only to a want of consideration, and to the fact that the population has already extended far beyond any calculations which they could, with sobriety, have formed at its commencement. It is not too late to supply this omission, which interest as well as philanthropy so strongly dictates.

Cleanliness, fresh air, and pure water, and the opportunity and the means of relaxation and innocent recreation, are almost as essential to morals as to health.

No one can doubt, in this respect, their direct and beneficial influence. The rich can take care of themselves, and can flee the sources of pestilence, and go after health and recreation where they are to be found. Not so with the poorer and humbler classes in society, to whose labour and service the rich owe all their wealth and many of their pleasures. Whoever goes into the low places in crowded cities, into the subterranean abodes where these wretched beings congregate like rabbits in a warren, or, rather, like swine in their styes, and enters into the melancholy statistics of mortality, in such cases will learn some measure of the suffering which is here endured. In London, and other places of a similar character, the presence of the police and the officers of the peace, always in such places in strong force, will remind him that there is a connection not to be overlooked between condition and character, between destitution and crime, between outward filth and impurity of mind, neglect of person and neglect of morals. The most crowded parts of London are the most vicious parts; and a new should not neglect the experience of an old country. A city without public squares and public gardens should provide them, and on a most liberal scale. In a pecuniary point of view, as rendering a residence in the city the more desirable, and so increasing the value of estates in it, I have no doubt that it would yield ample advantages and profits. But health and morals are not to be measured by any pecuniary standard; and where wholesome water, and fresh air, and light, and sunshine, and cleanliness are concerned, no expense and cost are to be considered as exorbitant. To talk about the value of land in such cases, and to place this in competition with health, comfort, and morals, is equally short-sighted and inhuman.

The public parks and pleasure-grounds in London are highly ornamented with shrubs, plants, and flowers, and accessible to the public for exercise and recreation. In St. James's Park, and in some others, metallic labels are affixed to the foreign plants and shrubs, with the botanical and the vulgar name of the plants upon them, and the class and the country to which they belong. This is a beautiful arrangement, and well deserving imitation; furnishing instruction, as well as satisfaction; inciting to the study of botany, and opening a sealed book to the unaided and curious student of nature. Every one knows the advantage of teaching by example; and what an interest is given to the objects, which the natural and visible world presents, by the associations which science throws around them. This practice, I found, prevailed in other public gardens and pleasure-grounds. It was the case in the beautiful and highly cultivated botanical garden in the neighbourhood of Liverpool, which, though created and supported by private subscriptions, and for scientific purposes, is yet free of access to the public one or more days in the week. The same is the case with the very tasteful garden in Sheffield, a romantic and charming piece of ground, which, though on a small scale, combines many attractions; and likewise with the Arboretum at Derby, embracing, I think, about eleven acres, and formed into a garden and pleasure-ground for the public recreation. This last is the fruit of individual munificence. Mr. Strutt, an eminent manufacturer at Derby, employed Mr. Loudon—the late distinguished horticultural writer—to lay out, plant, and ornament these grounds, at an expense of ten thousand pounds sterling, or fifty thousand dollars; and then, with eminent liberality, gave them to the city of Derby for the public use and recreation of its inhabitants. Tens of thousands of pounds expended in the erection of a Corinthian column, or a marble mausoleum, would not have formed so durable or extended a memorial of him; and thousands upon thousands yet unborn, in the enjoyment of this beneficence, will invoke blessings upon his memory.

#### X.—ORNAMENTAL SHRUBS AND FLOWERS.

The cultivation of flowers and shrubs and vines is a remarkable and prominent feature in the landscape of England; and a circumstance which

has given no little gratification to my national pride has been the profusion of American plants, azalias and kalmias, magnolias and rhododendrons, and a large variety of pines and firs, which are seen in the shrubberies and plantations and pleasure grounds, both public and private. A very large establishment in London is exclusively devoted to the sale of American plants; and they are everywhere admired for the splendor of their foliage and the beauty of their flowers. Green-houses and conservatories are almost universal in the country, where anything like a garden exists; and the better class of houses are surrounded and adorned with a great variety of flowering shrubs and plants, presenting, through the season, a charming succession of gay and brilliant ornaments. Even the laborer's humble cottage, too seldom, I am compelled to admit, anything but a picturesque object, will occasionally have its flowering shrubs adorning its doorway, and the ivy hanging its beautiful tresses over its window, forming, as it were, a mirror, set in a frame of the richest green. The village of Marr, in Yorkshire, not far from Doncaster, and the village of Edensor, in Derbyshire, near Chatsworth, and the village of Lord Brownlow, in Lincolnshire, the best built and by far the handsomest villages I have yet seen in England, to cottages of an excellent and picturesque construction, monuments of the liberality of their proprietors, add these beautiful rural embellishments of vines and shrubs and flowers, and at first blush compel a reflecting mind to admit the moral influence of such arrangements upon the character and manners of their inhabitants. Churches and ruins, likewise, are often seen spread over with the richest mantlings of ivy; and, among many others, the venerable and magnificent remains of Hardwicke Hall, for example, are covered, I may say, in the season of its flowering, with a gorgeous robe of it, matting its sides with indescribable luxuriance, climbing its lofty battlements and fringing its empty windows and broken arches, as though nature would make the pall of death exquisitely beautiful and splendid, that she might conceal the hideousness of decay, and shut from the sight of frail mortals these affecting monuments of the vanity of human grandeur and pride.

I have said and written a great deal to my countrymen about the cultivation of flowers, ornamental gardening, and rural embellishments; and I would read them a homily on the subject every day of every remaining year of my life, if I thought it would have the effect which I desire, of inducing them to make this matter of particular attention and care. When a man asks me what is the use of shrubs and flowers, my first impulse always is to look under his hat and see the length of his ears. I am heartily sick of measuring everything by a standard of mere utility and profit; and as heartily do I pity the man who can see no good in life but in pecuniary gain, or in the mere animal indulgences of eating and drinking.

The establishment of horticultural societies in Salem, Boston, Worcester, New Haven, New York, and Philadelphia—and I speak of these societies in particular because I have attended the exhibitions of most of them—has rendered an immense benefit to the country, not merely in the introduction of new and valuable fruits and vegetables, and in what they have done to improve and perfect the cultivation of those long known among us, but in the improvement of the public taste, and the powerful stimulus they have given to the cultivation of flowers and the formation of gardens and ornamental grounds throughout the country. Few countries in temperate latitudes are richer in the floral kingdom of nature, and the luxuriance of vegetable growth and the splendors of vegetable beauty, than the United States. Why should they not be cultivated? Was the human eye, that wonder of wonders, that matchless organ of our physical constitution, that inexhaustible instrument of the most exalted and varied pleasures, made in vain? Are the forms of beauty in the natural world, so infinitely multiplied as they are around us,

made for any other purpose than to be enjoyed; and what better means can we take to strengthen the domestic affections, of all others the most favourable to virtue, than to render our homes as beautiful and as attractive as possible? Who does not see constantly the influence of external circumstances upon character as well as comfort; and perceive how greatly order, exactness, and personal neatness contribute to form and strengthen the sense of moral exactness and propriety?

The horticultural establishments of England, their vegetable gardens, their flower gardens, their shrubberies and plantations, their green-houses and conservatories, are upon the most extensive scale; and I shall presently give a full account of some of the principal ones which I have had the pleasure of visiting.

#### XI.—CLIMATE OF ENGLAND.

Another marked difference in the agricultural condition of England and the northern portion of the United States, is in the climate. I cannot speak with any confidence of Scotland, but the climate of England must be pronounced highly temperate. It is favourable to the growth and the constant vigour and freshness of the grasses. It is not only temperate, but moist. The last season may have been peculiar. I landed in Liverpool near the end of April; and there was more or less rain for forty-six days in succession, until I became quite satisfied that an umbrella was as necessary as a hat, and that it would be advisable to fasten it to my back. When the clear weather finally set in, we had two months, or more, of as fine weather for harvesting as I ever knew, with scarcely the intervention of a day's rain; yet there was nothing of the parching heat of our summers, and I saw no land burnt up by drought. It is now December, and I have scarcely seen any ice, and not a flake of snow; and there is no frost in the ground. Many persons speak of this as the usual temperature, and say that the cold weather does not commence until after Christmas. The dews appear to me very light, owing, as I suppose, to the mildness of the days; and there have been none of those blowing clouds of dust with which our air is often charged, and which with us, after long droughts, are so very disagreeable. Of thunder and lightning this season I am unable to recall a single instance; and at no time of the day has the heat been in the slightest degree oppressive.\*

Their insular situation exposes them to frequent and dense fogs, which interpose to prevent the earth being ever parched by drought; and the rains to which they are subject keep the earth, where it is of a retentive character, much soaked with water, and preserve an almost perpetual greenness of vegetation.

In many parts of England the crops of turnips are never pulled until they are wanted for feeding in the course of the winter; in other places they require a very slight covering to keep them from the frost. In most cases sheep do not require to be housed; and in some cases neat cattle get their chief living in the fields through a great part of the winter, though I cannot but regard this practice as very bad husbandry. Ploughing appears to be seldom interrupted for any length of time; and wheat is sown from October to April. In parts of New Jersey, Pennsylvania, Delaware, and

\* The annual average depth of rain in England is about two feet. In 1840, for instance, the depth at Aberdeen was 24.627 inches; at Empingham, 18.58; Epping, 20.767; Falmouth, 31.511; Gosport, 25.525; Greenwich, 18.24; York, 24.72 inches. That is perhaps not much below the average of the continent of Europe. Some portions of western Europe, however, are exceedingly wet; 123 inches have been noted to fall at Coimbra in Portugal in a year. The fall of rain is still greater in the West Indies. At St. Domingo, 120 inches, at Cayenne, 116 inches; at Maranham, 277 inches. So that even under the Equator, a sufficient supply of rain water can be obtained for the service of the inhabitants. —*Farmer's Almanac.*

the States South, they enjoy similar advantages of a mild temperature; but North of these the despotism of frost and snow commences, and holds undisputed sway for four months in the year. Yet, notwithstanding this, our seasons are quite long enough for the perfect ripening of all the crops grown among us; and, with a little extra labour, even the valuable green crops, which here play so important a part in the feeding of stock and the enriching of the land, might, if deemed expedient, be raised and used among us. Of this, however, I shall speak hereafter. These remarks apply only to what has come under my own personal observation; and I can be said to have seen, as yet, only a small part of England. The winter management of farms here is a matter of as much importance as the summer husbandry, and will claim my particular attention. The disposal of the produce, the fattening of animals, the breeds or kinds of live stock most likely to make a good return to the farmer, and the whole management of the manure yards, are matters in relation to which much useful instruction is to be obtained.

It would seem as though a country with so rough and severe a climate as New England, and with such long winters as prevail there, which, for more than a third part of the year, interrupt entirely all the out-door operations of husbandry, must be exceedingly unfriendly to agriculture, compared with one where the winters are so open and field-labour is practicable through the whole of the year. This is, indeed, the case; yet there are some compensations for these privations and disadvantages, which in New England are duly appreciated, as the winter, when labour is to a great degree suspended, is the special season for the education of the young; for reading and mental improvement, and for the most friendly and social intercourse. If these circumstances may be thought to have no connection with agriculture, strictly so called, yet they are certainly to be considered in reference to the condition of the agricultural population; and in every circumstance which renders their condition more comfortable and happy, and, above all, which advances their intelligence, we may ordinarily look for a corresponding improvement in their cultivation and rural husbandry. A New England village resembles, to a great degree, a united and happy family, where perfect equality prevails; where a friendly sympathy is everywhere active and strong; and where all seem bound to contribute, according to their power, to the general welfare, comfort, and improvement. Society exists in the United States under circumstances so entirely different from those in which it is found here, that a comparison can hardly be instituted between them. The intercourse to which I have here referred, can scarcely be said to exist in England; the general character of the laboring population being not many removes, so far as intellectual improvement is concerned, above that of the other animals which cultivate their fields. In several respects, it must be admitted, the mild temperature of an English climate affords singular advantages. The winter season affords the best opportunity for draining and ditching; the active operations of the farm being, in a degree, suspended, labor is obtained at a low rate; and as a great portion of field work, in England, is done by the piece instead of the day, the shortness of the days makes no difference of expense to the employer.

## XII.—AGRICULTURAL POPULATION.

I have referred to some differences in the condition of society here, and in the United States, and those differences it may be well to understand. The agricultural population in England is divided into three classes—the landlord, the tenant farmer or occupier, and the labourer.

1st.—*The Landlords; Rents; and Taxes.*—The landlord is the owner of the soil. Most of the landlords are noblemen or gentlemen, and are looked up to with a deference and veneration, on account of their rank with which those of us who have been educated in a condition of society where titles and ranks

are unknown, find it difficult to sympathize. They own the land. Some few of them keep portions of their vast territories in their own occupation, and under their own management; but, by most of them, their lands are leased in farms in different sizes, seldom less than three or four hundred acres, and in many cases eight hundred, a thousand, and twelve hundred acres. The rent of land varies in different places; in some being as low as five shillings; in others rising to almost as many pounds. Rents are in general paid in money. Sometimes they are valued in kind; that is, the tenant engaging to pay so many bushels of wheat, or so many bushels of barley, or such amount of other products; but in these cases, also, the landlord usually receives his rent in money according to the current prices of these articles. The rents are paid in semi-annual payments. The fair rent of land is sometimes estimated at a third of its products; by some, a different rule is adopted, which is, after all the expenses of cultivation and the usual assessments are deducted from the gross proceeds, that the balance remaining should be divided equally between the landlord and the tenant. In general, however, as far as my observation has extended, the rate of rent is not determined by any particular rule, other than that which prevails in most commercial transactions, that each party makes the best bargain for himself that he is able. It is only just to add that in all the cases, without exception, which have come under my remark, there has seemed to me, on the part of the landlords, the highest measure of liberality; the rents in general bearing a small proportion to the legal interest of the money at which the lands are valued, and for which they could be sold at once; lands costing £60 sterling, or 300 dollars per acre, being frequently let for 30s. or £2 sterling per acre, that is less than eight or ten dollars per acre. We are not well satisfied in the United States with a return from our land under five or six per cent. on its cost; but the landlords here seldom obtain more than two-and-a-half per cent. or three per cent. on the price which the land would command, if brought into the market. The low rents which are obtained show the abundance of wealth, and how greatly an investment in land is valued for its security; and the active competition for the lease, which appears in almost every part of the country when farms are to be let, seems to imply that the rents are reasonable, and, more than that, liberal. As I shall not hesitate to put down my impressions of the country, of men and things, with the utmost frankness, avoiding all personalities, I must say that there has appeared to me on the part of the landowners, with many of whom, among the largest in the country, I have had the pleasure of becoming acquainted, the most marked liberality in the management of their great estates, both in the terms and continuance of their leases, and in the aid rendered to their tenants in making improvements. The liberality and amount of the expenditures indeed strikes an American with astonishment. In the United States, and especially in the northern parts of it, where there is a constant struggle to live, where men have to contend with a severe climate and a stubborn soil, and where money is comparatively scarce, the accumulations small, and the farms extremely limited, and where the first lesson taught to a child, even in his swaddling clothes, is a lesson of self-dependence, it is not surprising that men should be compelled with extreme care to husband their small means, and that a frugality, in itself highly commendable, should sometimes verge within the limits of meanness. This, indeed, is far better than that reckless expenditure, without regard to one's means, which we sometimes see, and which is almost sure to involve the individual who indulges in it, in irretrievable debt and ruin. But there cannot be a doubt that in New England we often commit a great error in withholding a reasonable expenditure in the improvement of our lands; and that we are not sufficiently impressed with the obvious truth, that a proper expenditure of capital is as important to a successful and improved agriculture, as to the successful prosecution of any branch of manufactures, trade, or commerce.

Leases may be annual, or at will, or for a term of years. In a lease at will it is understood that the landlord is not bound to give his tenant any previous notice to quit, when he designs that his possession shall terminate at the end of the year. When land is taken by the year, it is understood that the tenant has six months notice of the intention of the landlord not to renew his lease, if such intention exist. The lands in England are burdened with taxes from which the United States are free. These, in many cases, amount to a sum equal to the rent of the land. The tithes, or tenth of every article produced are not now taken in kind; but are commuted and paid in money. The poor and parochial rates are often heavy; these all are paid by the tenant, unless a special agreement is made to the contrary.

Some persons are disposed to question the right of individuals to such extensive tracts of land, which, in many instances, they neither cultivate themselves, nor suffer others to cultivate, and which descend undiminished through successive generations in the same family. The legal or constitutional right is determined by statute; upon the moral right, or the right founded upon principles of political justice, I am not disposed to enter, as this would lead me to discuss the foundations of all property, a subject foreign from my purpose. The tithes system, as it exists here, strikes a foreign and unpractised eye, as a singular feature in the condition of things. A tithe, or tenth part of the produce of the land, according to the provisions of the Levitical law in respect to the Jewish priesthood, was taken for the support of the established church; and the priests and clergy of the different parishes were accustomed to levy it in kind, and to exact it to the extremity of every tenth portion of the honey made by the bees in the farmer's hives, every tenth chicken in the good wife's poultry-yard, and every tenth egg laid by her fowls. Indeed, the monks, if reports be true, had always a remarkably keen appetite for honey, and poultry, and eggs. By one of the kings of England, the possessions of the church were seized and confiscated; and the right of claiming tithes, in many parishes or districts, was given to his friends, reserving a very small portion for the support of the clergy. A great portion of the tithes are now, therefore, held by laymen, and in some parishes, for example, where the tithes amount to several thousand pounds, the clergyman gets only as many hundreds; and the tithes of any particular parish or place, or rather the right to enforce and receive them, is as much a matter of sale or traffic as the land itself. It is not for me to quarrel with the institutions of a country of which I am neither citizen nor subject; but it is obvious that every burden upon the land must, to a degree, operate to the prejudice of agriculture; and the matter of levying a tax originally intended exclusively for the support of religious institutions, after it has long since avowedly ceased to be applied in any form to that object, is an affair for those to consider who are especially affected by it. I have not deemed it necessary to inquire into the amount paid in this way, which varies considerably in different places; but the amount stated to me by one farmer, the occupier of 250 acres of land, and whose rent is £370, is at least £60 sterling (or 300 dollars) per year in parochial rates, including all but specific taxes. The poor-rates are in many cases extremely burdensome upon the land, the wages of the laborers being in general so limited as not to admit, but in very rare cases, their laying aside any of their earnings for old age, or seasons of sickness and calamity. The support of the poor formerly rested, in a great measure, upon the religious houses, which were very largely endowed with lands and possessions for this very object; but when these houses were broken up and the property taken by the state, this burden was transferred to the backs of the landholders or occupiers. The individual possessions of the landowners are sometimes enormous, amounting in many cases to scores of thousands of acres, and, in one instance within my knowledge, to seventy-five thousand acres; and in another, I believe, to more than a million acres.

2.—*The Farmers.*—Next come the farmers, who lease the land of the land-owners. These men are not like farmers in the United States, who themselves labor in the field; they rarely do any personal labor whatever. They are, in general, a substantial and well-informed body of men; and many of them live in a style of elegance and fashion. Many of them are persons of considerable property, as indeed they must be in order to manage the farms which they undertake. The capital necessary to manage a stock or an arable farm must be always estimated at double or treble the amount of rent; and, in general, cannot be set down at less than £10 sterling, or 50 dollars, per acre. The stock required for a grazing is, of course, much more than for an arable farm; but in no case can success be looked for without ample means of outlay. In no respect does the agriculture of England differ more from that of the United States, especially from that of the northern states, than in that of capital. Our farmers, in general, have very little floating capital. They attempt to get along with the least possible expenditure. Under such circumstances they operate to very great disadvantage. They can never wait for a market. They cannot bring out the capabilities of their farms; and the results of their farming are consequently limited and meagre. The difference between a new country contending, as it were, for existence, and an old country operating with the accumulations of years and centuries, is most sensibly marked; the expenses incurred on some farms in England solely for manures purchased, exceeding thousands of pounds sterling, and the cost merely of grass seeds, are perfectly surprising to an American farmer; yet experience has demonstrated that, in these cases, the most liberal outlay of capital is the most sure to be followed by successful results.

The farmers in England, as far as I have had the pleasure to meet with them, are a well-informed set of men, especially on subjects connected with their particular pursuits. There, of course, is the variety among them which is to be found in other classes; but their manners, without exception, are courteous and agreeable, their hospitality distinguished, and their house-keeping—and I speak with the authority of a connoisseur in these matters—is admirable. Indeed it has not yet been my misfortune to meet, in England or Scotland, with a single instance of sluttishness in any private house which I have visited; but, on the other hand, the most exemplary neatness. I cannot say as much of all the hotels or taverns in the country, many of which are far inferior in all respects, and none of them superior in any, to our best hotels. There is one circumstance in English manners so much to the credit of their house keeping, that I shall, for the best of reasons, venture to remind my American friends of it, although I fear that any reformation in the case is hopeless. In no private house which I have visited have I been smothered or offended with tobacco smoke; and I have seen the offensive and useless habit of chewing tobacco since I came to England in but one solitary instance, and that was on the part of an American. At public dinners the same reserve is not practised, and the atmosphere becomes as thick as a London fog. I will not interfere with any gentleman's private pleasures; but I will lose no fair opportunity of protesting against a practice which has little to recommend it, and in respect to which I think we have good grounds to ask—what right has any man to indulge in any mere personal or selfish gratification, in-doors or without, at the expense of his neighbour's comfort? I know very well the value to my own country, as a branch of agriculture, of the production of tobacco; but I cannot look upon its cultivation with much complacency. Nor does the exhausted condition of the soil, where tobacco has been sometime cultivated, reconcile me to its culture. Indeed, how much were it to be wished that instead of the production of an article useless for subsistence and pernicious to health, there could be substituted the cultivation of plants for the food and comfort of millions now suffering from the want of them!

3.—*The Agricultural Laborers.*—Next to the farmers come the laborers; and these three classes preserve the lines of distinction among them with as much caution and strictness, as they preserve the lines and boundaries of their estates. These distinctions strike a visitor from the United States with much force; but, in England, they have been so long established—are so interwoven in the texture of society—and men are, by education and habit, so trained in them, that their propriety or expediency is never matter of question. The nobleman will sometimes, as an act of courtesy and kindness, invite his tenant-farmer to his table; but such a visit is never expected to be returned. The farmer would under no circumstances invite the laborer to his table, or visit him as a friend or neighbor. I do not mean to imply that there is, on the part of the higher classes of society in England, any insolence or arrogance in their treatment of their inferiors. Free as my intercourse has been with the highest and the middle classes, I have seen no instance of this, nor anything approaching it, but the contrary; and the best bred men in the country—the true gentlemen—are distinguished by their courtesy and the absence of all ostentatious pretensions. While they naturally fall into the orbit, in which birth, education, and the political institutions of the country have accustomed them to revolve, the well-principled among them would, I am sure, be the last persons, by any assumptions, voluntarily to mortify one below them with a sense of his inferiority.

The farm laborers are, I will not say in a degraded condition, for that would not, in any sense, apply to them, unless where, by their own bad habits, they may have degraded themselves; but they are in a very low condition, and extremely ignorant and servile. They rarely, as with us, live in the house of their employers, but either in cottages on the farm or in a neighbouring village. They are, usually, comfortably clad, in this respect contrasting most favourably with the mechanics and manufacturers in the cities and large towns; but they are, in general, very poorly fed. Their wages, compared with the wages of labor in the United States, are very low. The cash wages paid to them seldom equals the cash wages paid to laborers with us, and our laborers, in addition to their wages in money, have their board; but the English laborers are obliged to subsist themselves, with an occasional allowance, in some instances, of beer, in haying or harvesting. The division of labor among them is quite particular—a ploughman being always a ploughman, and almost inseparable from his horses; a ditcher, a ditcher; a shepherd, a shepherd only; the consequence of this is that what they do, they do extremely well. Their ploughing, sowing, drilling, and ditching or draining, are executed with an admirable neatness and exactness; indeed, the lines of their work could not be more true and straight than they usually are, if they were measured with a marked scale, inch by inch. They speak of ploughing and drilling or ridging by the inch or the half-inch; and the width of the furrow slice, or the depth of the furrow, or the distances of the drills from each other, will be found to correspond, with remarkable precision, to the measurement designed. But they seem totally destitute of invention, and have, evidently, little skill or ingenuity when called upon to apply themselves to a work different from that to which they have been accustomed. Their gait is very slow; and they seem, to me, to grow old quite early. The former circumstance explained itself to me when I examined and lifted the shoes which they are accustomed to wear, and which, when, in addition to being well charged with iron, they gather the usual amount of clay which adheres to them in heavy soils, furnish at least some reason why, like an Alexandrine verse, “they drag their slow length along.” There are occasional instances of extraordinarily good management where they are enabled to accumulate small sums; but in no case, under the best exertions, can they make, from the wages of labor, anything like a provision for their old age and decay.

They are little given to change situations, and many of them, both men and women, live and die in the same service. Several instances have come under my observation of thirty, thirty-five, and forty years reputable service; and many where persons, even upon the most limited means, have brought up large families of children without any parochial assistance. But, in this case they are all workers; the children are put to some sort of service as soon as they are able to drive the rooks from the corn, and no drones are suffered in the hive. I visited one laborer's cottage, to which I was carried by the farmer himself, who was desirous of shewing me, as he said, one of the best examples, within his knowledge, of that condition of life. The house, though very small, was extremely neat and tidy; the bible lay upon the shelf without an unbroken cobweb over its covers; the dressers were covered with an unusual quantity of crockery, sufficient to furnish a table for a large party—a kind of accumulation which, I was told, was very common; and their pardonable vanity runs in this way, as, in higher conditions of life, we see the same passion exhibiting itself in the accumulation of family plate. The man and woman were laborers, greatly esteemed for their good conduct, and had both of them been in the same service more than forty years. I asked them if, in the course of that time, they had not been able to lay by some small store of money to make them comfortable in their old age? I could not have surprised them more by any question which I could have proposed. They replied that it had been a constant struggle for them to sustain themselves, but any surplus was beyond their reach. I cannot help thinking that the condition is a hard one in which incessant and faithful labour, for so many years, will not enable the frugal and industrious to make some small provision for the period of helplessness and decay, in a country where the accumulations of wealth in some hands, growing out of this same labor, are so enormous.

To the honor of several proprietors, the kindest provision is made by them for the decayed and superannuated. In some cases their wages are continued to the end of life; and in some, as I saw with great pleasure, comfortable cottages are provided for the old and infirm: they have their rent and fuel without charge, and a regular stipend as long as they live. This was the case at the seat of the late distinguished farmer, the Earl of Leicester, formerly Mr. Coke; and likewise on the estates of the Duke of Devonshire, where even the old school-master of the village is pensioned, and has a house and a liberal allowance provided for him. Several other instances have come under my observation, where the superannuated and decayed laborers were kindly provided for and received a pension adequate to their comfortable support. This is as it should be. In every just community the rights of honest labor ought to be respected and secured. I confess it would be far better for them to be able to provide for themselves than to be dependent upon the precarious bounty either of individuals or the public; but I should be unwilling to overlook any act of justice or honor. It is obvious that the prospect of a supply from the bounty of the landlord can only apply to those who are in the direct employment of the landlord, and not to those who serve the tenant farmer, whose situation and permanency, where the lease of the farm is only for the year, are always, to a degree, doubtful.

It cannot be denied that those who labor with us are altogether a superior class of men to the English laborers; I refer, of course, to the natives of the country. A considerable portion of our labor is now performed by foreigners, who, when they unite sobriety and frugality with faithful industry, are sure of good treatment and success; indeed, I have known several instances of laboring men, and some of them in my own employ, who, by good conduct, have supported themselves, and have accumulated, after a few years' service, their four and five hundred dollars and upwards, that is, their eighty and their hundred pounds, an acquisition which, in England, a laboring man would

not dream of as the result of his labor, sooner than he would dream of receiving a pension of the same amount from the government. With us the laborer is vastly better paid than in England. With us the laborer always is, or always may be, the owner of the house in which he lives, and of as much land as he chooses to cultivate. Here the cottager is always a mere tenant, subject to the pleasure of his landlord; and, though there are many cases where allotments of small portions of land are granted them for a garden spot, and for the obtaining of some small supplies for their families, yet there are many where no indulgence of this sort is allowed, not even so much as a cabbage yard. The laborer here is doomed to remain in the condition in which he is born—he cannot rise above it. The provision for the education of the children of the laborers is, in most parts of England, extremely limited and meagre. There are some national schools, and there are, in many places, schools established and supported by the beneficence of the landlords, for the benefit of the laborers in their own villages, and on their own farms. Sunday schools are likewise kept up in all the parishes which I have visited; and I should be happy, if it were allowed me, to adorn my page with the names of some noble women, who, with a benevolence truly maternal, take a deep interest in these institutions, and generously support them, and, better than that, personally superintend them. These are bright examples. In one case, at a small country village, on a Sunday, I saw more than four hundred of these children, cleanly and plainly dressed, entering the parish church, and taking their seats together, behaving with the most exemplary propriety. When they lifted up their voices in the solemn chaunts of the church, and their gentle and shrill tones were heard above all the rest, I could not help lifting up my own heart to God in thanksgiving, that the highest truths of religion can be taken in by the humblest minds; that here was at work an instrument of their elevation, which no human power could forbid; that here they were taught to recognise the dignity of their moral nature; and that there is one place, where all earthly distinctions betray their insignificance, and every human being may, on equal terms and with equal confidence, invoke a common and a universal Father. This school was entirely supported by, and under the care of a noble woman, who, to the highest distinctions of rank, education, fashion, and fortune, adds the far higher attributes of a deep sense of religious duty, and an earnest desire to be useful.

The Sunday schools do not, everywhere, confine themselves to religious instruction, but reading, writing, and the elements of arithmetic, are also taught, because, in many cases, the children of the poor are kept so constantly at labor as to have no other opportunity of getting this instruction. The education given them is of a very limited character, and does not extend beyond reading, writing, and the first principles of arithmetic, exclusive of religious instruction. The national schools, which are established by aid from the government—which measures its bounty by what may be raised by private subscription in any parish or village—require the catechism of the established church to be taught, and the attendance of the children at the church, under the penalty of exclusion from the school. The British and Foreign School Society allows the attendance of the children at such church as the parents choose; but the catechism of the established church, and no other, is allowed to be taught in their schools. The schools supported by the liberality of the dissenters are, comparatively, few; and in most of these, without doubt, the same interest is active, and the same influences are at work, to attach their children to the particular sect by whose patronage the school is established and sustained. I speak now of England. I am not yet able to speak of the condition of things in Scotland, although it is constantly boasted of that the education of the Scotch laborer is always provided for, and that the Scotch laborer, in point of instruction, is far superior to the English. This remains for me to see.

The condition of the laborers in this country is a subject of such deep concern to the community, on the ground of pecuniary profit as well as of philanthropy and justice, that I shall, in the course of my inquiries, revert again to it. I do not feel that as yet I am sufficiently well-informed to speak with much confidence on the subject; but I shall not leave it without some further remarks. The common wages of farm labor, vary for men, from five shillings to twelve shillings per week; but I think a fair average would be eight to nine shillings sterling. A shilling may be reckoned at twenty-four cents, so that the monthly wages for a man may be put down at eight dollars and sixty-four cents. This is the whole, where labor is paid for in money, excepting, as a matter of kindness, the farmer generally brings the coals for his laborer. There are cases, too, in which the farmer stipulates to supply his wheat to the laborer at a fixed price, which is to be unaffected by any changes in the market. Six shillings, only, a week are reported to be paid in some places, but I have met with no case less than eight shillings and sixpence a week.

It may be interesting to some of my readers to have a more particular account of the wages and condition of the laborers, and for that reason I will give some statements of their condition in that part of the country where wages are paid in kind.

In the neighbourhood of Haddingdon, in East Lothian, I visited a laborer's cottage, being one in a range of six cottages, in a district of country beautifully cultivated and highly improved, and presenting some of the finest examples of agricultural improvement which I have ever seen. The wife, a very tidy and civil woman, about forty years of age, was at home; her husband and daughter laboring in the field. This was a very good specimen of a neat cottage, and its inmates had passed the greater part of their lives in it. It had no other floor but the hard ground; and two beds were fixed in the wall, like sailors' berths on board ship. The shelves were covered with crockery; and a bible, and a few religious and other tracts lay upon the mantel-piece. A cake made of pea-flour and barley-flour was baking over the fire, of which I was asked to eat, but the taste of which did very little towards quickening my appetite. There was, besides the one in which I was, a small room for coal and lumber, where, in case of great emergency, a lodging might be made up. One of her neighbors in the same block, with no larger accommodations, had eight children to provide for. Two grown-up daughters, with one smaller one, occupied one bed; the parents, with one child, occupied the other; the two grown up sons slept in the lumber-room or coal-house. There is often much closer lodging than this. The husband of the woman, in whose cottage I was, was a ploughman, and likewise a bondager, a species of service or contract which requires him to furnish a female laborer, at tenpence per day in ordinary work, and one shilling per day in harvest, whenever her services are required. If he has not a wife or daughter who will answer this purpose, he must keep a woman in his house to be always in readiness when required. His wages were—

18	bolls of oats, at 4 bushels per boll . . . . .	72	bushels.
2	bolls of peas,                   "                   . . . . .	8	"
4½	bolls of barley,               "               . . . . .	18	"
	and £1 for "lint"—or shirts.		

This payment of wages in kind, if the rate is fairly fixed, is certainly an equitable mode. Its effect upon the laborers, as in this case, as they themselves have grain to sell, is to make them the advocates of high prices, and, consequently, the friends of those restrictive measures by which foreign competition in the grain market is prevented. The employer likewise keeps a cow for the laborer; or if he has no cow, an allowance is made to him of five or

six pounds in money. He is likewise allowed 1,000 square yards of ground for potatoes, which the farmer ploughs and manures for him; but which he cultivates in extra hours. For the rent of his house he gives twenty-one days' work in harvest, if required; but should it happen that only twelve or fourteen are required, it is accepted as an equivalent.

For the woman's work he receives a fixed amount per day, whenever she is employed; and for her six months' service in the year, he pays her three pounds. For the other six months he pays her nothing more than her board and some clothes. The farmer brings his coals for him, which he purchases at a small sum, being small coals, here called pan-wood. The value of three shillings and sixpence in coals will serve him through seven weeks in winter. Seven loads (one horse-load, I suppose) of coals are purchased at the quarries for three shillings and sixpence. The farmer's shoes cost him ten shillings, and one pair will last him eighteen months. His daughter's working shoes last her a year: this is exclusive of her Sunday's shoes. In most parts of Scotland the women, in the summer season, wear only their natural sandals and hose, which have, indeed, the advantages of being easily washed, and easily repaired; but in this part of Scotland they form the exception of wearing shoes and stockings the whole year. Their living consists of bread made of barley and peas, meal or oaten porridge and milk, and potatoes; and they generally have a pig. They cannot, of course, lay up any money; and she added, in her own pleasant dialect, that, "the lassies have muckle sair work in harvest." They depend on the sale of their surplus grain for what little money they need. I will do justice to her modest merit, and say, to the shame of thousands rolling in unstinted luxury, that she spoke of her condition as comfortable, and expressed strongly and religiously her contentment.

The wages paid in the county of Northumberland, where the Scotch system of farming is carried to a high degree of perfection, is as follows—as given by several gentlemen, familiar with the subject, to the parliamentary committee.

FIRST EXAMPLE.	
36 bushels of oats	
24   "   barley	
12   "   peas	
3   "   wheat	
3   "   rye	
36 to 40   "   potatoes	
24lbs. of wool	
A cow's keep for a year	
Cottage and garden	
Coals carrying from the pit	
£4 in cash.	

SECOND EXAMPLE.	
10 bushels of wheat	
30   "   oats	
10   "   barley	
10   "   rye	
10   "   peas	
A cow's keep for a year	
800 yds. of land for potatoes	
Cottage and garden	
Coals led	
£3 10s. in cash	
2 bushels of barley in lieu of hens.	

THIRD EXAMPLE.	
36 bushels of oats	
24   "   barley	
12   "   peas	
6   "   wheat	
1000 yards of land for potatoes	

A cow's keep
House and garden
Coals led
£5. in cash.

The following, which is a specimen of the half-year's account between a large farmer and one of his laborers in a part of Northumberland, is worthy of observation.

————— Dr. to —————		£.	s.	d.
Jane Thompson (the bondager), 121½ days at 10d.....		5	1	3
Catherine Thompson (a child), 24 harvest days at 1s. ....		1	4	0
Do., 73½ days at 5d .....		1	10	7½
Elizabeth Thompson (a younger child), 7½ days.....		0	1	9½
Isabella Thompson (a dress-maker at other times), 35¾ days at 1s. ....		1	15	9
Do., 20 harvest days at 2s. 3d. ....		2	5	0
Wife, 9 harvest days.....		1	0	3
His old father, 52 days .....		3	18	0
John Thompson's half-year's cash .....		2	10	0
		£19 6 8*		

This account, it will be seen, with the exception of the last item, does not include any portion of the laborer's own service, but that of his family only. The difference in the price of harvest work at different periods, as between one shilling and two shillings and three-pence, is probably owing to labor becoming more scarce, on account of the general ripeness of the crop, or the hurrying state of the weather.

The Scotch laborers seemed to me, from a very limited observation, strongly attached to their employers. On one farm, where I had the pleasure of visiting, one of the laborers had been in the employment of the same family forty years, and another sixty; to each of whom, although their labor now was of very little value, the farmer continued the same rate of wages which they had in early life. This indeed would seem to be no more than just, that the honest laborer, whose life had been spent in the service of another man, should not be turned adrift in his old age; but, alas, how rare is justice!

Of the extraordinary frugality with which some persons in humble life live, even where prices are high, I may, as well in this place as anywhere, give an example which came under my observation. In Arbroath, near the magnificent ruins of the ancient abbey of Arbroath, I heard the movements of a handloom, and I took the liberty with due ceremony of going in. A middle aged Scotch woman, of pleasing appearance and neatly dressed, was weaving. I asked her how much she was able to earn? She replied that if she rose early at five o'clock, and worked all day through the week, after paying for the use of the loom and the cost of winding her spools, her week's work would amount to four shillings. She received no parish assistance. She paid three pounds sixteen shillings for the rent of her house. Her fuel cost her nine-pence per week; and out of the remainder—less than two shillings—she had to support and clothe herself and an aged mother, who was very infirm and incapable of helping herself. What the support that either of the poor creatures could have under such circumstances must be left to conjecture. The woman spoke of her circumstances as being difficult, but she made no complaint; and presented an example of true christian philosophy which would have done honor to a superior education and the highest condition in life.

In all parts of the country women are more or less employed on the farms, and in some parts in large numbers; I have frequently counted thirty, fifty, and many more in a field at a time, both in hoeing turnips and in harvesting. I have found them, likewise, engaged in various other services: in pulling weeds, in picking stones, in unloading and treading grain, in tending threshing-machines, in digging potatoes and pulling and topping turnips, in tending cattle, in leading out dung, and in carrying lime-stone and coals. Indeed,

\* Parliamentary Report on Employment of Women and Children in Agriculture.—1843. p. 297.

there is hardly any menial service to which they are not accustomed; and all notions of their sex seem out of the question whenever their labor is wanted or can be applied. The wages of women are commonly sixpence and eightpence, and they seldom exceed tenpence a day, excepting in harvest, when they are as high as a shilling. The hours of labor for the men are usually from six o'clock, a. m., to six, p. m., with an interval of an hour for breakfast and an hour for dinner. The women rarely come before eight o'clock, and quit labor at six, with the usual indulgence for dinner. Many of the laborers walk two and three miles to their work, and return at night. Their meals are taken in the fields, and in the most simple form. The dinner is often nothing more than bread.

In the season of harvest immense numbers of Irish come over to assist in the labour, and this presents almost the only opportunity which they have, in the course of the year, of earning a little money to pay the rent of their cabins and potato patches. Nothing can exceed the destitution and squalidness in which they are seen; starved, ragged, and dirty beyond all description, with the tatters hanging about them like a few remaining feathers upon a plucked goose. At their first coming they are comparatively feeble and inefficient; but, after a week's comfortable feeding, they recover strength, increasing some pounds in weight, and, if they are allowed to perform their work by the piece, they accomplish a great deal.

I found in one case on two farms—which, though under two tenants, might be considered as a joint concern—more than four hundred laborers employed during the harvests, a large proportion of whom were women, but not exclusively Irish. The average wages paid the men in this case was one shilling sterling, (or twenty-four cents) per day and their food, which was estimated at about ninepence (or about eighteen cents) per day. Their living consisted of oatmeal-porridge and a small quantity of sour milk or butter-milk for breakfast; a pound of wheaten bread, and a pint and a-half of beer at dinner; and at night, a supper resembling the breakfast, or two pence in money in lieu of it. I was curious to know how so many people were lodged at night. In some cases they throw themselves down under the stacks, or upon some straw in the sheds or out-buildings of the farm; but in the case to which I refer above, I was shown into the cattle-stalls and stables, the floors of which were littered with straw; and here the men's coats and the women's caps and bonnets upon the walls, indicated that it was occupied by both parties promiscuously. This was indeed the fact. Each person, as far as possible, was supplied with a blanket, and these were the whole accommodations and the whole support. This was not a singular instance. I am unwilling to make any comments upon such facts as these. They speak for themselves. They are matters of general custom, and seemed to excite no attention. I do not refer to them as matter of reproach to the employers, who were persons of respectable character and condition, and whose families were distinguished for their refinement. But it presents one among many instances in which habit and custom reconcile us to many things which would otherwise offend us; and lead us to view some practices, utterly unjustifiable in themselves, with a degree of complacency or indifference; and as unalterable, because they have been so long established. I believe there is only one part of the United States where anything resembling such a condition of things prevails, or would be permitted; and there only among a class of beings whose claims to humanity seem not very well established in all minds, and whose degradation, on account of their complexion, appears absolutely hopeless. But, even here, this indiscriminate consorting is not common; nor would it be permitted by any respectable planter.

This condition of things should certainly save the country from the reproach, if it be one, which some English tourists are disposed to consider a fault in American manners, that of treating the sex with too much courtesy and defer-

ence. I cannot bring myself, however, to view the subject with any lightness whatever. My confident conviction is that the virtue of a community depends on nothing more than on the character of the women. In proportion as they are improved, and treated with deference on account of their sex, the women are brought to respect themselves, and the character of the men is directly improved: character itself becomes valuable to both parties. But in proportion as the condition of women is degraded, and they are considered and treated as mere animals, self-respect is not known among them; character is of no value; and the moral condition of such a class, or rather its improvement, is absolutely without hope. Nor is it without its pernicious influences, which must be too obvious to require to be pointed out, upon the classes in the community above them. Much fault as some persons have been pleased to find with the deference paid to the sex in the United States, I should be very sorry to see it in the smallest measure abated. I do not believe, taken as a whole, there is a more virtuous population upon earth, than are the women of New England and the middle states; and nowhere is there a greater decency and propriety of conversation and manners. I speak of these portions of the country in particular, because with them I am intimately acquainted, and have a right to speak with confidence; but I have no reason to say that the same respectability of character does not prevail in other parts of the United States.

I do not claim for my country anything like an immaculate condition of society; very far from it: but I do claim for them a highly improved moral condition; and have no hesitation in saying, that in most of our country villages prostitution is unknown, and an illegitimate child is a comparatively rare occurrence. I add with equal confidence, that under the influence of our free schools and universal education, and the disinterested and philanthropic exertions among all sects, for the religious education of the young in Sunday schools, the beneficial and ameliorating results fully equal every reasonable expectation. This comes of the value of character, and the lessons early inculcated upon them to respect themselves as women. I would, if possible, strengthen this sentiment; and therefore would, in no department of life, render less prominent the distinctive barriers between the sexes. In all my intercourse with society in the United States, and with opportunities as large as any man of observing all classes among them in the various conditions of life, I have never known an instance of a woman going to a public bar for drink, or sitting down in a public bar-room with men, or alone, to regale herself. The ale-houses and gin-shops in England are as much accustomed by women as by men, and the results of such practices are exactly what might be expected—an extreme vulgarity of manners, and a large amount of drunkenness among the lower class of women. What, as a matter of course, comes with it need not be told; but the records of the police courts leave no one at a loss.

My observations in this case must be understood as applying solely to the lowest class: these constitute a very numerous portion. They apply likewise mainly to cities and large towns. In respect to the department of the middle and the highest classes—with whom my intercourse, through their kindness, has been familiar and extensive—nothing in manners or conversation can be farther removed from everything vulgar or offensive; and for propriety, and the highest degree of refinement, nothing can be more exemplary and delightful.

In districts strictly agricultural, the low rate of wages does not admit of much expenditure in this way; and, if there are indulgences, they must be at home in the village ale-houses, and only occasional. For a considerable portion of the year, the farm laborers are not allowed any beer; in the haying and harvesting their allowance seldom exceeds one and a half pint, which, as it is small beer, cannot be considered excessive. I could not learn that any allowance of whiskey or spirit is ever given them by their employers, or that it is

ever carried by them into the fields. The drinking, in this country, with the lower and laboring classes of people seems, in a great degree, confined to the licensed houses, of which, certainly, there is nowhere any want. In passing through the village of Glossop, in Derbyshire, a modern and an exceedingly well-built village, in a distance, I should judge, of less than three-fourths of a mile, I counted, as I passed along on the box of the coach, thirty-five licensed retail shops, most of which were probably for the sale, among other things, of intoxicating liquors. Indeed the number of licensed retailers in every village in England is quite remarkable, and would seem, in many cases, to include almost every fourth house.

I am not disposed to object to the employment of women in some kinds of agricultural labor. The employment of them in indiscriminate labor is liable to the most serious objections. Nothing can be more animating, and, in its way, more beautiful than on a fine clear day, when the golden and waving harvest is ready for the sickle, to see, as I have several times seen, a party of more than a hundred women and girls entering the field, cutting the grain, or binding it up after the reapers. In cultivating the turnips they are likewise extremely expert. In tedding and making hay, and in various other agricultural labors, they carry their end of the yoke even; but in loading and leading out dung, and especially, as I have seen them, in carrying broken limestone in baskets on their heads, to be put into the kilns, and in bearing heavy loads of coal from the pits, I have felt that their strength was unnaturally taxed, and that, at least in these cases, they were quite out of "woman's sphere." I confess, likewise, that my gallantry has often been severely tried when I have seen them at the inns acting as ostlers, bringing out the horses and assisting in changing the coach team, while the coachman went into the inn to try the strength of the ale.

As far as health is concerned, the out-door employment of women is altogether favorable. As far as virtue or moral purity is concerned, out-door employment in itself is not more objectionable than employment within doors. Indeed, from the inquiries which have been made into this matter, and the elaborate reports that have been given to the government, it does not appear that the agricultural districts, where the custom of out-door employment for women prevails, are more immoral than the manufacturing districts. But the natural effect of such employment upon women is to render them negligent of their persons, and squalid and dirty in their appearance; and with this neglect, of person, they cease to be treated with any deference by the other sex and lose all respect for themselves. Personal neglect and uncleanness are followed by their almost invariable concomitants, mental and moral impurity and degradation. The working likewise promiscuously with men, which is done continually, must expose them to rude jests, and to language and manners which, among the lower class of men, are too often grossly indecent and immoral. In all other respects many kinds of out-door agricultural employment must be and is, as it is admitted, favorable to health and vigor. The general health and vigor of such women, so many hours engaged in reasonable exercise in the open air, contrasts most favorably with the effeminacy, debility, and early decay of those who are confined in heated and close manufactories, or in sedentary employments within doors. Nor in point of moral conduct, as far as mere occupation is concerned, is there any reason to suppose that the agricultural classes would suffer in comparison with the manufacturing classes, or with the host of young women in cities, employed in various trades and in-door occupations. We have few instances, in the free states, of women being employed in field labor. The women in Wethersfield, Connecticut, have for years been accustomed to the cultivation of onions, doing everything for the crop, excepting ploughing and manuring the land, even to preparing it for the market. They certainly have suffered no evil, but, on the

contrary, have derived much benefit from the occupation. Nowhere, it is believed, can men, dependent upon their own exertions for support, find wives better able to manage their household affairs, more frugal, more industrious, or more tidy, than among the industrious young women of Wethersfield. It must seem strange to many persons if I also add, as I know I may with truth, that many of these young women are persons of good education, and to a degree, allowing for the retired condition of society in which they have been brought up, even of refined manners: so totally different, indeed, are the conditions of the laboring classes in England and the United States. In truth, no comparison can properly be instituted between them. In general, among the laboring classes in England, their low condition, their ignorance, and want of education, and the almost absolute impossibility of rising above the estate in which they are born, render them, to a great degree, reckless and improvident. Character becomes consequently of far less importance than it would otherwise be. There are wanting, consequently, the motives to that self respect, which constitutes the highest security of virtue; and, under such a condition of things, it is not surprising to find a laxity of morals, which produces swarms of illegitimate children. This is attended by the usual consequence—an absence, on the part of the parents, of that sense of obligation to support and provide for their offspring, which is to be found in its purity and strength only in legal wedlock.

There are two practices in regard to agricultural labor, not universal, by any means, but prevailing in some parts of England and Scotland, which I may notice. The first is called the "Gang system." In some places, owing to the size of farms being greatly extended, cottages being suffered to fall into decay and ruin, laborers have been congregated into villages, where have prevailed all the evils, physical and moral, which are naturally to be expected from a crowded population, shoved into small and inconvenient habitations, and subjected to innumerable privations. In this case the farmer keeps in permanent and steady employment no more laborers than are absolutely required for the constant and uninterrupted operations of the farm; and relies upon the obtaining of a large number of hands, or a gang, as it is termed, whenever any great job is to be accomplished, that he may be enabled to effect it at once and at the smallest expense. Under these circumstances he applies to a gang-master, as he is termed, who contracts for its execution, and through whom the poor laborers must find employment, if they find it at all; and upon whose terms they must work or get no work. The gang-master has them then completely in his power, taking care to provide well for himself in his own commissions, which must, of course, be deducted from the wages of the laborers, and subjecting them, at pleasure, to the most despotic and severe conditions. It is not optional with these poor creatures to say whether they will work or not, but whether they will work or die—they have no other resource—change their condition they cannot—contract separately for their labor they cannot, because the farmer confines his contracts to the gang-master; and we may infer from the Reports of the Commissioners, laid before the government, that the system is one of oppression, cruelty, and plunder, and in every respect leading to gross immoralities. The distances to which these laborers go is often as much as five or six miles, and this usually on foot, and return at night. Children and girls are compelled to go these distances, and consequently must rise very early in the morning and reach home at a very late hour at night. Girls and boys and young men and women work indiscriminately together. When the distance to which they go for work is ten miles, then they are sent in carts. When the distances are great, they occasionally pass the night at the place of work, and then lodge in barns, or anywhere else indiscriminately together. To talk of morals in such a case is idle. One of the gang-masters, who has been an overseer seventeen years, gives it

as his testimony, under oath, "that seventy out of a hundred of the girls became prostitutes," and the general account given of the operations of the system shows an utter profligacy of mind in their general conversation and manners, when morals must follow of course. If they go in the morning and stay only a little while, on account of rain, or other good cause, they are paid nothing. The day is divided into quarters, but no fractions of time are in any case allowed to them. Then the persons employed are required, in many cases, to deal with the gang-master for the supplies they receive, in payment for their labor. The results of such a system are obvious. The work being taken by the piece, the gang-master presses them to their utmost strength. The fragments of days, in which work is done and not paid for to the laborers, are all to the benefit of the gang-master, who, in such case, gets a large amount of work done at no cost. These poor wretches, being unable to contract for themselves, or to get any work but through him, he of course determines the price of the labor, and, one may be sure, puts it down to the lowest point. But his advantages do not end here, for there is no doubt that he gets a high advance upon the goods which he requires them to purchase of him, and thus their wages are reduced still lower. No just or benevolent mind, it would seem, can look upon any such system in all its details, as given in the Commissioners' Report, but with a profound sense of its injustice, oppression, and immorality.

One of the gang-masters says, "If they go to work two hours and a half, it is a quarter of a day. If they go a long walk, seven miles or so, and it comes on a wet day, there is the walk all for nothing. Children of the ages of four, five, and six, work in the gangs. They earn 9d. a day, the big ones; the small, 4d.; children of seven years old, 3d. a day." "It is the ruin of a girl," says a parent, one of the laborers, "to be in such a place as that." "My children's hands are so blistered," says another of the parents, "pulling turnips, that I have been obliged to tie them up every night this winter. Pulling turnips blisters the hands very much—they are obliged to pull them up—they must not take turnip croons (a sort of fork) for fear of damaging the turnips."

"The gangman, or leader," says another witness, "pays the wages of all employed in the gang, and, of course, makes his profit entirely from their labor, as the farmer takes care that the gang system shall not cost him more than the common system of individual labourers. The leader's profit, as I have heard, is sometimes 15s. per day. The assembling of twenty-five and thirty women and children and lads, of all ages and conditions and characters, together, has a most fatal effect upon their morals and conduct." Another respectable and reverend witness says, "The gang is superintended by a lazy, idle fellow, of profligate manners and a dishonest character—such, at all events, are the characters of two in my own neighbourhood."

I will not dwell upon the evils of a management of this kind. It is obvious what a power such a man, the employer of these people, has over them; and it is as easy to infer what is likely to be the character of young persons more especially placed under his control. When are men to be just? and when are men, who live upon the hard labor of others, and who hold not merely their physical but their moral destiny in their hands, to feel their responsibility as christians and as men?

The most melancholy circumstance in the case is given in the testimony of one witness, a clergyman, who says, "that he fears the gang system will and must increase, especially upon large farms." It would not be unreasonable to fear that God would send blight and mildew upon fields where human life and virtue are thus sacrificed, and decency and morals thrown to the winds; and where the crops are watered with the tears of these wretched victims of injustice and oppression.

There is another system of employment which prevails in Northumberland and in some parts of Scotland, to which I have already alluded: this is called the bondage system, but it does not appear to me liable to the strong objections which the name would seem to imply. In this case the laborer, when he contracts for his services, makes a condition that he will, as may be required, furnish a woman as an additional laborer; and he receives so much per day for her labor, according to the number of days she may be employed. In such case, if he has not a wife or daughter to supply the place, he engages some young woman who lives in his family, and to whom he pays such a sum by the year as may be agreed upon, in money, clothing, or otherwise, and she lives in his family as one of the family for the whole year. There are few forms of servitude which are not liable to abuses, and the greater the state of dependance and weakness, so much increased is the liability to abuse; but where the employer is a conscientious and just man, such a contract may be mutually advantageous.

In parts of Scotland what is called the Bothie system prevails, and the support of the laborers is a very summary process. The wages are paid in money or kind, as may be agreed upon; and the laborers, if single men, are furnished with a room, fuel and bedding; with two pecks of oatmeal on Monday morning, and with a daily allowance of new or of sour milk—occasionally they may have beer and bread for dinner instead of the porridge. Nothing more, however, is done for them. They prepare their porridge for themselves in such way as they choose; but this comprehends the whole of their living. It would be idle to say that this diet is insufficient for the support of a laboring man, as it must be admitted that few laborers exhibit firmer health, or more muscular vigor, or really perform more work than many of these men. This mode of living would however, I think, be a little too primitive for the New England taste, though on matters of taste we are told there is to be no dispute. Having myself visited a Scotch Bothie, I cannot, how much soever the economy of the arrangements may be praised, very much commend the style of the house-keeping. Indeed it is not difficult to infer that where young men and others are turned into a hovel together, and without any one to look after their lodging or prepare their meals, the style of living cannot have the advantages even of the wigwam of a North American savage; for there, at least, there is a squaw to provide the food and look after the premises.\* The wages of a Scotch laborer are about £12 sterling per year, and living as above; and for a woman, as a field laborer, four shillings sterling per week, or about eighty-eight cents, out of which she provides for herself.

The condition of labor forms, as is obvious, a most important element in the agriculture of a country. Human labor, indeed, seems far more essentially concerned in agriculture than in either commerce or manufactures. A few hands may manage a large ship, freighted with immense wealth, and performing voyages which double the circuit of the globe. A child may superintend a large number of spindles; and a single power wheel sets in motion a vast and complicated machinery. Agriculture has already derived vast benefits from mechanical ingenuity, and may confidently anticipate from this source an immense extension of her power; but there can be no question that she must, at least, for a long time to come, continue mainly dependant upon human labor. The cost of labor, therefore, and the general support

\* Of the Bothie system, as it is called, or employment of unmarried men, living together in a bothie or hovel attached to the steading, it is hardly necessary to say that a more effective means of demoralising and brutalising a peasantry could not be devised than that of crowding together a parcel of young men, half of them perhaps strangers, Irish, or bad characters, in a hovel by themselves, without even an attempt at moral superintendence. This is one of the worst evils that has attended the introduction of the large farm system.—*Laing's Prize Essay.*

and condition of this labor are alike interesting to the agriculturist and the philanthropist.

In an old country like England, where labor is so abundant, it is to be expected that the rules of labor should be exact and stringent; indeed, without this the management of a large farm would be impracticable. The women usually begin work at 8 o'clock, and, resting an hour for dinner, they work until five, or, in a pressure of work, until six. The ploughman must feed and clean his horses at four o'clock in the morning, and at six o'clock the plough must be under way. At two o'clock his horses are put up for the day, and he devotes himself until six o'clock to their cleansing and feeding, and to the care of his plough and harness; eight hours in the field and the ploughing an acre of ground, being considered a full day's work. The other laborers begin labor at six o'clock in the morning, and work until six in the afternoon, with the intermission of half an hour for breakfast and an hour for dinner. No laborer leaving his employment before the termination of his engagement, without good and sufficient reason, can recover any portion of his wages; and no employer, without equal reason, can dismiss a laborer before the end of the term for which he is engaged. In general, however, laborers continue for years in the same employment, especially married men; and it is extremely interesting, speaking well both for master and servant, to see men and women who have remained in the same service twenty, thirty, forty, and even fifty years, and their children coming forward to take their places. In such cases they become, as it were, an integral part of the establishment, and both parties are equally benefited.

In some parts of the country, as in Lincolnshire for example, twice a year, in the spring and autumn, are held, in some principal market towns, statute fairs, vulgarly called "Statties," where young men and women wanting service assemble, and persons wanting laborers or servants go there to supply their wants. Such arrangements have certainly many advantages; but they have also their evils, and the assembling of large numbers of men and women, in such cases with, not unfrequently, the usual accompaniments of a Fair, are said to lead to much dissoluteness and dissipation. This is to be expected. This arrangement serves to average the rate of wages, and must be to all parties a great saving of time. In the present condition of female labor in the United States, there could be none but the worthless to offer themselves in this way; but with respect to young men seeking employment, there would be great advantages in having a day and place fixed in some principal town, when and where persons wishing for employment might be found by persons wishing to employ them; and such an Exchange might be annually held to advantage. An arrangement of this kind has often recommended itself to my mind for its convenience, and I have, before this, urged its adoption.

I have endeavored, with strict regard to truth, to state what I understand to be the condition of the agricultural population in this country. Further inquiries may serve to correct or modify my views on this subject. I am perfectly aware how difficult it is for a foreigner to obtain a correct knowledge or to form a fair judgment of the customs and manners of any country which he visits; and especially where his residence is limited, and his observations necessarily partial. Feeling no prejudices, and having no private interests or partialities in the case, other than those which are inseparable from an education in another condition in society, and under political institutions differing entirely from those which prevail here, I am desirous above all things, to hold my mind open to the light of further and more exact inquiry.

It does not need any long experience to learn that first impressions are not always the most correct; and every intelligent and candid mind must

allow that most men have some reasons which, to their minds, appear sufficient for what they do; that many customs which have prevailed for ages, however objectionable at first sight they may appear to us, have grown out of peculiar circumstances of time and place, which sanction their expediency at the time of their origin, if not the propriety of their continuance; and that, in respect to many acknowledged evils, it is far more easy to deplore the existence than to point out the remedy. While circumstances of this nature prompt to caution and forbearance in our judgments, they do not require us, at the expense of our moral sense, to regard these evils in any other than their true character, to palliate either their nature or extent, or to look upon them, under any circumstances, in utter despair of their removal or alleviation. Nor will they excuse any neglect of all proper and possible exertion to remedy an acknowledged evil.

The condition of the laboring agricultural class is certainly, in many parts of England, exceedingly depressed; and though in frequent instances it may be called comfortable, in few that I have seen can it be considered prosperous. Their labor is not extraordinarily severe; they are by no means treated with unkindness, or, excepting through the misfortune of the ill-temper of their employer, with severity; they are decently clad, and there is a great amount of active benevolence everywhere at work to assist them, and to alleviate their distress in sickness and misfortune. But they are very poorly fed; with many exceptions, they are wretchedly lodged; their wages are inadequate to their comfortable support—and their situation affords little or no hope of improvement—at least, the power of making it better does not rest, where it should, with themselves.

It is a painful, though not an unheard of anomaly, that, in the midst of the greatest abundance of human food, immense numbers of those by whose labor this food is produced are actually suffering and perishing from hunger; that where ten millions of acres of improvable lands, capable of being made productive lands, lie uncultivated,\* millions of hands, which might subdue, enrich, and beautify this waste, from necessity remain unemployed; and that in a country, where the accumulations of wealth surpass the visions of oriental splendor and magnificence, there exist, on the other hand, such contrasts of want, destitution, privation, and misery, as would surpass belief and defy the power of the imagination, but for the support of incontrovertible and overwhelming evidence. Under the present institutions of the country a perfect remedy is hopeless, and an alleviation of these evils is all which can be looked for. An entire revolution in the institutions of the country, in the forms of society, and in the condition of property, could only be effected by violence; and the consequences of such a revolution it would be frightful to contemplate. But should a revolution occur, and the frame-work of society be broken up, and its elements be thrown into a state of chaotic confusion, what sagacity could predict the results, and what security is there that in any re-arrangement these evils would be rectified and the rights of labor any better protected? I say the rights of labour, for who, under any circumstances, will presume to deny that they, by whose labor the earth is made to yield her fruits, and all accumulations of wealth are obtained, have not, indeed, in common justice, a perfect claim to a full share of the products of their own toil. I care not what claims arbitrary and despotic power may set up; nor by what laws and rules she may seek to appropriate to her own use or luxury much the largest portion of these products; but I claim for the laborer an ample share of the fruits of his industry on the obvious grounds of natural right and justice and the plainest principles of christianity.

I am not at all disposed to quarrel with any of the institutions of this great

\* *Journal of Royal Agricultural Society*, Vol. IV. Part ii. p. 308.

and enlightened country—great and enlightened, as a whole, beyond almost any precedent. I am not disposed, in any offensive form, to profess my own preferences for institutions to which birth and education may have strongly attached me, founded as they are on the great principles of universal liberty as the birthright of every man, and of social equality as conformable to nature, and the only relation in which men can stand to their Creator, or under which they would dare to approach him. But, to my mind, it is obvious that no great improvement can take place in the character and condition of the labouring population while they remain a distinct and servile class without any power of rising above their condition. At present the most imaginative and sanguine see no probability of their rising above their condition, of being anything but laborers, or of belonging to any other than a servile and dependant class. The low state of their wages absolutely forbids the accumulation of any property. They cannot own any of the soil which they cultivate. The houses which they occupy belong not to themselves, and they may at any time be turned out of them. They must ask leave to live, or they must take it by violence or plunder when they will not be suffered to live. Their only home is the grave, and even their repose here is not always secure.

In a country where labor is superabundant, and the price of land places it utterly beyond the reach of those who have no means to purchase but from the scanty products of their own manual labor, the condition of the laborer is that of absolute dependance. In a condition of society where artificial ranks and classes exist, and where all the wealth and all the power are in the possession of the upper, or, as they are sometimes denominated, the favored classes, the barriers which hem in the lowest class—without property, without power, without education, without even a home which they can call their own—are, of course, impassable. In a country where labor is scarce, where land is cheap and free, and where the advantages of a good education are offered gratuitously to all, where no arbitrary distinctions of rank exist, and every man by the force of his own talents and character may occupy that condition in society to which he chooses to aspire, it is obvious how different is the situation of the laboring portion, or, if so it may be denominated, the lowest *caste*.

I believe it is impossible for a man who lives in a state of entire dependance upon others to have the spirit of a man; and who, in looking out upon the beautiful and productive earth, where God has placed him, is compelled to feel that there is not a foot of soil which, under any circumstances, he can claim for himself; that there is not a tree nor a shelving rock by the road side, where he can shelter himself and gather under his wing the little ones whom God may have cast upon his care, but he is liable to be driven away at the will of another—at the caprice of avarice, selfishness, pride, or unbridled power; that the use of his own hands and limbs are not his own; that he cannot, but at the will of another, find a spot of ground where he can apply them; and that even the gushings from the rock in the wilderness and the manna which descends from heaven are intercepted in their progress to him, and doled out too often in reluctant and scanty measure.

This will not be pronounced an exaggerated or colored portrait of the condition of the agricultural laboring population of England. I suppose that, with the exception of some few rights of common, where some miserable mud-hut has been erected and the possessor has a kind of allowed claim during his life, few instances can be found of a laborer's owning, in fee simple, a cottage, or so much as a rood of land. I recollect, in passing through a part of Derbyshire, in a region which I was told afterwards was, from the contiguity of several large estates, called the "Dukeries," the coachman, by whose side I was seated, said to me that this was the Duke of Devonshire's village, and this the Duke of Rutland's, and this the Duke of Norfolk's, and

so on; and I could not help asking myself, with some sinking of heart, where is the people's own village?

In a part of Lincolnshire, an excellent landlord and friend, distinguished for his integrity and philanthropy, was kind enough to take me to visit several of his cottages, that I might see, as he said, some of the best examples of this kind of life. It was on a Sunday evening. The houses were humble, but they were neat and comfortable. The inhabitants of one house which we entered were advanced in life, and alone; for, although they had children, their children had been under the necessity, as soon as capable of service, of leaving home in search of a livelihood. The appearance of these people was altogether respectable, but there were two incidents which, though very small in themselves, at least furnished matter for grave reflection. The landlord had given notice, a few days previously, to some of his cottagers to quit, because, with a view to the small profit to be derived from their board, they had taken lodgers into their families, who were not agreeable to him. The old people whom I was visiting, though they had occupied the same place for perhaps more than thirty years, and felt themselves quite too far advanced to seek a new home, were suffering under the apprehension that they too might, in some way, have involuntarily incurred the landlord's displeasure, and might be turned out of their homes likewise; and the woman said that her husband, through fear of such an event, "had had no sleep for several nights." In another house, which we visited, we found the woman of the house had just returned from attending the *accouchement* of a neighbour, the wife of a laboring man; and she told us that when she announced to the father the birth of twins, he received the intelligence with sadness, and replied, that "it would have been a kinder act if Heaven had been pleased to have taken them both away." Where honest and laborious people, in advanced age, feel constantly that they may be turned adrift, at the caprice of their landlord, from the home of their youth, and where a father regards the birth of a child as a curse, the benevolent mind sees evils in the condition, which it must lament if it cannot remedy, and which it must lament the more, in proportion, as all remedy seems hopeless. The landlord in this case, as I am persuaded, was incapable of committing, knowingly, any act of injustice or unkindness; but it is obvious to what abuses such a power is liable; and to what evils a relation of such servile and abject dependence may subject one.

In the present condition of society in England, no material alteration, however, is to be looked for in the position of the laboring classes. Their lot seems to be sealed, and they must remain in this condition of servility and dependence. They cannot rise above it. They are not slaves; but they are not free. Liberty and independence, to them, are words without meaning. They have no chains upon their hands, but the iron enters into their souls. Their limbs may be unshackled, but their spirits are bound.

At the anniversary meeting of the Northamptonshire Agricultural Society, several aged and respectable laborers were called in and advanced to the upper table to receive the premiums for good conduct, "which they had merited," in the terms of the report, "by many years of faithful *servitude*." I confess, as I said on the occasion to the noble president, this term sounded harshly to my ear, and the more, if it expressed their true condition. Go where they will, the same barriers impede their advance; and if the ambition of wealth, or rank, or influence, of which they see such glittering examples continually passing before them, should ever dawn in their minds, it would kindle only to be extinguished under inexorable circumstances.

There are persons who see in this condition no evil nor hardship. I am not about to expatiate upon its evils or hardships, if evils or hardships there be in it. If, in the present condition of society, pecuniary gain is to be the only worthy object of pursuit, and a pecuniary standard the only rule by

which the goods of life are to be measured, and the human frame is to be regarded as only so much organized flesh and bone to be worked up at our pleasure into the means of wealth and luxury, then the improvement of the character and condition of the laboring classes is not a subject to attract the attention of the political economist, excepting so far as the perfection of the machine may conduce to the increased amount of the work to be accomplished by it. But, if a better rule is to prevail, and men are to feel their moral responsibility to each other, and the physical comfort of those by whose toil we live, and the moral improvement of those, upon whom as well as upon their more favored brethren, God has equally impressed his own moral image, are to be cared for, the condition of the laboring classes deserves the most serious attention and the most cordial interest of every man who has a spark of patriotism, public spirit, or philanthropy in his bosom.

This attention is now given, in various parts of the country, by many persons of distinguished benevolence and active usefulness, who know no higher pursuit and find no richer pleasure than in doing good. They are not willing while they enjoy the loaf to put their laborers off with merely the under crust, and not always enough of that.

The census of Great Britain reports the number of laborers employed, in agriculture, at 887,167, and these, with their families, compose a population of not less than 3,500,000, or one-fifth of the whole population of the kingdom. The wages of labor, according to the reports of the committees of Parliament, vary, in different counties, from 7s. sterling to 12s. per week; and the rent of their cottages may be said to average about 1s. 6d. sterling per week, or £3 18s. per year.\* It may interest some of my American readers to learn the expense of some of the families of the cottagers as they are given from authentic sources, as below:—

“H. Sopp, laborer, has a wife and four children; earns 9s. 6d. a week; spends 7s. 2d. in flour and yeast; has been without tea, cheese, butter, soap, firing and candles, clothes and beer, for three months.”

“—Slements, laborer, has a wife and four children; earns 11s. 6d. per week; spends 7s. 3d. in flour and yeast.”

“—Pullen, laborer, has a wife and six children; wages 11s. 6d.; flour and yeast, 9s. 7d.”

I shall quote further, the actual expenses of a laboring man with a wife and six children, in March, 1841; and “this will afford an average view of the manner of living of the agricultural population of the southern and midland counties of England.”

6 gallons of flour. . . . .	8s. 0d.
Yeast. . . . .	0 3
1lb. of meat, and $\frac{1}{4}$ lb. of suet . . . . .	0 8
1lb. of butter . . . . .	1 0
1lb. of cheese. . . . .	0 6
$\frac{1}{2}$ lb. of candles. . . . .	0 3 $\frac{1}{2}$
$\frac{1}{2}$ lb. of soap. . . . .	0 3 $\frac{1}{2}$
Potatoes . . . . .	1 6
Worsted, starch, cotton, and tape. . . . .	0 3

Total. . . . . 12 3

“This leaves nothing for rent, clothing, education, or any other expenses, the only fund for defraying which consists of the extra earnings during harvest-time, a resource which, in many parts of England, is greatly limited

\* One shilling sterling may be reckoned at 24 cents 4 mills; when a sovereign, as now, is estimated at dolls. 4.88.

by the periodical influx of Irish laborers. It is obvious, from a glance at this statement, that the bulk of agricultural laborers in the country are, *at the best*, just able to struggle on from hand to mouth, and that any suspension of employment, rise in the price of provisions, or unforeseen casualty, must, of necessity, compel them to resort to echarity, or to descend to a coarser diet, and exchange the habits of an English for those of an Irish peasant.”\*

\* The condition of living among the poor agricultural laborers may, perhaps, find some strong illustrations in the subjoined note, which is for those only to read who take an interest in so humble a subject :—

“A poor man can seldom afford to purchase even the coarsest joint of mutton; but if he lives near a town he can often get the *sheep's head and pluck* for less than 1s. 6d., indeed very frequently for a shilling; and with these his wife can make up *four* hot meals. These substantial and truly savory meals may be eaten with potatoes only, as bread is not necessary.

“No instruction is *necessary* for the making of pies and puddings” (that is because the laborer is never expected to have them), “whether of fruit or meat; but we may just remark that a *meat-pudding* (when a laborer can afford it) is one of the most substantial and savory dishes that can be brought to a hungry man's table; and if instead of putting pie-crust over the meat, you cover it with mashed potatoes, and put it either into the oven or bake it by the side of the fire, it will answer quite as well as paste. In Cornwall there is a common practice among those cottagers who bake at home, of making little pasties for the dinners of those who may be working at a distance in the fields. They will last the whole week, and are made of any kind of meat or fruit, rolled up in a paste made of flour and suet or lard. A couple of ounces of bacon, and  $\frac{1}{2}$  lb. of raw potatoes, both thinly sliced and slightly seasoned, will be found sufficient for the meal; the pasty can be carried in the man's pocket, but it costs 4d., as thus:—

$\frac{1}{2}$ lb. of flour....	1d.
Suet or lard....	1d.
Potatoes .....	0 $\frac{1}{4}$ d.
$\frac{1}{2}$ lb. of bacon ..	1 $\frac{1}{4}$ d.

“Oatmeal is a frequent diet of the Scotch and Irish peasantry. The preparation is simply to put a handful at a time gradually into a pot of warm water, and a little salt, simmering it over the fire and keeping it stirred with the other hand, until it becomes as thick as a pudding; or in about ten minutes time. It may then be eaten with a little treacle, or with a piece of butter put into the centre; but the better way is to eat it with cold milk, taking a spoonful of the strabout with a mouthful of the milk; for if boiled in milk it is not near so good. Fine meal does not answer the purpose, and the coarse ground ‘*Scotch oatmeal*’ is the best. Now, about half a pound of this, along with three pints of milk, will make a substantial and a very wholesome breakfast or supper for the family. It is indeed a hearty food; and the cottager, who seeks to support his wife and children both frugally and healthfully, should never be without it. The price in London is 4d. per quart, and the quart weighs nearly 1 $\frac{3}{4}$ lb.; so, supposing the milk to be bought at 1d. the quart, three good meals can thus be got for 8 $\frac{1}{2}$ d.

“Potatoes will ever be the peasant's standard vegetable; for, if of good mealy quality, they contain more nutriment than any other root; and three or four pounds are equal in point of nourishment to a pound of the best wheaten bread, *besides having the great advantage of better filling the stomach.*

“The liquor in which any meat is boiled should always be saved for the making of soup, and the bones even of fish should also be preserved; for although quite bare of meat, yet if stewed down for several hours they will yield a species of broth, which along with peas or oatmeal will make good soup. A lot of bones may always be got from the butchers' for two-pence, and they are never scraped so clean as not to have some scraps of meat adhering to them.

“This done, the bones are to be *again boiled* in the same manner, but for a longer time, and the broth may be made the next day into a stew with rice.

“Nor is this all; for the bones, *if again boiled* for a still longer time, will once more yield a nourishing broth, which may be made into pea-soup; and when thus done with (!)” (for, alas! everything mortal has an end) “may either be sold to the crusher or pounded by yourself, and used as manure for your garden.”

These directions are extracted from a Treatise, of which I do not question the utility, on Cottage Economy, published in the Journal of the Royal Agricultural Society, and which certainly contains many valuable suggestions for the poor cottager. The perfect coolness and calm philosophy, however, with which the writer descants upon a single sheep's head and pluck making four savory dinners for a family; and a pasty made of any kind of meat or fruit rolled up in suet or lard, with a couple of ounces of bacon, and half a pound of raw

The following was given me as the wages paid on a farm in Lincolnshire, where the wages are more liberal than in many places, and the farming of the highest order of excellence:—

potatoes thinly sliced, and slightly seasoned, carried in a man's pocket when he goes to work a good distance from home, being *ample* for his dinner; and upon potatoes having the great advantage over bread *of better filling the stomach*; and the advice respecting the cooking of the same bones again and again, three successive days, make one think, to use Burke's expression, "That the Norfolk Squires must have dined" before they could have attained this high degree of philosophy.

The directions for eating the stirabout or oatmeal porridge, seem likewise very kindly given to those who appear to have so little use for their mouths as hardly to know the way to them. "The better way is to eat it with cold milk, taking a spoonful of the stirabout with a mouthful of the milk;" perhaps a slice of the raw potato, mentioned above, kept in the side of the mouth, might answer equally well as a cooler; this would enable them to dispense with the milk also, and save these poor fellows, whose mouths are kept so cool upon the meal paste from the danger of too sudden a transition to food which has been warmed over a fire instead of being carried in the pocket.

The contrasts constantly presenting themselves in human life are often striking and instructive; and it may not be without its moral use if, with the laborer's "savory" viands, his sheep's head and pluck, his cold pasty, and his bones boiled three times over, together with the wholesome advice given in the same treatise, "to pinch and screw the family even in the commonest necessities," until he gets a week's wages before hand, that he may not run in debt, (Query, what in the name of humanity does "*pinching and screwing*" mean in this case unless it be to boil the bones again after they are pounded?) we compare the bill of fare at the dinner given to the council of the Royal Agricultural Society, by the Mayor in behalf of the city of Derby, at the late agricultural show, holden in July, 1843, in that hospitable town. This bill, as well it may be, is printed on blue satin paper in letters of gold, in keeping with the banquet.

#### ROYAL HOTEL—DERBY.

*The Mayor's Banquet to the Royal Agricultural Council, July 11th, 1843.*

##### BILL OF FARE.

FIRST COURSE.	ENTREES.
Three turbot and lobster sauce.	Veal tendons.
Three salmon and shrimp do.	Curry'd lobsters.
Five dishes of filleted soles.	Veal cutlets and mushrooms.
Five dishes of trout	Curry'd rabbits.
Ten tureens of turtle soup.	Lamb cutlets and cucumber sauce.
Eight do. of green pea do.	Eight leverets.
Eight do. of soup Julian.	Eight couples of ducks.
	Eight couples of roast chickens.
SECOND COURSE.	Eight plum puddings.
Four haunches of venison.	Eighty dishes of bakewell do.
Four necks of do.	Eight do. of apricot do.
Five couples of boiled chickens.	Twenty do. of cheese cakes.
Four hams.	Thirty do. of maids of honor.
Three calves' heads, stewed.	Cherry tarts, and currant do.
Four quarters of lamb.	Jellies, blanch mange.
Four geese.	Rhenish cream, &c., &c.
Four veal fricandeau and ragout.	
Four pigeon pies.	DESSERT.
Two rumps of beef, stewed.	Ices, grapes, peaches, cherries.
Four savory pies.	Nectarines, strawberries, raspberries, pines.
Five turkey poult.	Almonds and raisins.
Five tongues.	Candied fruits.
Three sirloins of beef.	Damson cheese, Tartarian cheese.
Three legs of lamb, & gooscherry sauce.	Orange marmalade.
	Preserved ginger.
ENTREES.	Sponge cakes, pound cakes.
Lobster patties.	Fruit, brandy, wine, biscuits, ginger cakes,
Stewed kidneys.	&c., &c., &c.
Sweetbreads.	
Mutton cutlets with tomatás.	

##### Wines at Pleasure:

In these comparisons most certainly I mean no disrespect to any human being. I myself, with a large party, had the honor to sit down at the hospitable and elegant table of the Mayor of Derby, who, in company with many of the citizens of that ancient town spared no effort

*The Foreman—*

Has a house and garden (about 3 roods) rent free  
 He keeps three young men, for which he has £15 a year  
 each, £45.

He has 6 bushels of malt for each man  
 — 1 quarter do. for himself  
 — the best wheat at 48s. per quarter  
 — seconds do. at 32s. „  
 — four pigs kept in the yard with his master's

He feeds and kills his own bacon  
 and has £24 in cash, and two cows kept.

*The Shepherd—*

Has a house and garden (about 2 roods) rent free  
 — 2 quarters of wheat at 48s. per quarter  
 — 2 bushels of malt  
 — a cow kept, and  
 — £22 a year in money.

Four laborers have the following yearly wages, from May-day to May-day:—

2s. 3d. per day, from May-day to Michaelmas  
 1s. 9d. „ from Michaelmas to May-day  
 2s. 3d. per acre for grass and clover mowing  
 7s. „ for corn cutting  
 16 bushels of wheat, at 6s. per bushel  
 1 bushel of malt, without charge  
 1 cow kept do.

Each laborer pays £4. 4s. for a house, and has about 3 roods of garden.

*Calculation of what each man receives.*

90 days, at 2s. 3d. . . . .	£10 2 6
21 acres of grass and clover mowing, at 2s. 3d. . . . .	2 7 3
18 „ of corn cutting, at 7s. . . . .	6 6 0
172 days, at 1s. 9d. . . . .	15 1 0
Cow keeping . . . . .	8 8 0
	42 4 9
Deduct house-rent . . . . .	4 4 0
Nett yearly wages . . . . .	38 0 9

“The English laborer,” says an assistant poor-law commissioner, “even if he has transcendent abilities, has scarcely any prospect of rising in the world, and becoming a small farmer. He commences his career as a weekly laborer, and the probability is that whatever may be his talents and industry, as a weekly laborer he will end his days.” “This is the *best* side of the

to make the visits of their friends as agreeable and comfortable as possible; and certainly in this respect no persons could have succeeded better. Nor am I disposed to find fault with the luxuries with which any gentleman or company are disposed to entertain their guests. But the contrast here presented between the condition of the producer and the consumer—between him whose toil creates the food and him who eats it—cannot fail to read a most important and instructive lesson. What its moral uses are, I think, no fair and reflecting mind will be at a loss to perceive. I shall not therefore, as in Esop's fables, write the moral at the bottom, but I shall leave the whole to my reader, without note or comment; feeling sure that if it leads to no serious reflections there must be a melancholy obtuseness of intellect; and if it stirs no pity, and no humanity within him, there is reason to fear that all the springs are cut off, and the well is utterly dry. Such, alas! are but too often, though not always, the melancholy effects of luxury and prosperity.

picture; what is the reverse? If he has no chance of rising in the world, how many chances has he of falling? If he is thrown out of employment; if he has a large family of girls or young children; if he yields to temptation and becomes irregular in his habits; what is to become of him? The answer is obvious; for a time he will be assisted by casual charity, and struggle on against extreme privations; but if the causes of distress continue, one or other of two things will be his final lot—he will either be enrolled among the 1,072,978 paupers receiving parish relief under the new poor law; or he will be starved out of the country into some large town, and absorbed in the floating population who tenant the cellars and lodging-houses, and live by the worst-paid description of manufacturing industry, or by thieving, prostitution, and casual employment.”\*

As I have before remarked, it is much more easy to point out and deplore an evil, than it is to suggest a remedy. A republican would say that the evil is fundamental, and grows out of a constitution of society establishing different ranks, the appropriation of the land in a few hands, the high price of land, the depressing sense of dependence, and the hopelessness of competition, and of all attempts to acquire influence, respect, or wealth, incidental to, and inseparable from, such a frame-work of society. Persons born to affluence and distinction, and persons who have never felt their efforts checked or suppressed by a sense of a dependence which they cannot escape, can very imperfectly estimate the effect of these circumstances upon character. But whether desirable or not—and, in this matter, I would leave every man to the enjoyment of his own honest opinion—as all expectation of a change in the constitution of English society seems as vain as to expect to reduce the inequalities of the surface of the country to a common level—it only remains to consider what alleviations of the evils of the condition of the laboring classes can be successfully attempted. The inquiry is one which most deeply concerns religion and humanity. It is only just likewise to remark, and I do it with the highest pleasure, that the subject is now interesting innumerable benevolent persons in the highest ranks and in the middle conditions of life, to a degree perhaps never before known; and that many of the highest minds are now concentrating their energies upon its investigation and cure. It is with equal pleasure that I can say that I have found among many of the landlords the most watchful attention to the welfare of their laborers, and every kind provision for them in sickness, decay, or misfortune. Alas! that there are so many, who do not come within the reach of this provision, and so many, who refuse or neglect to make it.

### XIII.—ALLOTMENT SYSTEM.

That, which seems to be admitted on almost all hands to have operated to the most advantage, is what is termed the allotment system. In this case, the laborer hires of the landlord a small piece of land, and it is generally limited to one quarter of an acre, and seldom exceeds half an acre, for which he pays such a rent as may be agreed upon; and he and his family cultivate it in their spare time, either before going to work or after having returned from their day's work. The manner, in which this land shall be appropriated, is generally determined or prescribed by the landlord; though, in some cases, it remains optional with the laborer. These small lots of land, though generally leased at a moderate rent, in some cases, as at the Duke of Devonshire's village of Edensor, at a rent merely nominal—being at the rate of from one pound to eight pounds an acre, though, in the latter case, the land generally lies contiguous to some large manufacturing town, where the laborer finds an opportunity of disposing of many small products at a high price. In general, the land so taken, exclusive of some few garden vegetables for daily

\* Laing's Prize address.

use, is applied to the growing of potatoes and wheat; and alternated with these two crops.

The effect of these allotments upon the character of the occupant is quite remarkable. He becomes himself, for the time being, an owner of the soil; he has a feeling of independence which nothing else can give, and which at once exalts his character. He is able to avail himself to advantage of the labor of his wife and children, who in some cases perform most of the work on the ground in hours which would otherwise be wasted or misappropriated. His ground yields him a large supply of vegetables for his family, and enables him to keep and fatten a pig or two, and likewise some poultry, which very much conduce to his comfort, and that of his family. The cultivation of his ground likewise occupies hours which might otherwise be spent in the drinking-house, where nothing good is to be learnt, and where the foundation of the ruin of many a laborer is laid; and the ruin of his family follows generally, as matter of course. Besides these advantages from the allotment system, his youngest children are here early trained to habits of industry and carefulness.

The mere keeping of a pig in such cases is a matter of serious profit, and not of that only, but of pleasure; and I have been so much struck, with the remarks of one of the commissioners on this subject, that I transcribe them for the gratification of my readers:—

“Of such a pig, the first product of allotment, garden or potato headland, it is the fashion among political economists to speak disrespectfully. Now, whatever might be the superior profit to the cottager, of saving the money which he spends on his pigs and buying his bacon in the market, this, as it never has been, and never will be so saved, we may dismiss. In the meantime his pig, besides its usefulness, is also a real pleasure to him; it is one of his principal interests in life; he makes sacrifices to it; he exercises self-control for its sake; it prevents him living from hand to mouth, stupidly careless of the future. I am persuaded that a greater act of cruelty could hardly be perpetrated, than the discountenancing this practice, or rather amusement and enjoyment, among the poor.”\*

So much for the moral effects of this simple matter of the poor man's keeping a pig, in which I perfectly agree with the writer, and honor the benevolence which discerns, even in these humble matters, a moral utility. It is difficult to say, why, when the rich man finds his pleasure in his hunters, his dogs, his game, his menageries, and aviaries, the poor man should not have his pleasure in his pig; an animal, indeed, not always of the most agreeable endowments, nor of very refined manners, but yet in temper and manner susceptible of a considerable improvement by education, and entitled to no small respect for his usefulness, since if his master feeds him when living, he returns the kindness when dead, by feeding his master; a merit which cannot be ascribed to some other domestic pets far more expensively cherished and caressed.

Too much indeed cannot be said in favor of the allotment system, of its justice, its humanity, and its usefulness. Its influence upon the happiness of the poor, and its moral tendencies—its tendency to prevent idleness and dissipation, and to produce sobriety, industry, and frugality; and especially to keep men at home, and attach them to their homes, most strongly recommend it. Many facts prove that the laborers in some instances pay full double the ordinary rent of the land, and find their account in it. In most cases, however, the lease of a farmer forbids his under-letting any portion of his land; and allotments can only be granted under special agreement, or by the particular consent of the landlord. This is not always to be procured; nor is it always without strong opposition from the farmers themselves.

\* Sir H. Doyle's Report on Employment of Women and Children, p. 295.

It will perhaps be asked by some of my readers, why do I enter so fully into the condition of the rural population in England, when we have nothing which bears a resemblance to it in the United States? This latter is one of the very reasons why I do it; but I hope that others will present themselves, upon reflection, which will at least excuse, if not justify me. I may as well give some of those reasons in this place; then, perhaps, I may be heard with more patience.

I have promised my friends here, and in the United States, that they shall have my honest impressions of whatever comes under my observation connected with agricultural and rural affairs, and the condition of the rural population. In the next place I see in the list of my subscribers the names of many, who will take a much stronger interest in such views, than in details of crops, accounts of live stock, and the practical operations of husbandry, which I shall go into at large in the course of my reports; certainly I am bound to consult, in some measure, *their* tastes. In the next place, we shall find in the management of small farms and small allotments, examples of successful cultivation, which cannot be without their use and application to farming on a much more extended scale. Lastly, I cannot think it will be without its use to compare the condition of a laborer, where to him land, under the present condition of things, is unattainable, and labor superabundant, with a condition of labor where, as in the free states, every industrious man can have land of the most fertile and productive character almost at his pleasure, and where the price of land places it within reach of his labor; where every man may have his home, and sit down quietly without the apprehension of removal; where it is not a necessary study with him how often he may have meat, or how many days in the week he may have bread; but where, with industry, sobriety, and frugality, he may always have more meat and more bread than he requires, and something for the poor and the stranger.

I shall take the liberty here of inserting an account, sent me by a kind friend, of the working of the allotment system in a village within his neighbourhood—I believe, in Lincolnshire. It is an interesting and instructive account. His opinions respecting the size of farms must rest upon his own responsibility. I neither endorse nor deny them. On the subject of the size of farms I shall speak at large when my views have become matured by farther observation.

“Scampton is the property of a gentleman (Sir George Cayley, Bart.) of liberal views and enlarged benevolence. One of his first movements, upon succeeding to the estate some thirty years ago, was to provide for the comfort of those who, under his superior tenants, were to be the immediate laborers upon his land.

“To fourteen cottages, allotments of land were made. A field of sixteen acres was set apart as pasturage, that each cottager might keep a cow; and another field of twenty-six acres was appropriated as mowing ground, that all might be provided with fodder for the winter. Each cottage had an acre of tillage land allotted to it in the field, and something like another half acre as garden ground, around its little homestead.

“A cow club, or insurance, was established, to enable those cottagers who lost a cow by casualty, to replace her immediately, and without loss of time.

“In the spring of the year the cows are valued by a competent and disinterested person. Each cottager pays sixpence in the pound on the value of his cow. Cows above fourteen years of age are not insurable. If a cow dies within the year, the owner receives *three-fourths* of her value. The dead cow is the property of the club.

“Sixpence in the pound, annually, has actually covered to *three-fourths* of the value, all casualties upon a run of twenty years.

“Under the inspection of a shrewd and spirited agent the whole affair has worked to admiration, and been productive of peace and plenty amidst the little

community whose happiness it was designed to promote. No burning of stacks here, because every man has one of his own. No invasion of the rights of property, because every man is a possessor of property and anxious to guarantee his neighbour's rights, that he may hold his own in the better security.

"The rent that each cottager pays is something less than £10 per annum. The produce that is yielded, much to the credit of the humble cultivators, is abundantly ample to cover the out-goings, and leaves a surplus that makes them comfortable.

"The acre of tillage land is remarkably productive. It is divided into two allotments—half an acre is in wheat, the other half in potatoes; alternating the crops, of course, every year. On this short rotation, the land has not suffered, *but actually increased in fertility*. For the last ten years the crops of wheat have yielded twenty bushels to the half acre. The twenty years preceding, eighteen bushels was the average. Instances of twenty-seven bushels to the half acre have been known. The half acre of potatoes, with others grown in the garden, are usually fed to pigs, and instances have been known where the cottager has sold twenty pounds worth of pigs and well supplied his own family with bacon. It is common for them to sell from ten to twenty pounds worth of pigs, or pork, per annum, and still keep a good supply for family use. Some of the cottagers, who have been blessed with careful wives and good cows, have sent twelve pounds of butter, per week, to market, during all the flush of the feed.

"It must be understood, that while the cottagers' allotments of land are thus multiplying his comforts, he has a constant supply of work, and current wages, from the neighbouring farmers. His own farming is done after his master's day's work is completed, with perchance a day now and then, as at seed time and harvest.

"Happy, comfortable, and superior in condition, as these cottagers appear, yet the system that makes them so has often been called in question. It has been observed, that the children of cottagers, thus happily situated, are not over anxious to go to service, and not over apt to keep their places when they do go. There appears a latent consciousness about them that the house of their parents is well supplied with bread and bacon.

"Perhaps the evil, if it be one, has a deeper origin than at first sight appears. May it not be traceable to our social system, the genius of which delights to keep property in large masses, under great proprietors? These proprietors have a similar predilection for large divisions of their property—large farms, and men of large capital to work them. All this may be well—very well suited to the cast-iron consciences of the political economists; but it creates a chasm between the large farmer—the farmer of two hundred and fifty acres, with a capital of twenty-five hundred pounds, and the mere laboring cottager. The latter can never hope to pass so great a void. There are no intermediate resting places. There are no farms of twenty, fifty, or a hundred acres, to which the successful and deserving cottager can be promoted. The steps of the ladder are out. Having obtained the rare blessing of a cottage allotment, the language of his heart is, "Let us eat, drink, and be merry, for in our present condition we must die." His highest ambition being achieved and the family little more to hope for, it is not to be wondered at that some little laxity should be observable. Let the great landlords of the land supply a motive by a more natural division of their property—let them encourage the aspirations of the industrious cottagers by small farms in prospective, and larger beyond them, and the energies of our peasantry will never be found to flag. But this is, perhaps, scarcely to be hoped for."

I shall add here an account given me of a successful attempt at the im-

provement of the condition of the poor rural laborers by allotments of land, uniting with these allotments at the same time, a provision for the education of the poor children by whose labor these grounds are cultivated. The accounts have a two-fold value in showing the practicableness of meeting the expenses of education by the labor of the pupils, and the increased and extraordinary product which may be obtained from land under the spade husbandry.

“A friend to the more general diffusion of a sound education amongst the peasantry of the United Kingdom, who has long witnessed the success with which education may be, *without cost*, combined with instruction, in the best modes of cultivating the soil, begs to submit to those who are impressed with the importance of the effort, the few following facts.

“A landed proprietor has established what are termed ‘Agricultural Schools,’ upon the principle of uniting our present national with agricultural instruction by making the labor of the little scholars, while under tuition in the art of husbandry in the afternoon, to compensate the master, in the way of salary, for the instruction they receive from him, in the usual course of our national education in the morning. Schools have already been established upon this plan at the villages of East Dean and Willingdon, and they are attended with the happiest results. The usual quantity of land required for the purpose does not exceed five acres, and for this the master pays a rent, certainly equal to, and in most cases beyond, that of the adjoining land, occupied by farmers. In the case of the Willingdon school, there is an appropriate house for which the master pays an additional rent. The only payment in money to the master is the usual penny a week from each scholar.

“Nor can any reasonable objection be made to this plan on the ground of so employing the boys in the afternoon. The girls in our national schools are taught, and for the same number of hours, to work with the needle, the use of which is not more important to them, than that of the spade and the hoe to the boys.

“As various questions will naturally suggest themselves to those who read this statement, the following answers by the schoolmaster to numerous inquiries already made, are inserted here.

#### REPLY OF THE MASTER TO INQUIRIES RESPECTING THIS SCHOOL.

*Willingdon, near Eastbourne, Sussex.*

“I have twenty scholars, to whom I teach reading, writing, and accounts, the Church Catechism, Collects, and Psalmody on the national plan, with the approbation of the vicar, without any salary, for one penny per week from each boy, from nine to twelve o’clock; and from two till five in the afternoon cultivating the land. I have not lost one from dissatisfaction, but I am glad to say that they willingly assist me.

“I am satisfied that I can keep two cows on the same quantity of ground, stall-fed, where I could keep but one if I allowed her to graze; and grow more corn.

“I have no grass land, and all the first winter my cows had only straw, turnips, and mangel wurzel, till green food came on in the spring, and now my hay is the *clover* I sowed with the grain crop last year.

“I have experienced a great deal of good from the liquid manure from the two tanks, one from the cows and the other from the pigs.

“I have just killed a pig weighing twenty-nine stone seven pounds, and one before about the same weight, which I have used in my family. I have a wife and four children.

“It is allowed that my oats are the best sample in the parish. I tied my oats in sheaves, and set them up the same as wheat, which saves a great deal

of scattering: this is the general practice in Cornwall and Scotland, and, I hear, in some parts of Kent, and is particularly useful for barley to malt.

“I thrash my corn over the cow-house, as in Cornwall, Switzerland, &c., which keeps it perfectly dry, being thus kept from the damp ground.

“I am entirely supplied with water by the rain which falls on the house, preserved in a tank in the ground.

“The quantity of land I rent is five acres, on the side of the South Downs, at £3 an acre; this, with £5 for my house, makes £20, which I have paid for the year ending Michaelmas last, though I might have taken off my crops, and lived rent-free, but I preferred staying and teaching, though I have no salary; and so I think would many others.

“I have now three cows, a heifer, and a calf, standing opposite to each other, with a road between their mangers for feeding these stall-fed cattle, which have never needed a farrier; and from skim milk I have made cheese like the Dutch cheese.

April, 1842.”

“GEORGE CRUTTENDEN.

“At your request I send the particulars of my produce last year, which I am perfectly satisfied with, leaving me a balance of £40 after everything is paid, though the last was an unfavorable dry summer.

“I am likewise happy to say, the principal farmers of the parish have taken into their employ six of my scholars all under twelve years of age, into their service since Christmas, and two of them under nine; and all after leaving my day school, where they paid me one penny a-week in addition to their work, have each paid me fourpence a-week out of their wages, for evening instruction; and their master is now using the liquid manure the same as I do, which I have found most beneficial.

“I have a wife and four children, whom I support in a comfortable way, and wish I could see many of my neighbours do the same, but that is not the case.

(Signed)

“G. CRUTTENDEN.

“Willington School, April 14, 1843.”

“A landed proprietor at Willington, seeing the success of this school, recommended the establishment of a similar school in the adjoining parish of East Dean, where, in the spring of 1842, five acres of land were let to John Harris, an infirm man, who, two years before, had been in the Eastbourne Union House, with his wife and seven children, where at three shillings per head, they cost at the rate, yearly, of £70 4s., which is equal to the rent of 351 acres of sheep walk; now he is supporting his family on only five acres, and when recommended to give up his five acres, said ‘he had rather continue to pay rent, rates, tithes, and taxes, and teach without a salary, than have fourteen shillings a-week without the land.’

“Harris in the Union House resembled a mouse in a granary devouring the fruits of labour; but does not this same Harris on his five acres resemble the mouse in the fable releasing the famishing lion? For by his rent he is helping to support the owner of the soil, by his rates the poor, by his tithes the church, and by his taxes the state, which surprises those who have long been accustomed to hear it is requisite to let land in *large* farms, for the supply of food for large towns.

“But do not the HIGHER RENTS paid for allotments of land by the spade than the plough, show, that after supporting the cultivators and their families, they *send more to market per acre* than the great farmers?

“It was the eagerness of laborers in Sussex to hire land, that suggested the possibility of some men to obtain as much as five acres, undertaking to teach reading, &c., three hours daily without a salary, without at all antici-

pating that twelve boys averaging eight years of age, by their labor for three hours after noon could well pay for their instruction in school before noon; but a trial of upwards of three years has put this beyond doubt, as dozens of signatures in the visitor's book testify, of clergymen and members of both Houses of Parliament, not only of this neighbourhood, but also from Ireland and Scotland, amongst whom was Mr. Townshend Mainwaring, M.P. for Denbigh, who inspected these schools April 29th, 1843, and entered in the East Dean visitors' book that he was much gratified by the complete success which appeared to attend the simple principle upon which the school was conducted.

"And these self-supporting schools require much less superintendence than where the master has a fixed salary, because if he neglected or misused the boys before noon, their parents are not likely to send them back to work for him after noon.

"He is interested in cultivating the land well, as it is the only support of his family.

"Landlords are interested in letting land to masters who pay high rents.

"Rate-payers are interested in able-bodied men being enabled to maintain themselves.

"Parents are interested in sending their children where they early learn to earn their livings in that state of life unto which it has pleased God to call them.

"The farmers around, seeing the great produce from stall-feeding and liquid manure, are interested in taking additional hands into their service.

"The more food that is raised from the soil, the more there will be to exchange for clothing, and thus an increased home market be provided for our manufacturers; who, the more they earn, the more they have to lay out in meat, &c.

"And to effect this, there is no deficiency in capital. There is no want of hands, as our Union Houses are overflowing with the able-bodied; nor is there any want of land, as the heaths, commons, and grazing land, even round London, show."

It is stated, likewise—and it is a fact deserving of all remark—"That during a course of twelve years, out of 400 rents, only three rents have been deficient, though the tenants were taken without reference to character, and told the rent would not be demanded if not tendered; but the desire of keeping the land has secured the annual payment, and only one during the whole of that time has been convicted of a misdemeanor."....."In fifty parishes in one county in which there are above 3,000 allotments, after the most careful inquiry our agent heard only of one commitment to prison in 1840, and not even one in 1841, out of the whole 3,000 families."

The general condition on which allotments are granted is, that they shall be cultivated by the spade, and the extraordinary product obtained in this way deserves to be remarked. The statements to which I shall refer are drawn from the Reports of a Committee of Parliament, and seem, therefore, entitled to confidence. I have myself visited several allotment grounds in different parts of the country, and am quite satisfied that the results under this system of management are not overstated. On this subject I shall say more hereafter, but it may not be out of place if I give here some examples which have been referred to.

John Piper, in Sussex, holds an allotment of four acres. He obtained, in 1842, forty-two bushels of wheat from three quarters of an acre of land; he had two hundred and fifty bushels of potatoes from three-fourths of an acre; he had ten bushels of barley from the other land, and kept two cows, and three and sometimes four pigs; he considers that there might be an acre of grass, and the cows were kept entirely upon the produce of the four acres; a portion of this was not arable, as some trees were growing upon it. A peculiarity in this

man's management is, that he works one of his cows in his cart, and calculates that her labor saves him an expense of five pounds; she is milked in the morning before she is put to work, and, although worked, she makes eight pounds of butter a week, besides furnishing some milk for the family. This is a sort of Robinson Crusoe management, which is well deserving of attention. It would not be easy to find a reason why the female of one class of animals should be exempted from work, rather than of another; and there is no ground to suppose that with good feeding and careful usage, moderate labor would be injurious to the health of an animal; much more likely is it to be conducive to health, and even, in such case as this, to the more liberal secretions of milk.

Other circumstances in this man's economy are worthy of observation; he saves all his liquid manure in a tank by his own house, and mixes with it a proportion of soot and salt; he throws his land into heaps, and puts the liquid upon the heaps, and then spreads it abroad—"because," as he remarks, "his land is so near the chalk, that if he put his liquid manure upon the land, three-fourths of it would be wasted—it would go clean away so as never to get it again; but when put in a heap of mould it is retained."

*Produce of four acres, held by J. Piper, in 1842.*

	£.	s.	d.
42 bushels of wheat, at 7s. 6d. per bushel.....	15	15	0
250 do. potatoes, at 15d. per do.....	16	12	4
Food for one cow, which gave 4lbs. butter per week, at 1s. per lb.	10	0	0
The other cow do. do.	10	0	0
Food for three pigs, at 20st. each, and at 3s. 6d. per st.....	10	10	0
	<hr/>		
	£62	17	4

This example shows the extraordinary results of minute and exact cultivation, and the value of economy in husbanding with the greatest care all the resources for manure. The cow is an animal I have always looked upon with the greatest respect for her justice and her liberality; in this case she pays for her board by her yield in milk and butter, and adds to it her labor, or, as is said in case of a free passage on board ship, "she works her own passage;" but the good creature's usefulness does not end here. When she has completed her round of beneficence, her benefactions do not close with her life; her hoofs are made into glue; her horns into combs; her bones into knife-handles and cane-tops; her hair worked up into plaster; her skin into shoes; and her meat into food. Who can wonder that the Hindoos always regarded her with a religious veneration?

The next instance presented by the Parliamentary Reports is that of J. Dumbrell. His allotment is six acres, and is managed by himself, his father, (70 years old), and a child of nine years old. "The soil is chalk on a deep soil, in a valley."

His stock consists of two cows and a heifer, and from two to three pigs. His succession of crops is thus described:—"First, Italian rye grass, cut four times, watering it each time with liquid manure after cutting it; then tares; then clover; then cabbage comes in and mangel wurzel; and second cut clover, and sometimes three; and that carries us all the summer through: then we begin upon the roots in winter, turnips and mangel wurzel, and straw."

The following is the statement of his produce for 1840:—

	£.	s.	d.
From two cows in nine months and a half, from the 16th of Jan. to the 26th of Oct., made 400½lbs. of butter, which at 1s. per lb.	20	0	0
The cow, all the year stall fed, yielding a third more than the other, which grazed half an acre, and their two calves sold for.....	5	18	0
The skim milk, at 3 pints 1d., or given to the pigs, is estimated at..	10	0	0

On one quarter of an acre he grew 18 bush. of oats, which, at 4s. per bush., amounts to.....	£	s.	d.
		3	12 0
On 88 poles ( <i>i. e.</i> , a little more than half an acre), he grew 32 bush. of wheat, worth, at 8s. per bush. (which is equal to the consumption of himself, his wife, and three infant children).....		12	8 0
Besides pigs, potatoes, vegetables, and the butter to be expected to the end of the year, which may fairly be estimated on the whole of the land (including the foregoing, as I understand the account, which is rather imperfectly drawn up) at.....		60	0 0
Out of this he paid :—			
Rent, rates, tithes, and taxes of one acre.....	£1		7
Rent of one acre and a half.....		7	0
Rent of half an acre of grass.....	£2		10
Lodge in it.....		1	0
Rates, tithes, and taxes.....		15	
		£4	5
Hired labour.....	£2		0
Seed corn.....		2	0
		£4	0
		Leaving but.....	43 8 0

The two pounds paid for labor were paid for threshing.

There are two other accounts of the same individual subjoined.

<i>Produce of 3¼ acres in 1841.</i>		<i>Produce of 6¼ acres in 1842.</i>	
	£. s. d.		£. s. d.
Wheat, 21½ bush., at 8s....	8 12 0	Wheat, 40 bush., at 6s. 6d..	13 0 0
Oats, 44 bush., at 2s. 9d..	6 1 0	Oats, 93 bush., at 2s. 6d..	11 12 6
Potatoes, 80 bush., at 1s..	4 0 0	Peas, 22 bush., at 4s. 6d..	4 19 0
Two calves sold for.....	5 10 0	Potatoes, 150 bush., at 1s.	7 10 0
Butter, 423¼lbs., at 1s....	21 13 3	Two calves, one fat and one suckled.....	3 7 0
Milk sold and given to the pigs.....	10 0 0	Butter, 290lbs., at 1s....	14 10 0
		Milk sold and given to pigs.	8 0 0
	£55 16 3		£62 18 6

In 1842 he lost two cows by death, and the additional land was taken in bad condition.

At the same time he presented a sample of his wheat on which were eighty-four stalks from one grain. There is another secret of this man's success—he had signed the temperance pledge; he was a tee-totaller, and drank neither spirituous nor fermented liquor.

An inquiry was made of Mr. Dumbrell, “how it was possible to keep two cows and maintain a family of five persons on only three acres of land;” to which this is his answer—“The statement you saw was very true; half an acre of pasture, half an acre and eight rods in wheat, and one quarter of an acre in oats; the other part was green food for the cows, such as rye, tares, cabbages, clover, mangel wurzel, turnips, and Italian rye-grass. But if you are surprised at my keeping two cows on this quantity of land, I must tell you that one crop a year will not do it; but my plan is to take second crops, that is, rye is the first thing I cut green in the spring; then I dig the land and manure it with the liquid manure, as far as it will go; then finish with rotten dung, and plant mangel wurzel and turnips; and the part that I manure with the *liquid* is always the *best*. The next thing I cut is winter-barley and turnips, and plant some cabbages for winter; by this time I cut the grass and clover, which grows again in a short time, with a little of the liquid manure as soon as it is cut. Last summer I cut the Italian rye-grass and clover three times; and

this year I have nearly cut it twice already, and there were really two good crops of the Italian rye-grass, and I think there will be two more this summer, with a little manuring. My early cabbages I always let stand to grow again all the summer, and they bring a great deal of food. I plant again in November, and put the liquid manure to them as far as it will go; but to the rest I use dung or ashes, which are not so good as the liquid, which anybody may tell in the spring by looking at the bed of cabbages; so, I hope, it now appears how the cows are maintained in winter as well as in summer. During last winter I had no hay, only turnips, mangel wurzel, and straw, and they did very well."

I have already apprised my readers that my reports must be, in a degree, desultory, from the necessity of giving them before the whole ground has been gone over. Compelled at once to begin the erection of my building, I must use such materials as I have; and which, I fear, under such circumstances may appear incongruous and ill-assorted to an eye accustomed to order and exact arrangement; whereas, if everything were at hand, I might better succeed in preserving the symmetry and adjusting the architectural proportions of the edifice. I shall therefore make no excuse for saying here something more of spade-husbandry, and the extraordinary products of small pieces of land, and it must be admitted that it is by no means disconnected with the subject of cottage allotments.

The utmost productive capacity of an acre of land, in any crop, has not yet been fully determined. The amounts attained frequently surprise us, but we have not yet got to the end of the line.

One of the witnesses before the parliamentary committee gives an account of a man who supported himself and wife and son from two acres of land, for which he paid a rent for the two of 9*l.* 10*s.*; and in the course of seven years he had saved enough from the produce of his two acres to purchase two acres of land, for which he paid about 30*l.* to 40*l.* per acre. He states, likewise, his own personal knowledge of six acres of land which, under the spade cultivation, produced at the rate of 52 bushels of wheat to the acre. Another witness testifies that on the estate of Lord Howard, Barbot Hall, in Yorkshire, a rood of land was dug and planted with wheat by his lordship's direction, and 28 bushels of wheat were obtained from this quarter of an acre, which would be at the extraordinary and unheard of rate of 112 bushels per acre.

The authenticity, or rather accuracy of such a statement as this may well be considered as questionable; but I have the pleasure of presenting one, exhibiting a most extraordinary yield, on which full reliance may be placed.

In visiting Horsham (the last summer), in the county of Sussex, my attention was strongly attracted by two small pieces of wheat in a garden by the roadside, exhibiting an extraordinary luxuriance; and I have been able to obtain a detailed history of its culture and yield, through the politeness of C. S. Dickens, Esq., of Coolhurst, near Horsham.

The seed of this wheat was brought from Australia, being the product of some wheat which had been sent there two or three years before. The quantity of land sown, in one of the pieces, was thirty-four square yards. The wheat was dropped in rows nine inches apart, and in holes six inches apart, and only one grain in a place. The number of corns planted was 682, out of which 33 failed to germinate. The cultivator obtained four gallons of good wheat from the land, exclusive of several of the finest plants, which he saved. The usual number of stems from each seed was 18 to 20; a considerable number gave 30 to 35, and one was counted which had 40 full-sized stems, and three of a smaller size. The straw from the 34 yards weighed 72*lbs.*, which would be 284 trusses of 36*lbs.* to the acre. The weight of the 682 corns planted was 17 drachms. This being multiplied by 142, the land being

the 1-142nd part of an acre, gave about 9½lbs. as seed for the acre, consequently one bushel of wheat at 63lbs. per bushel would plant nearly seven acres. The produce of 4 gallons, multiplied as above by 142, gives the great quantity of 71 bushels, or 17 sacks, 3 bushels to the acre. The ground had borne potatoes the previous year, and had received no top-dressing, nor been in any way manured for the wheat. A sample of the wheat, which has been kindly sent to me, in the straw, and which I have deposited in the museum of the Royal Agricultural Society, was six feet in height.

These are remarkable facts. What has been done can be done. They forbid our resting satisfied with what has been accomplished; and they encourage the hope that the productive powers of the soil are vastly greater than have yet been determined. Onward is the watchword of the present day, in every department of science and art. Why should agriculture form an exception? Away with the drones! Do not let us mistake a fog-bank for land; nor think that we have reached the end of the voyage until our feet actually press the solid ground.

I have treated, thus largely, the subject of allotments, as presenting one of the first and most efficient means of bettering the condition of the agricultural laborer. My own convictions are strong on this point; and they are sustained and strengthened by the testimony of many men of large experience and shrewd observation. The laborer finds, in an allotment, a means of turning his spare hours to advantage, and in a mode of labor which, from its very character, being in the association of his wife and children, under his own control and management, and for his own immediate and personal benefit, becomes a pleasure instead of a toil. He finds in it the means of eking out his scanty wages; of providing, to a degree, for an occasion of sickness, or other suspension of his employment and wages. He is enabled to bring from this source many rare comforts to his own frugal table; and has himself, if he is a man of feeling—and why should he not be?—an opportunity of enjoying one of the richest of all pleasures, that of making a small contribution to relieve an unfortunate or a sick neighbour. It presents a good school of industry for his children, under his own immediate inspection. It quickens his own intelligence in making agricultural experiments upon a small and useful scale; and rouses a spirit of wholesome emulation in his crops even with the master farmers. It removes him from strong temptations to gambling, low dissipation, and intemperance. It gives him an interest in the soil; it attaches him to his home; it involves him in all the risks of the public safety; and makes him the friend of public peace and order. It gives him the spirit of a man, raising him above the sense of slavish dependence, and the dread of becoming a pensioner on public charity. In so doing it at once exalts him in the community; induces a most wholesome self respect; inspires a just regard for the rights of property; attaches him the more strongly to his superior, who thus shows his willingness that he should walk erect instead of keeping him upon the ground with his foot upon his neck; and presents innumerable, constant, and powerful motives to improvement and good conduct. I wish it were in my power to convey to those, who have been born to affluence, rank, and authority, the force of these sentiments upon minds altogether differently circumstanced from themselves; but I know it would be difficult—I fear it might be impossible. A consciousness of absolute dependence, so extremely difficult to be engrafted in the human mind, seems indispensable to teach us our duty either to man or God.

That the whole of this subject has an important bearing in its economical and moral aspects upon my own country cannot, I think, be overlooked by a reflecting mind; and, in the course of my reports, will, I trust, be made more fully apparent.

(END OF THE FIRST REPORT.)







