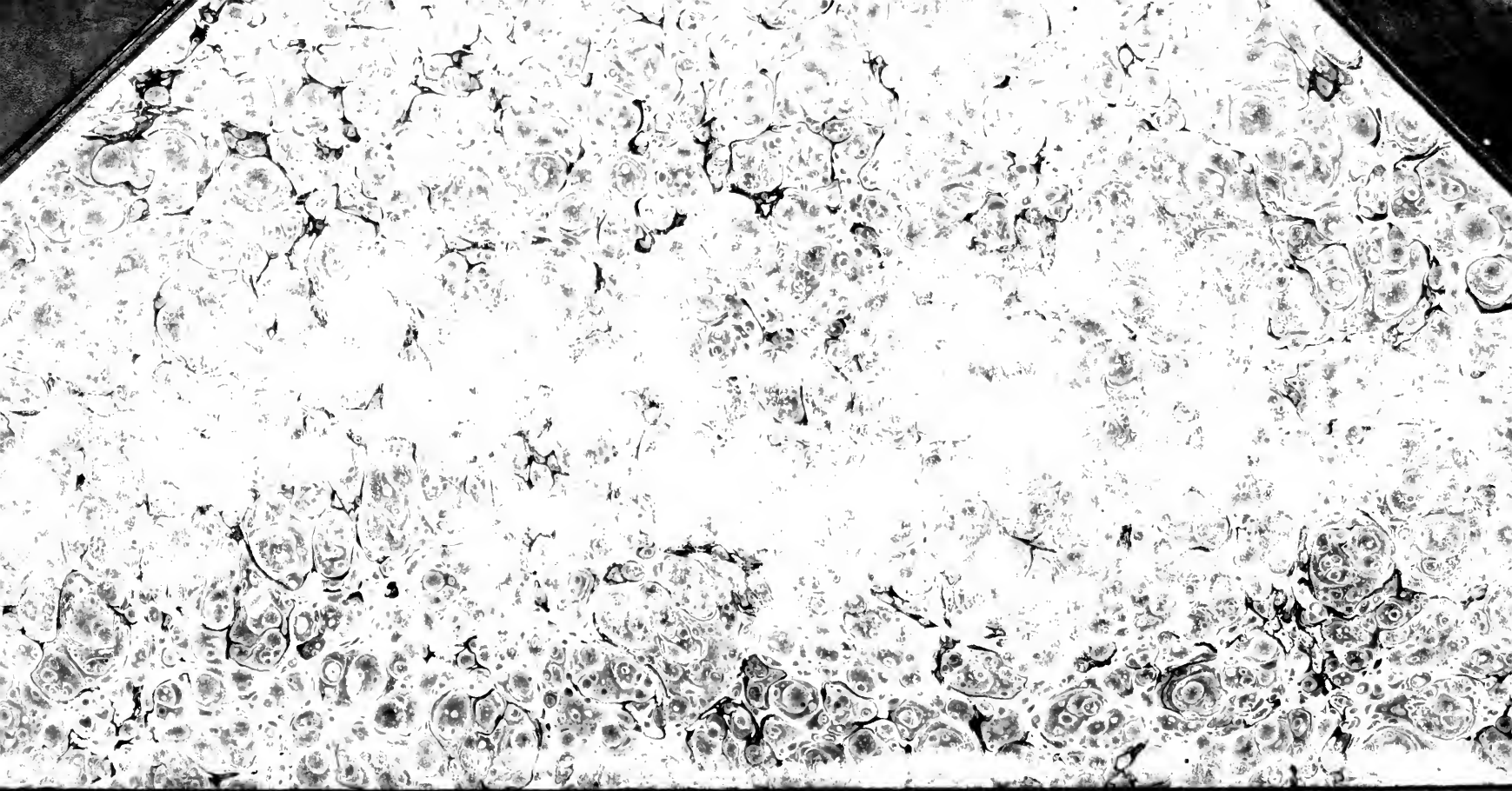

THE FARMER'S MAGAZINE.

VOLUME THE FIRST.

(THIRD SERIES.)

JANUARY TO JUNE, DCCCLII.

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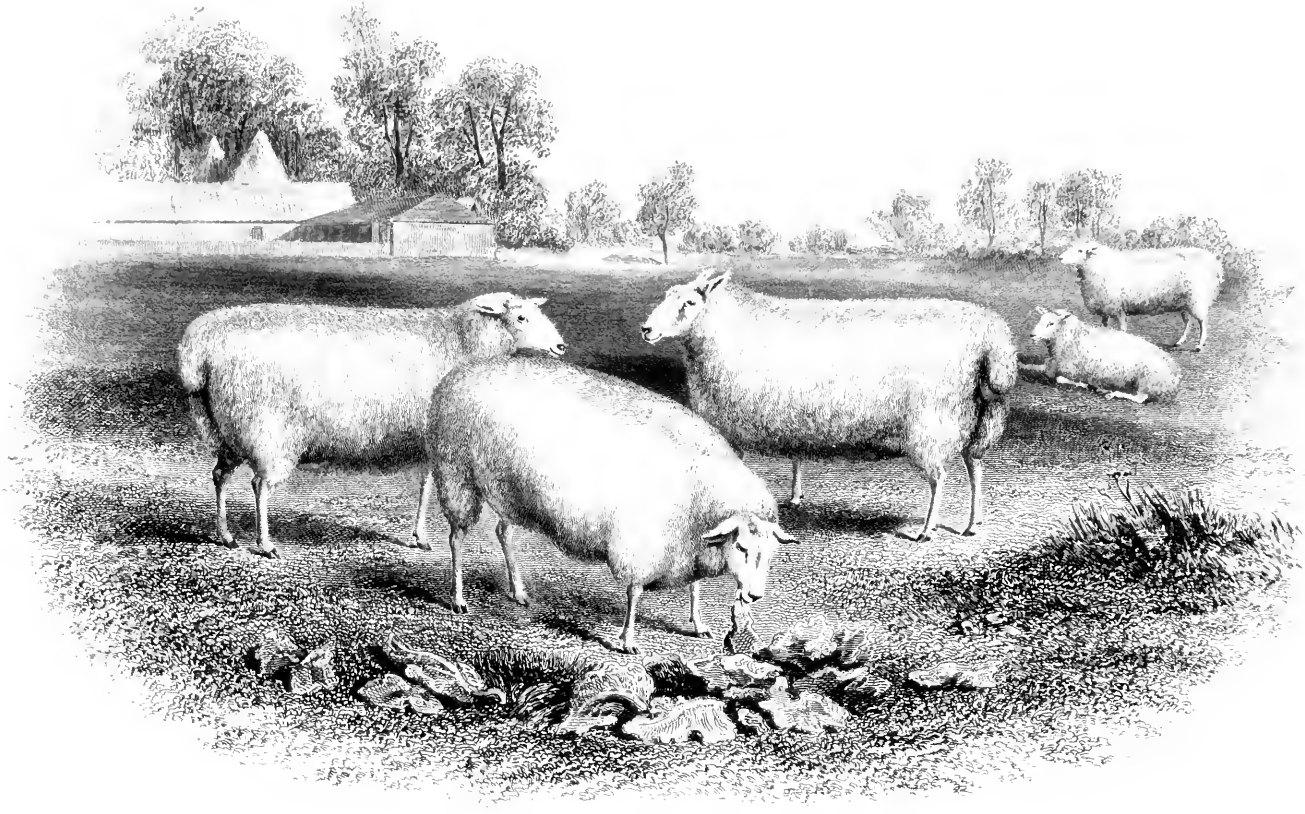


THE FARMER'S MAGAZINE.

JANUARY, 1852.

PLATE I.

A SUFFOLK STALLION.

The subject of our first plate "Duke", a Suffolk Stallion, the property of Mr. Catlin, of Butley Abbey, near Woodbridge, is a beautiful chesnut cart-horse, rising five years old, and allowed by competent judges to be equal to any horse in the kingdom. He stands sixteen hands two inches high, and was bred by the owner. His sire, the celebrated horse Boxer, was sold to his Grace the Duke of Manchester for £300. His dam, an exceeding good Suffolk mare, belonging to Mr. Catlin; and her sire, a noted horse, belonging to Mr. Largent, of Marlesford. "Duke" obtained, in 1848, the first prize at the East and West Suffolk Agricultural Associations, as the best two year old. In 1849 he obtained the first prize amongst horses of any age at the East Suffolk Show. At Bury St. Edmunds, he won the first prize for the best three-year-old. In 1851 the first prize of Thirty Sovereigns at the Royal Agricultural Society's Show at Windsor, was awarded to him, beating all England; and at the East Suffolk Show, held at Woodbridge, in September, 1851, he obtained the first prize of Ten Sovereigns.

PLATE II.

LEICESTER EWES.

The subject of our second plate, a pen of Leicester ewes, the property of William Sanday, Esq., of Holme Pierrepoint, Notts, obtained the first prize of Twenty Sovereigns at the Royal Agricultural Society's Show at Windsor, in July last.

REAPING MACHINES.

The great interest displayed by the agricultural world in reference to the American reaping machines recently introduced into England, would almost lead to the supposition that public attention had never before been directed to this object, and that no attempt had ever been made in this country to construct such an implement. Most persons will, we think, be surprised when they learn how many parties have, at various times, applied themselves to the subject, but without producing a machine fitted for actual work. Believing that an account of the various attempts to construct reaping machines, made in Great Britain, would be interesting to our readers, we have collected the subjoined information, from which it will be seen that an implement, very like the American machines, had been produced in Scotland twenty-five years since, and from the similarity of M'Cormick's reaper to this machine (Bell's) it will, we think, be apparent that the original invention is of British origin,

having been improved upon in America and re-introduced into this country. The engravings and description of Bell's reaping machine (page 6) are taken from that excellent work, "Loudon's Encyclopædia of Agriculture," published by the Messrs. Longman, to whose liberality we are indebted for the use of the cuts, and permission to extract the description.—Ed. Far. Mag.

ON THE USE AND ADVANTAGES OF A REAPING MACHINE.

[*From the "Quarterly Journal of Agriculture," August,* 1828.]

I am aware that there are popular prejudices still alive in the country against machinery in general, and that objections will be brought against the introduction of so useful an instrument as a reaping machine. I shall now state one or two of these, and show that they are all groundless and trivial.

1. It may be objected that, if reaping machines were generally introduced, one of the most lively scenes which the country presents would be withdrawn, and the gaiety and charms of rural life would, at this season, be destroyed. The noise and bustle that must prevail among a multitude of rustics of all ages collected together may, no doubt, disturb the stillness of the country; but I am at a loss to know in what manner such an assembly can add much to the comfort and happiness of human life. The tourist who has deserted the smoke of the city to invigorate his languid frame by excursions of pleasure, may no doubt be attracted by the bustle and activity of harvest work; the busy and lively scenes may cheer him on his journey, and give him a high idea of the health and cheerfulness that prevail amid rural occupations. The poet, too, transfers the picture into his pages, and adorns it with all the embellishments of fancy. Perhaps it may be said, that if the creaking and monotonous sound of an engine had only been heard on our harvest fields, instead of the voice of rural scandal and rural jest, one of the finest passages in the "Seasons" would never have appeared, and one of the peculiar charms of rural life would have been entirely obliterated. It is true, that amid a band of reapers there may be much social glee, and the toil of the fair may be mitigated by nameless gentle offices, and the hilarity of the harvest-home may lose its relish if not sweetened by the recollection of the toils that are past and the foretaste of the rest that is anticipated; but when the picture is stripped of its poetic drapery, we shall see love associated with jealousy and hatred—harmony with rivalry and contention—that the labour is too severe for health and true enjoyment, and that the sprightliness which novelty had excited soon gives place to languor and fatigue. The harvest-field is in fact a scene of constant, severe, and laborious exertion. If the crop is likely to be exposed to an equinoctial blast, and a farther supply of reapers cannot be obtained, it may be supposed that every nerve will be strained by the whole band, that no interval of rest will be allowed, and that while the head is bent down, and every member of the body exerted to the utmost, and the heat often oppressive, immediate and fatal consequences will frequently take place. The hope of victory, or the desire of reward, may for a while animate the heart amid strenuous exertions; but wherever there is a continuance of labour the inevitable result will be uneasiness and pain. Who would willingly submit to a burden if he could obtain relief? Who would willingly drink a bitter cup if he could render it pleasant? And who can doubt that relief from harvest-work, notwithstanding all its fancied gaiety and harmless mirth, would be gratefully hailed as a boon by the peasantry of our land, if we exclude the stimulating rewards with which it has hitherto been associated? The most romantic theorist, or the most sentimental moralist, will readily allow that a mode of reaping so very expensive, and becoming every year more impracticable, should not be persisted in, though some of the beauties of autumn should fade, and some of the charms of the country be defaced.

2. It may also be objected, that if reaping machines were generally introduced they would seriously affect the interests of old and infirm people, whose earnings are small, but who obtain great relief from the high wages they receive for harvest work. There is no doubt that one of the expected advantages to be derived from the introduction of an efficient reaping machine is to reduce the number of hands employed in harvest, and thus effect the reduction of the price of agricultural labour; and we may admit, without hesitation, that individuals will suffer by a lower rate of wages; but we must at the same time affirm, with equal confidence, that any general benefit can very seldom be acquired without incurring partial evil. The only question with regard to a reaping machine is not whether it will be attended with loss to individuals, but whether the evil that it will inflict will not be more than counterbalanced by the good that it will produce? What public benefit can result from the price of harvest-work being higher than the price of any

other kind of labour? If any extraordinary expense is incurred in the production of corn, this expense must necessarily be included in the price, and a tax will consequently be imposed on the whole community. If the farmer were exempted from this extraordinary expense, he would be able to cultivate his land better, and raise more luxuriant crops; a more abundant supply would be followed by a fall of price, and the poor would generally receive more essential benefit from the low price of corn than the reapers had derived from the high price of labour.

But is it at all reasonable that the burden of supporting the old and infirm should rest solely on the shoulders of the farmer, and be attached to so necessary an operation as that of cutting down the corn? If the hand must still be employed in reaping, why not in spinning and weaving? If the sickle is to be continued for the benefit of old women, why should the matron be deprived of her wheel? If manual labour is to be preferred to machinery, should not the spinning-mill and the power-loom be consigned to immediate destruction? The steam-engine, too, the formidable rival of manual labour, though the source of our high commercial prosperity, must likewise be doomed (*palleo metu*) to silence and rest. The supposition is monstrous and extravagant; but no less visionary is the objection to the introduction of machinery into harvest-work. If any discovery in the arts of life be desirable, there is none that can come into competition with an invention that would reduce the expense of the operations of husbandry, increase the produce of the ground, lower the price of provisions, extend our commercial superiority, and thus diffuse comfort throughout all classes of the community.

It is not to be supposed, however, that no labourers at all would be employed in harvest-work, however powerful the machinery to be introduced. A considerable degree of manual labour would still be indispensable; and that labour, too, of a nature in which the most feeble would participate. Although the corn be cut by the aid of a machine, it has still to be gathered, bound, set, carried, and stacked by the hand of man. A grand point, however, would be gained, if harvest-work could be brought nearer the same scale with the other operations of husbandry; for where costly sacrifices and extraordinary exertions are requisite, there must be danger and difficulties necessary to be removed.

3. Another objection is, that the construction of a reaping machine to cut down corn without damage or loss is hopeless and impracticable. I wish I could overleap this barrier, and that the objection with which I have now to grapple derived no strength from past experience. The history of former attempts, however, serves to check our hopes, and damp our spirits. Many efforts of able and scientific men, continued through a series of years, have all proved fruitless. Splendid premiums offered by different agricultural bodies have all failed in calling forth the wished for invention. In the year 1815, an honourable committee of the Highland Society of Scotland were appointed to inspect a reaping machine, invented by Mr. James Smith, manager of the Deanston Cotton Works, Doune; to examine the machine in operation, and to report their opinion to the society. The committee accordingly met; they set the machine to work in cutting oats and beans on uneven ground, and they reported, that the machine not only wrought expeditiously, "took up the whole straw close from the ground, and laid the cut corn with great evenness and regularity, ready for the band-makers and binders;" but they also further reported, "that, in their humble opinion, this machine is perhaps, next to the plough itself, the most valuable invention that has occurred in the annals of husbandry, that the discovery is of great national importance, and that Mr. Smith is not only highly deserving of the patronage of the society, but eminently entitled to the special favour of government, and to liberal parliamentary reward; that, regarding Mr. Smith as standing high in the class of ingenious men, who devote their talents to the good of their country, they felt themselves called upon to recommend earnestly that the society be pleased to make him a present of 200 guineas as a mark of their approbation, and as an encouragement to labour for the public good."

In the same year, nineteen respectable farmers, in the district of Monteith, felt themselves called upon, in witnessing the operation of the same machine, to bear their testimony in approbation of the work performed in their presence. They certified, "that the cutting and laying were most correctly done, and that the quantity of work performed exceeded their most sanguine expectation. They congratulated the public on Mr. Smith's success, and were fully satisfied that, in a very short time, the machine would be generally used wherever agriculture is properly understood and practised."

A new era had now commenced. The night had passed away, the morning had auspiciously dawned; but, alas! the darkness has as suddenly returned. Certainly our hopes are very much damped by this and many other failures. Frequent disappointments, however, in such cases do not necessarily lead to despair. We are not warranted to suppose that the whole inventive powers of man have

already been exhausted in abortive attempts at the construction of a reaping machine. Is it not more reasonable to suppose that in every new attempt former defects will be avoided, that former improvements will be adopted, and that, before every man of mechanical ingenuity has contributed his share, ultimate success will be obtained? Mr. Patrick Bell, a young man in the county of Forfar, of high attainments in many of the sciences, has lately constructed a reaping machine on a new principle, and the harvest is impatiently looked to that his invention may be put to the test of experiment. A model of this machine was some time ago lodged with the committee of the Highland Society, and public attention has again been highly excited to a matter of the highest importance to the general interests of agriculture. That this machine will combine perfection in all its parts on the first trial may be too much to expect; but may we not expect too little, if we do not hope that some progress may be made towards the end we have in view?

With regard to the impracticability of constructing an efficient reaping machine, I may, without scruple, concede that there is little or no hope that one will ever be invented to work in all circumstances. If corn be much lodged, or broken down in different directions, it is not to be expected that by the power of machinery it can be cut and gathered regularly and without loss. Although a reaping machine were discovered as powerful as our wishes could desire, still it would be prudent to use the sickle partially, as manual labour must be applied when mechanical power fails. In good seasons it is but a very inconsiderable part of the crop that is lodged; it is only when the corn is too long exposed to the weather, after it is fully ripe, that the stalks are broken down in different directions; and if a machine could be discovered of such power as to cut down all the corn as soon as it came to maturity, there would be but comparatively little of the crop that would not come fully within its operation. Although the sickle were partially employed on every farm, and the strength of the young and the old fully called into maturity, the great object of a reaping machine might still be attained; and those increasing evils with which the farmer is now struggling might be almost wholly removed.

I need scarcely say that these objections I have been considering are but of little weight, and present no insurmountable obstacle to the introduction of a reaping machine; they ought not to cool our ardour, nor relax our exertions, as the goal may be nearer than we are well aware. The advantages that would result from the use of a reaping machine may not be so easily enumerated. It would not only lessen the unavoidable expense of harvest-work, give a new stimulus to the culture of the ground, preserve much of the corn that is now exposed to injury from the weather, afford a more plentiful supply to our grain markets, and consequently cheaper food to our manufacturing population, but it would infuse new economy into the management, and new order into the arrangement of rural affairs.

The farmer has not yet derived full benefit from the improvements that have taken place on the implements of agriculture, as he cannot reduce the number of people retained on the farm so much as he could wish, on account of the difficulty he experiences in executing his harvest-work. He can carry on his operations at other seasons with few labourers; enormous bands of reapers, however, are required in harvest. As a certain number of reapers are indispensable, and cannot be found in many situations without extreme difficulty, it is necessary to encourage a great proportion of them to reside on the farm. For this purpose the farmer has to build cottages, to let them on the express stipulation that the occupiers are to be at his disposal in harvest; and, in addition to the high rate of wages, he has to submit to many inconveniences, and much indirect expense, that his corn may not remain uncut, or be destroyed by an undue exposure to the weather. Now, as the families of all these cottagers must draw their subsistence from the farm, and are induced to remain in the country, from the cows, pigs, and poultry they are allowed to keep, as well as from the high price of harvest-work, the use of a reaping maching might thus relieve agriculture from the pressure of a burden which, under the present mode of reaping, it has been found impracticable to remove. It is the business of the farmer to provide food for the public; he is the purveyor for the whole community. Now, the less he consumes on his own farm, he has a greater quantity to carry to market; and if the food consumed by these half employed cottagers were brought to market, there would be a more abundant supply, and the interests of the public more effectually promoted. The sickle, then, remains the enemy of agricultural improvement, and opposes those salutary arrangements which are necessary for the public good.

Among the many advantages that would result from the use of a reaping machine, I may remark that the corn, when cut by it, would be left in a loose or uncompressed state. To some this may appear to be a matter of trivial consequence, but it is, in reality, of much importance. When the corn is cut down by the sickle, it is collected by handfuls, and the stalks are necessarily firmly squeezed together, so that the whole sheaf is closely com-

pressed when bound and set in the stook. The compression of the sheaf is attended with no small inconvenience. If the straw is damp it will soon putrefy; and reaping by the sickle is always impracticable but when the weather is fine and the straw completely dry. The more closely the sheaf is compressed, the longer period must elapse before it is fit for the stack, and the longer it must be exposed to injury from the weather. The corn, however, when cut, must necessarily fall loosely from a reaping machine; the sheaves, when bound, will not be in such a state of compression as when collected by handfuls in reaping by the sickle, and, being sooner ready for the stack, will be sooner secured from the risk of injury. If it be, then, an advantage attending the use of a reaping machine, that the crop will be cut down as soon as it comes to maturity, and the loss arising from shaking thus in a great measure prevented, it is, without doubt, another advantage of considerable moment, that the corn will be sooner carried to the stack-yard after it is cut, and be exposed to less risk of damage from the weather.

Another advantage attending the use of a reaping machine is, that a portion of the crop might be thrashed out immediately as it is carried from the field. The ancient practice was to thrash out the whole grain before it was removed from the fields; and this custom would probably have still remained, if it had continued to be practicable. In the present state of harvest-work, such an operation is altogether impossible, however great may be the advantages with which it is accompanied. It would lessen the amount of labour in carrying the corn, for it would be taken directly from the field to the thrashing mill. It would lessen the amount of the loss of corn, for loss must necessarily be incurred in building the stacks and taking them down. By bringing the new crop earlier into market, it would reduce the amount of the stock of old corn, and consequently the price; for the price of any commodity must, in some degree, be regulated by the length of time it is kept on hand.

But the greatest advantage attending the proposal of thrashing out a part of the corn when brought from the field is, that it would be used when it contained the greatest quantity of nutritious matter. There is a strict analogy between animal and vegetable life. Plants and animals, when arrived at full maturity, equally verge toward decay; and, though in some individuals of each class this progress may be slow, and for a time imperceptible, it is nevertheless certain and inevitable. Grain, when fully ripe, and before the process of decay commences, contains the greatest quantity of farina; it is consequently in the best state for food, and can be used with the greatest economy. It has been ascertained, by numerous experiments, that corn, when carried immediately from the field, is of greater bulk, or measures better, than at any future period, and, in this respect, it is in the most profitable state for selling. From many of these experiments, which seem to have been made with tolerable accuracy, it appears that corn, when kept in the stack for several months, loses in quantity about 20 per cent.; and what is still more remarkable, the quantity of meal or flour that it yields is diminished in an equal proportion. This is a fact with which every farmer is familiarly acquainted, however unaccountable it may be that it is almost totally overlooked and neglected in practice. The common excuse given by the practical farmers for delay in thrashing out the corn is, that the value of the straw would be injured if not given to cattle so soon as it was thrashed. The excuse, however, is inadmissible. If the straw of the corn thus thrashed were immediately built in large stacks, would it not keep as well as hay, and be in a more sound and fresh state than when built up in the smaller circular shape, which is necessary for the preservation of the corn? I am afraid that there is, in the usual practice of thrashing one stack after another, as the straw is consumed, some degree of blind attachment to former habits, as well as some little feeling of pride and ostentation. A corn-yard well filled with stacks, well built, well thatched, well roped, has certainly an imposing effect, and the possessor may be supposed to view it with some degree of exultation: and there is no doubt that the speedy removal of a stack is a tacit reproof of the care that was employed in building it, that the symmetry of the whole is thus destroyed, and that so much wealth is thus withdrawn from public observation. The introduction of a reaping machine, that would enable the farmer to thrash out a portion of his corn as it came from the field, would be attended with advantages to compensate him for any wound his feelings might receive by the want of splendour and display in his corn-yard. The bulk of straw might still meet the eye; the immense stack or stacks might be tastefully arranged, and have a substantial appearance; the stores of the granary might be exhibited; the bank-book might be inspected with less uneasiness, and pleasant conversation might be held with the factor on the rent-day when the arrears were paid up. In short, if it really be the interest of the farmer to thrash out the corn before it be built up, means would not be wanting to gratify his vanity, and maintain his consequence in the eyes of the world.

If there be any truth in these statements I have now, through your indulgence, submitted to the

consideration of the public, the obvious conclusion is, that every encouragement should be given by individuals, and public bodies, to promote an invention which involves the interests of the whole British Empire. But how is the encouragement to be given? What are the most fit means to be employed in obtaining the end proposed? I know no way more effectual than by proposing liberal premiums. Might not all the agricultural societies in the kingdom make a simultaneous offer? It would well become our own Highland Society, who so often appear as the van in the march of improvement, to set a conspicuous example, in not only voting a grant themselves, but in arranging the plan for other bodies to act in concert. They have already a just claim to our gratitude, in having suggested, and carried into effect, several measures of much public interest, and their attention cannot be directed to an object of more essential benefit to agriculture than the invention of a reaping machine. On every farm of any considerable extent, by the use of a proper machine, there might be a yearly saving of £30; the average saving on a single parish might be £200 a-year, and, upon the whole of Great Britain, no less than a million sterling. A premium of £20,000, or even £30,000, would surely not be too high an encouragement for such an object as this. It would excite public attention, it would whet the invention of scientific men in every part of the world, it would attract the notice of many who may not be aware of the importance of the subject, and give more sleepless nights to those who may have wished to associate their names with the improvement of their country. Three years might be allowed to complete and perfect the invention, and, at the lapse of that period, arbiters might be appointed by competent societies, by whose judgment the premiums might be awarded. I feel, however, that I must leave this part of the subject to abler and more skilful hands; if the matter shall excite any degree of public attention in consequence of my humble endeavours, I shall obtain the object I have in view.

I am, &c. D. C.

REAPING MACHINES.

(From London's Encyclopædia of Agriculture.)

Though reaping machines, as we have seen (133), are as old as the time of the Romans, one of an effective description is yet a desideratum in agriculture, unless the recent invention of the Rev. Patrick Bell can be considered as supplying that desideratum. The high price in manual labour during harvest, and the universal desire in civilized society of abridging every description of labour, will doubtless call forth such a reaping machine as may be employed in all ordinary situations; and this is, perhaps, all that can be desired or expected. Corn laid down, or twisted and matted by wind and rain, or growing among trees, or on very irregular surfaces, or steep sides of hills, will probably ever require to be reaped by hand. But independently of the high price of labour, despatch, as an able author observes (*Sup. Encyc. Brit.*, i., 118), is a matter of great importance in such a climate as that of Britain. In reaping corn at the precise period of its maturity, the advantages of despatch are incalculable, especially in those districts where the difficulty of procuring hands, even at enormous wages, aggravates the danger from the instability of the seasons. It cannot, therefore, fail to be interesting, and we hope it may be also useful, to record some of the more remarkable attempts that have been made towards an invention so eminently calculated to forward this most important operation.

The first attempt at a reaping machine, so far as we have learned, was made by Boyce, who obtained a patent for a reaping machine early in the present century. This machine was placed in a two-wheeled carriage, somewhat resembling a common cart, but the wheels were fixed upon the axle, so that it revolved along with them. A cog-wheel within the carriage turned a smaller one at the upper end of an inclined axis, and at the lower end of this was a large wheel, which gave a rapid motion to a pinion fixed upon a vertical axis in the fore part of the carriage, and rather on one side, so that it went before one of the wheels of the carriage. The vertical spindle descended to within a few inches of the surface of the ground, and had there a number of scythes fixed upon it horizontally. This machine, when wheeled along, would, by the rapid revolution of its scythes, cut down a portion of the corn growing upon the ground over which it passed; but having no provision for gathering up the corn in parcels, and laying it in proper heaps, it was wholly unsuited to the purpose.

An improvement on this attempt was made by Plunket, an agricultural implement maker of London, some years afterwards. The principal alteration he made, was in substituting for the scythes a circular steel plate, made very sharp at the edge, and notched at the upper side like a sickle. This plate acted in the same manner as a very fine-toothed saw, and was found to cut the corn much better than the scythes of the original machines.

A machine invented by Gladstone, of Castle Douglas, in the stewartry of Kirkcudbright, operated upon nearly the same principles with Plunket's; but Gladstone made his work much better by

introducing a circular table, with strong wooden teeth, notched below all around, which was fixed immediately over the cutter and parallel to it. The use of these teeth was to collect the corn and retain it till it was operated upon by the circular cutter. The corn when cut was received upon this table, and when a sufficient quantity was collected, taken away by a rake or swecper, and laid upon the ground beneath the machine in separate parcels. To this machine was added a small circular wheel of wood, covered with emery, which being always kept in contact with the great cutter at the back part, or opposite side to that where the cutting was performed, kept it constantly ground to a sharp edge.

Salmon, of Woburn, made the next attempt; and his invention, it is said, promised better than those we have mentioned. It was constructed upon a totally different principle, as it cut the corn by means of shears, and it was provided with a very complete apparatus for laying it down in parcels as it was cut.

The next machine, and one of great ingenuity and promise, is that constructed by Smith, of the Deanston Cotton Works, Perthshire. Smith's perseverance, his successive improvements, and ingenious, yet simple contrivances for remedying defects, afforded strong grounds to hope that he would ultimately succeed in rendering his machine a most valuable acquisition to agriculturists; but various circumstances have prevented Mr. Smith from perfecting his invention. He made the first trial of his machine, upon a small scale, during the harvest of 1811. It was then wrought by two men. In 1812 he constructed one upon a larger scale, to be wrought by a horse; but though he cut down several acres of oats and barley with considerable ease, it was found that when met by an acclivity the horse could not move the machine with proper effect. In 1813 he made a more successful attempt with an improved machine worked by one man and two horses, and (1814) it was still further improved by an additional apparatus, tending to regulate the application of the cutter when working on an uneven surface. This machine was again tried in September, 1815, and with much success. A Scotch acre (1¼ acre English) of beans was cut down with ease in an hour and a quarter. The trials made with it on wheat, though not extensive, were satisfactory; and in reaping oats, the corn was laid down in the most regular manner. The cutter of this machine is circular, and operates horizontally; it is appended to a drum, connected with the forepart of the machine, its blade projecting some inches beyond the periphery of the lower end of the drum; and the machine is so constructed as to communicate, in moving forward, a rapid rotary motion to this drum and cutter, by which the stalks are cut, and falling upon the drum, are carried round and thrown off in regular rows. This most ingenious piece of machinery will cut about an English acre per hour, during which time the cutter requires to be four times sharpened with a common scythe stone. The expense of this machine is estimated at from thirty to thirty-five pounds. If properly managed, it may last for many years, only requiring a new cutter every two or three years—a repair which cannot cost much. This promising invention, which attracted a good deal of notice a few years ago, remains, it is believed, as it was then, in a state not calculated for extensive use. Mr. Smith's large concerns in the cotton manufacture may have prevented him from continuing his experiments, and it is understood that the time he has already devoted to it has been without sufficient remuneration or encouragement.

Bell's reaping machine (figs. 1 and 2) is the most recent, as well as the most perfect invention of this description. The framework of this machine (AA) may be made lighter or stronger, according to circumstances. BB and CC are four wheels, upon which it is mounted, of whatever form it is made. BB have their spokes at right angles to their naves, and are 3½ feet diameter. For neatness' sake the naves are made of cast iron. The wheels are from 5 to 6 inches broad at the rims, and are surrounded with a slight hoop of iron. Were they made narrower in the rims, when the ground was soft they would both cut it and drag without giving motion to the connected parts of the machinery. The small wheels (CC) which support the front of the frame, are, like the large ones (BB), made of wood; they are 14 inches in diameter, and 6 inches broad at the rims, with a very slight hoop of iron round them. Their axles, which are of iron, are screwed to the frame, and are about 1¼ inches in diameter. The wheels are placed as near the front of the frame as possible, the reason for which will appear when the general description of the machine is given. The wheels (BB) are connected with the main axle (D) in such a manner as that they may turn upon it similarly to a carriage wheel, without moving the axle with them: or they can be fixed to it at pleasure, so as to turn it round with them as occasion requires. For this purpose the holes in the naves are circular, and of course so much of the axle as passes through them is round. There are cross flanges cast upon the nave, which catch hold of the coupling-box (E) when the machinery is to be moved, and are disengaged from it by the handle (F) when the machine is going, without moving the machinery. In the engraving this part of the machinery is entirely

concealed at one of the wheels, except a small portion of the handle at H. The other coupling-box is but faintly represented at E. The handle (F) has a joint in it, which is fixed to the other half of it, which passes through the frame of the machine and terminates with the handle (H); so that both coupling boxes can be managed by the driver standing at H, although they are on opposite sides of the frame. The main axle (D) is 3½ feet long between the shoulders, and 8 inches from the shoulders to the coupling box. The frame of the machine is 4 feet broad by 7 feet long. Fixed upon the main axle (D) is the bevilled wheel (I) of 60 teeth, part of which is seen in the engraving. This bevilled wheel moves two pinions of 10 teeth each. These pinions are concealed in the plate by the frame of the machine. One of them turns the crank-rod (K), and the other gives motion to the coupling-wheels (LL) upon the top of the frame. The crank-rod (K) being thus put in motion as the machine moves forward, the crank (M) which gives motion to the cutters revolves with a uniform and steady motion. N is a coupling strap of iron, which connects the crank (M) and the moveable bar (OO) together, which is kept in its place by means of the sliding hooks (PP) working in the brass sockets (QQ), which are screwed upon the strong iron supports (RR). It is obvious that as the crank (M) revolves, it will, by pulling the connecting-rod (N), give a perpetual motion backwards and forwards to the moveable bar (OO). In order that there may be as little friction as possible to the moveable bar (OO), there are two friction pulleys fixed to the iron supports (RR), upon which the moveable bar (OO) rests. These are not seen in the plate, as they are placed immediately below the bar; but to any person who considers the thing attentively they must be readily understood. They are of the greatest consequence, as the back parts of the cutters wholly rest upon the moveable bar (OO), and from the spring which each cutter must necessarily have, the pressure upon it is very considerable. With respect to the cutters, it may here be remarked that the greater body of them is made of iron, edged with the best steel, hardened as much as they will bear without breaking out into chips when the machine is in operation. The cutter-bar, that is the bar upon which the cutters are screwed, is strongly screwed upon the extremities of the supports (RR) and is 6 feet long by 3 inches broad and three-fourths of an inch thick. The lower, or fixed cutters (SSS), are made triangular, of solid iron, edged with steel as before mentioned; they are 15 inches long from the point to the extremity, 4 inches broad at the base, and nearly one-fourth an inch thick; they are steeled only to the front of the bar, thus leaving a steeled edge of about one foot. In the middle of the base of the cutter there is a hole pierced, half an inch in diameter, and a corresponding one in the bar where it is to be placed; the hole in the bar is screwed, and in fixing a cutter a bolt is passed through the hole in the base, and screwed tightly down into the bar. To prevent a cutter from shifting its place, there are two small holes pierced, one on each side of the half-inch hole in the base, and corresponding ones in the centre of the bar; these holes are one-fourth of an inch in diameter. Into the holes in the bar there are two iron pins firmly riveted below, and left one-eighth of an inch above the bar, made to fit neatly into the holes in the cutters, although with a sufficiency of looseness to allow the cutter to be taken easily off when the bolt in the middle is screwed out. By this means, when the bolt in the middle is screwed down, a firm and unalterable position is insured to the under cutter. The upper cutters (UU), &c., like the under ones, are made of good iron, edged with steel as far as the hole where the bolts upon which they turn pass through. They are three inches broad where the hole is pierced; and behind the cutter-bar, as is seen in the plate, they are bent down about two inches, to allow the rollers and canvas to operate, as shall be afterwards described. After being continued horizontally about three inches, they are again bent up, and their extremities placed above the moveable bar: they are made about 13½ inches long from the point to the hole, and about 7½ inches from the hole to the extremity backwards. Both upper and under cutters are sharpened on both sides, similarly to a pair of scissors, the under ones of course upon the upper side, and the upper ones upon the lower side, thus forming, when the cutters are screwed to their places, a perpetual cutter upon that principle. The bolts upon which the upper or moveable cutters work are half-an-inch in diameter, and are screwed to the bar through a hole of corresponding breadth. They are made to go through the bar about half an inch, upon which a nut is screwed, to prevent the bolts from unscrewing, which they would otherwise do from the moving of the cutters, which would allow the edges of the cutters to separate, and of course the machine would get deranged, and would not operate. The points of the under or fixed cutters are six inches separate; of course the holes in the bar by which they are fixed are six inches apart: the bolts of the upper or moveable cutters are intermediate—that is, three inches from the others, so that the cutter-bar is bored from end to end with holes half an inch in diameter, and three inches distant. The small holes, with the pins which prevent the fixed cutters from shifting their places, are 1½

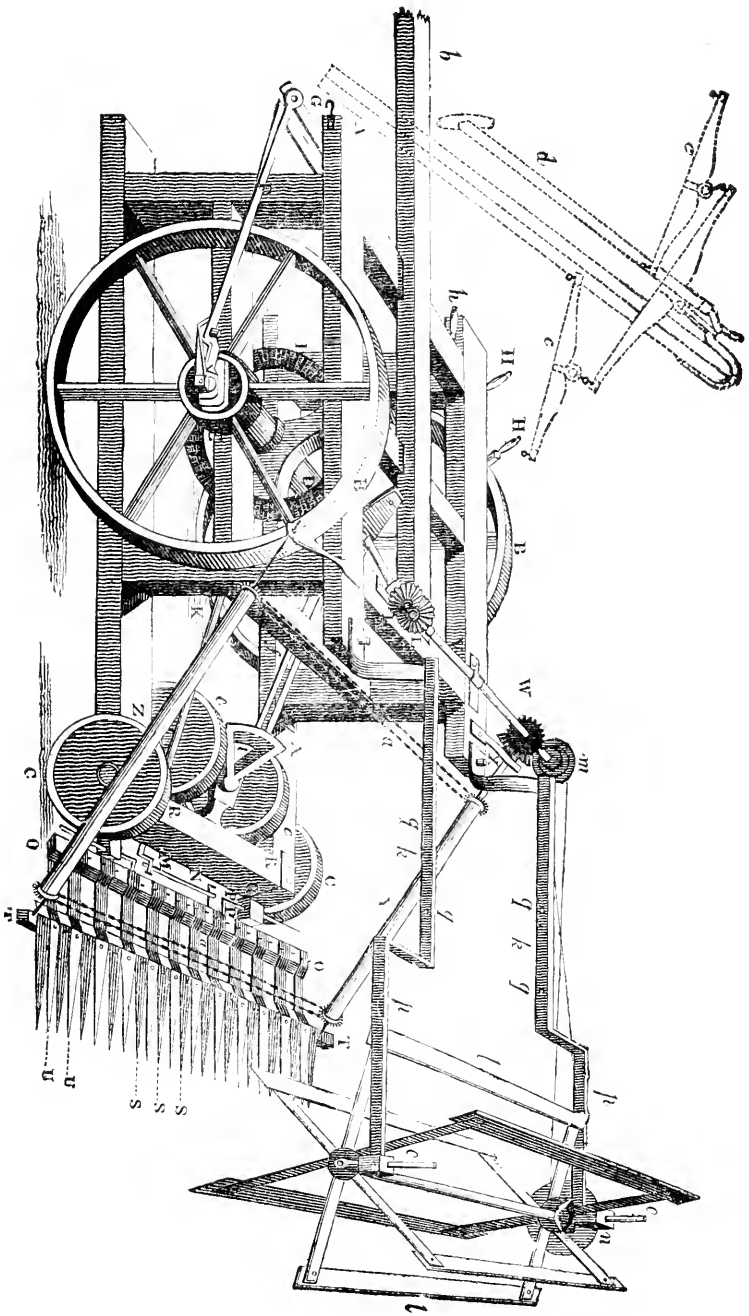


FIG. 1.

BELL'S REAPING MACHINE.

inches from the large holes; so that the bar, before the cutters are screwed upon it, is pierced first with a small hole, then a large one, then two small ones, then a large one, then two small ones &c., as may be understood from the plate—each hole 1½ inches apart. The back parts of the moveable cutters, as was already mentioned, rests upon the moveable bar, and on each side of every cutter there is an iron pin of one fourth of an inch in diameter, riveted into the moveable part. By means of these pins it is easily seen, from the consideration of the plate, that as the moveable bar is pushed backwards and forwards by the crank (M) upon the friction-pulleys below it, the moveable cutters will have a perpetual motion backwards and forwards. Under the heads of the bolts which fasten the moveable cutters and the cutters themselves there is placed a washer of brass to diminish the friction as much as possible; and for the admission of oil there are two small holes pierced in the head of each bolt: there are twelve moveable cutters, and thirteen fixed ones, with intervals of six inches between the points of the latter, so that the breadth of the machine is exactly six feet; but this breadth, from the principle of the machine, may be either increased or diminished, according to the nature of the farm upon which the machine is intended to operate. Upon a perfectly level farm the machine may be made broader; but upon a farm of sloping or uneven surface one of six feet in breadth will be found to be work enough for two horses. As it was before stated, the bevilled wheel (I) gives motion to the coupling-wheels (L L) of eighteen teeth each; these move the horizontal shaft (V), and the wheel (W) which is fixed to the end of it. The wheel (W) has thirty-six teeth and pinions (X), which it turns, and which is fixed upon the gudgeon of the roller (Y), has eighteen teeth. This part, however, is misrepresented in the drawing, which was taken from a model which had the rollers turned by coupling-wheels, as shown in the plate; the one roller (Y) turns the other (Z) by the pitch-chains (*a a*), the chief use of which is to keep the sheet of canvas from changing its place by the revolution of the rollers: the canvas, from its gravity, would slip down upon the rollers as the machine moves forward, and it would twist upon them by the unequal pressure to which it is exposed by the cut corn pressing unequally upon it. To prevent these derangements there are loops fixed to the canvas, which are made fast to the links of the chain about six inches apart; and there being an equal number of links to both the upper and lower chains, and an equal number of teeth in the four pulleys upon which they work, the canvas revolves uniformly without being in the least deranged by the many casualties to which it is exposed.

B is the pole to which the horses are yoked: it is made of wood, and is firmly fixed to the cross-rails upon the top of the frame; its length is ten feet from its extremity to the frame of the machine. *c c* are the swingle-trees by which the horses are yoked: they are yoked similarly to horses in a carriage, so as both to draw forward or push backwards at pleasure; their heads, of course, are towards the machine, and in appearance they push the machine before them, but in reality they are drawing, the same as in the plough. *d* is a small rod of wood, or helm, which the driver holds in his right hand, by the pulling of which to him, or pushing it from him, he conducts the machine straight forwards. The dotted lines in the plate are a continuation of the pole, with the swingle-trees and helm attached; the machine is turned at the end of the ridge by the following contrivance: The two wheels (*e e*), in the body of the machine, are joined to the lever (*f*), by an upright moveable axle; these wheels are similar to the two (C C) on the front of the frame: they have a strong iron axle, which is made so long as to let the wheels conveniently turn between the crank-rod (K), and the frame of the machine. In order that this piece of the apparatus may be used with advantage, the bevilled wheel (I), is not placed upon the middle of the main axle (B), but about one foot from the end of it, as is seen in the engraving; this throws the crank-rod (K) nearer the side of the machine, thus leaving plenty of space for the turning of the apparatus in the middle of the horizontal axle of the wheels (*e e*). There is an upright of iron sufficiently strong and firmly joined to the horizontal axle: this upright standard or axle passes through the middle of the lever (*f*), which is of wood, and at this part about 5 inches square; about 20 inches from the end of it, upon the top of the upright standard there is placed a segment of a wheel (*i*), with the teeth on the lower side: this is worked by a small pinion of six teeth upon the end of the rod (*g*): this pinion is not seen in the engraving, as it is completely concealed by the segment (*i*), the rod (*g*), and the small pinion upon it are turned round by the handle (*h*); the pinion moves the segment (*i*), which, being firmly fixed to the upright standard, turns the small wheels (*e e*) either way. When the machine is cutting, the wheels (*e e*) are put parallel to the cutters, and in this position they assist the machine in passing a furrow without allowing the cutters coming in contact with the opposite side of it; but when the machine is to be turned round, they are turned with an angle to the path of the machine by the handle (*h*), and the rod (*g*) being fixed in that

position by a screw near the angle, the lever is then pressed down and fixed with catch to the frame of the machine. In pressing down the lever (*f*), the small wheels (*e e*), which before were two inches from the ground, are pressed to the earth about two or three inches below the natural level of the machine; of course the two front wheels (C C) are lifted two or three inches from the ground, and the cutters considerably more, thus insuring them from accident while turning round. The machine now rests upon the two large wheels (B B), and the two small ones (*e e*), of the lever; and the two front wheels go for nothing, as they do not touch the ground; but the axle of the small wheels (*e e*) being placed with an angle to the main axle (D) of the large wheels (B B), the machine will naturally turn round upon the horses being moved slowly forward. Of course, the greater the angle formed by the two axles, the less space will the machine require to be turned upon. In turning the machine, however, attention must always be given to disengage the large wheels (B B) from the main axle (D); this is done by shifting the coupling boxes (E E) by means of the handles (H H). The apparatus (*l l*), or collector, is placed exactly above the cutters; it is two and a-half feet in diameter, made of wood as slight as may be; the supports (*k k*) in the original machine were made of iron, but now the two side beams of the machine are made of a piece of wood, with a natural cast upon it, similar to the beam of a plough, but rising with a much greater angle, as near the form of the iron supports in the plate as possible, and continued horizontally till their points are exactly above the moveable bar (*o o*). The points (*p p*) are made of iron, bent as in the plate, to allow the collector (*l l*) to turn round. At *q q q q* are strong iron screws, working in nuts placed in the wooden parts of the supports, which serve the double purpose of uniting the iron part to the wood, and allowing it to be drawn forward, or pushed backward, as occasion may be, by either shifting to another hole, or, which is better, by long slips to the middle of the bar. Long corn requires the collector to be placed forward, and short corn requires it to be taken back. At *o o* are two perpendicular rods, which slip in holes in the points of the supports, by the moving of which upwards or downwards the collector (*l l*), which turns in sockets in the lower end of these rods, is lowed or heightened, according to the length of corn to be cut. The rods are fixed in their places by screws in the ends of the supports; the collector is turned by a cross bolt or chain passing over the two pulleys (*m n*). A piece of slight canvas is put round the rollers (Y Z), fixed to the chain (*a a*), as before described; the lower ends of the rollers have a shield of plate iron round their gudgeons, to prevent the cut corn from warping, which it does effectually. The bushes of the roller (Z) are made to shift by screws, to tighten the chains a little, to prevent them from slipping the pulleys, as they lengthen by using, especially when new. Figure 2 is a representation of the machine in full operation; about six or eight yards of the field require to be cut at the ends, to allow the machine to turn without injuring the corn, which may be done by the machine itself. If the corn is standing nearly upright, a convenient number of ridges may be taken in and cut by going round them; but if the corn is standing, and the field free from deep furrows, it may be cut by going round and round it till it is finished in the middle. One man, as seen in the plate, is sufficient to manage the whole operation. The cutting, collecting, and laying are the three principal parts of this machine, which have been all more or less explained in the general description above: but as they are particular, a few words on these heads may still be necessary, that the machine may be completely understood in all its bearings. First, then, with regard to the cutting, it is desirable that the machine should do her work, and nothing more; if the motion of the cutters were too slow she would not clear the ground, and if it were too quick there would be a useless expenditure of power of machinery. Let it be remembered that the large outer wheels (B B) are three and a half feet in diameter, that the bevilled wheel (I) has 60 teeth, and that the crank rod pinion has 10, and that the cutters have twelve inches of cutting edge. The diameter of the wheels (B B) being three and a half feet or 42 inches, their circumferences are 131·9078 inches: every revolution of them will pass over nearly 132 inches of the ground surface; but there being ten teeth in the crank-rod pinion, and sixty in the bevilled wheel (I), every revolution of the wheels (B B) will turn the crank pinion six times, and of course the crank as often: but every turn of the crank-pinion gives two cuts, and each stroke of the cutters clears 12 inches of the ground, because they have 12 inches of a cutting-edge; therefore one revolution of the wheels (B B) gives 12 strokes to the cutters, and clears 12 times 12, or 144 inches of the surface of the ground; but one revolution of B B 12 inches more than enough, that is 1 inch each stroke. This, however, perhaps is nothing more than is advisable, to calculate upon making allowances for the operation of the machines, the partial dragging of the wheels, &c., &c. Secondly, the collector (*l l*) must not move too slowly, but it should retard the corn from falling upon the canvas; and it must not move too quickly, lest it should shake ripe grain: as before stated, it is 2½

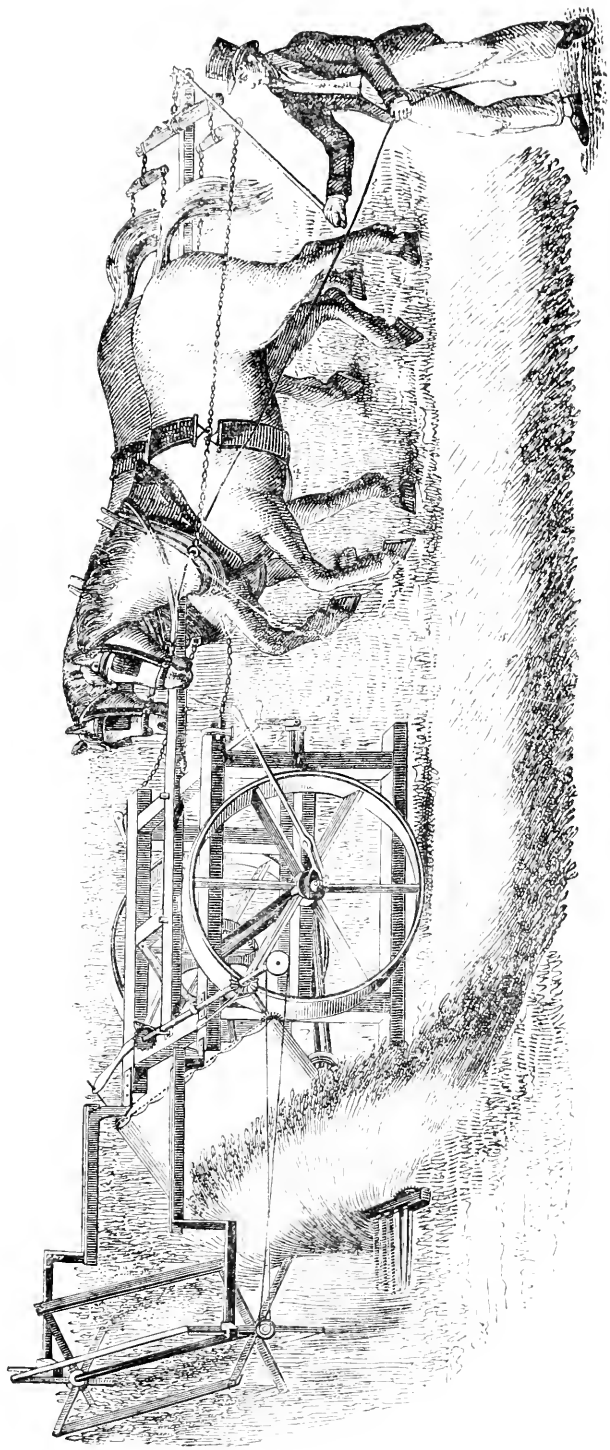


FIG. 2.

REPRESENTATION OF THE MACHINE IN FULL OPERATION.

feet in diameter, that is 94.2477 inches in circumference; but one revolution of B B passes over 132 inches of surface; therefore, that the collector (*l l*) may just touch the corn without bringing it back, or retard it from naturally falling back, it must make 1.4 revolutions for every one that B B makes. Since there are six arms in *l l*, every arm will touch the standing corn at equal distances of 15.7 inches. The pulley (*m*) makes six revolutions for one that B B makes; it is six inches in diameter, and the pulley (*n*) upon the axle of (*l l*) is nine inches; therefore *m* revolves 1.5 times for once that *n* turns round; and the collector (*l l*) revolves four times for once that the large wheels (B B) revolve. $4 \times 94.2477 = 376.99$ inches the space passed through by the circumference of the collector, while the machine moves forward only 132, the difference of which is 244.99 the space that the collector passes over more than the machine during one revolution of B B, therefore every inch of the corn is brought back 1.54 inch nearly by the collector, which is sufficient to insure its falling backwards upon the canvas; and yet it touches the corn so gently that it is impossible that it can injure it in the smallest degree: a quicker and a slower motion, however, is advisable, which is easily given by having two or three sheaves upon the pulleys (*m*) and (*n*), and then by shifting the bolt a different motion is produced. With regard to the canvas, it is necessary that it should revolve as much as the ground passed over by the machine; that is, while the wheels (B B) make one revolution, or pass over 132 inches of the surface, 132 inches at least of canvas should pass over the rollers: W, as before stated, has thirty-six teeth, and X eighteen, so that the roller (Y) will give two revolutions for one of W; but W revolves six times for one revolution of B B, hence the roller (Y) will revolve 12 times for every revolution of B B. The diameter of the rollers is 4 inches; their circumferences, therefore, are nearly 12.56 inches, 12 revolutions of which will give 150.72 inches. As before stated, one revolution gives only 132 inches, wherefore there is a preponderance of motion on the side of the canvas of 18.72 inches for every revolution of B B; this velocity is necessary to ensure the canvas of clearing itself in all cases, and with a smart velocity the cut corn is laid down with a greater angle to the path of the machine. It may here be observed, that it is often found convenient to have the canvas to lay down the corn on either side of the machine, according to the direction from which the wind is blowing: this may be done with a double wheel at X, with a handle in the usual method, employed for reversing the motion of the rollers of the threshing-machine. It were desirable, if possible, to have the canvas besmeared with a drying oil or gum, or some other substance which would prevent it from contracting with moisture, as the slightest shower or dew of a morning contracts it so much as to render the implement useless until the corn is perfectly dry.

An estimate of the probable value of Bell's reaping-machine may be formed from the reports signed by numerous practical farmers who were spectators to different trials made in 1828 and 1829. In September, 1828, the machine was tried at Powery, in the county of Forfar, before between 40 and 50 proprietors and practical agriculturists, who signed the declaration stating that the machine cut down a breadth of five feet at once; was moved by a single horse, and attended by from six to eight persons to tie up the corn; and that the field was reaped by this force at the rate of an imperial acre per hour.—Taken from *Gardeners' Magazine*, vol. v., p. 600. In September, 1829, the machine was tried at Monckie, in Forfarshire, in the presence of a still greater number of persons, who attest that it cut in half an hour nearly half an English acre of a very heavy crop of oats, which were lodged, thrown about by the wind, and exceedingly difficult to harvest. It was tried in a number of other places in Forfarshire, Perthshire, and Fifeshire, and the general conviction appears to be that it will soon come into as general use among farmers as the threshing-machine (*Gardeners' Magazine*, vol. vi.). The price is at present between £30 and £35; but if it were once in general use, probably the cost might be lowered; but even that price would be saved out of the usual sum paid for manual labour during only one harvest by an extensive farmer. Few men deserved better of his country, and indeed, of every civilized country where agriculture is practised, than Mr. Bell; for surely that invention must ultimately be of great benefit to men and women, which enables them to do by horses, oxen, or steam, that which they have hitherto done by a most severe description of manual labour, rendered doubly oppressive by the season of the year in which it must necessarily be performed.

A machine for reaping, and at the same time sheaving, corn; was invented in the year 1822, by Mr. Henry Ogle, a schoolmaster at Rennington near Alnwick, Northumberland. In 1823, Messrs. Brown, ironfounders, in Alnwick, advertised that they would furnish machines of this sort, complete for sheaving corn, at the beginning of harvest. No farmer, however, could be found who would go to the expense. The operation of the machine was satisfactory, and it was estimated to cut 14 acres per day. An engraving and description of it will be found in the *Mechanic's*

Magazine, vol. v., page 50. In the same work, vol. i., page 145, will be found an engraving of a mowing-machine, invented by Jeremiah Baily, of Chester county, United States, about 1821, and said to answer well, and to have been extensively used.

Whoever contemplates further improvements in this description of machinery, would do well to begin by making himself master of all the foregoing inventions.

Mann's reaping machine, invented by Mr. Joseph Mann, of Raby, near Wigton, in Cumberland, was first of all tried in 1822, and first tried in an improved form in 1826, and first tried in Scotland, at the Kelso Meeting of the Highland Society, in 1832. It made similar promise to Smith's and Bell's; and, had it been as perseveringly improved as the former, it might possibly have won the confidence of practical men; but, quite as much perhaps from want of hope on the part of its proprietor as from want of encouragement on the part of leading and influential agriculturists, it is going to rust along with its predecessors. It has a revolving polygonal cutter of twelve equal sides, and produces its cutting effects by a very rapid series of strokes. It gathers the cut corn by means of revolving rakes, and strips these in such a manner as to lay down the corn in a regular swathe. It is drawn by one horse walking along the side of the standing corn, and it cuts a breadth of 3½ feet at each turn, and is capable of cutting about 10 acres in 10 hours. A figure, and a description of it, may be seen in the 6th volume of the *Quarterly Journal of Agriculture*.

(From the Mark Lane Express, December 15, 1851.)

We have no doubt that very many of the persons, whose attention was attracted to the reaping-machines exhibited at the Show in Baker-street during the past week, were mystified by the statements and counter-statements put forth in reference to the "sole right" of manufacturing "Hussey's" reaping machine. We therefore think we shall be doing some service by explaining the facts and exposing the fiction with which the question in dispute has been surrounded. It having been some time since enumerated amongst other beneficial results of the Great Exhibition, that through its instrumentality the American reaping machines had been introduced into this country, we took occasion to remark, on the 13th October last, that such statement had been made in error, inasmuch as one of "Hussey's" machines had been brought over from America at the instance of Mr. Tollemache, one of the members for the county of Chester; had been taken up by the Messrs. Garrett, of Leiston Works, who had been engaged in making a machine with some improvements which suggested themselves, before the meeting of the Royal Agricultural Society at Exeter, in July 1850, where they intended to exhibit it, but were unable so to do in consequence of some informality in the entry. In order to clearly understand the question, which is extremely simple when divested of mystification, it will be necessary first to look at the *facts*, and next to the *law* of the case. In the year 1850, Mr. Ellis, of Liverpool, imported one of "Hussey's" reaping machines from America, at the instance of Mr. Tollemache, who, during a tour in the United States, had, from observation and information obtained, arrived at the conclusion that it was the most effective implement of that description. The machine so imported by Mr. Ellis was publicly worked by him in the neighbourhood during the ensuing harvest. The Messrs. Garrett immediately commenced the manufacture of machines on that construction, and entered one for exhibition at the Royal Agricultural Society's Show, to be held at Exeter in July, 1850. They also entered and deposited one in the Great Exhibition some time previous to the arrival in this country of Mr. Hussey's own machine for the Great Exhibition. It should be observed that neither Mr. Tollemache, Mr. Ellis, nor the Messrs. Garrett, took any steps to secure to themselves the sole right or privilege of making these machines, or of obtaining any especial advantage from their introduction into this country. One of "Hussey's" machines, with certain alterations and improvements, made by the Messrs. Garrett, was worked throughout the late harvest in the county of Suffolk, as already notified to the readers of the *Mark-lane Express* in a document signed by a large number of influential farmers in that county, expressing their satisfaction at its efficiency. Mr. Hussey's own machine was also worked in various parts of the country, and, in one instance, in successful competition with M'Cormick's reaping machine. Mr. Hussey himself was in England for, we believe, some months, having sailed from Liverpool about the 26th November, during which period not a word of objection was raised by him to the introduction and use of his machine by the Messrs. Garrett. On Monday last, the 8th inst., however, an advertisement appeared in the *Mark Lane Express*, we believe for the first time, setting forth an agreement between Mr. Dray and Mr. Hussey, in which Mr. Hussey appoints Mr. Dray as sole and exclusive manufacturer and vendor of his reaping machine; Messrs. Dray and Co. giving notice in the same advertisment that "they will commence legal proceedings against all persons assuming Mr. Hussey's name to enable them to vend their imita-

tion of his celebrated reaping machine." The date of the agreement between Mr. Dray and Mr. Hussey is not given. We will now state the *facts* succinctly, in order the more readily to see the bearing of the *law* upon the case.

One of "Hussey's" machines is imported by Mr. Ellis early in 1850, and is publicly worked in the harvest of 1851. A machine upon the same principle of construction, but with some improvements, is made by the Messrs. Garrett in 1850, is exhibited at the Great Exhibition, and is publicly worked by them in Suffolk throughout the late harvest, and, as we shall presently show, with the sanction and approval of Mr. Hussey himself; and on the 8th of December, 1851, direct two years after the introduction of the machine into this country, and after it had been publicly worked, an attempt is made under the cover of an agreement without a date, to monopolise the manufacture and sale of the implement, *to the injury of the agriculturists of the United Kingdom*. We say an attempt; for anything more futile than the idea of sustaining a claim to the exclusive right of making or vending it, under the circumstances, could not be entertained. Such a right could only be secured by patent or registration; and it is an established point in patent law that an inventor, or the introducer of an invention, who stands in the same position with the inventor, loses his right to a patent by using, or allowing others to use his invention publicly. Here, however, the claim is not made under the cover of a patent, but under a mere agreement between two parties, who seek to deprive the public of their rights, for their own private advantage—an agr e-ment which, we have no hesitation in affirming, so far as Messrs. Dray and Hussey are concerned, is not worth the paper it is written upon, and so far as the Messrs. Garrett or any other implement-makers in this kingdom are concerned, does not in the slightest degree prevent them from making reaping machines upon Hussey's principle. We cannot refrain from observing that we think it would have been more consistent with good taste had the Messrs. Dray abstained from the use of harsh language, which under no circumstances adds strength to a cause if a good one, and if a bad one, militates much against those who indulge in such expressions. They announce that they caution the farming world against "the unprincipled advertisements put forth by other houses making use of the name of Hussey;" and they further add that "one house pretends to be manufacturing under the direct superintendence of Mr. Hussey, that gentleman at the present time being far on his way to America." Now it is impossible not to see that these remarks are levelled at the Messrs. Garrett, and although their reputation for honourable dealing needs no support from us, we have taken it upon ourselves to make some enquiries, and we deem it but an act of justice to make known the following facts in answer to the charge above referred to:—

That Mr. Hussey's visit to the Messrs. Garrett was not merely a "social visit," but a *business* one, inasmuch as an agreement was actually entered into between Mr. Hussey and the Messrs. Garrett, upon certain points in reference to Hussey's machine in England, and in other countries, but which, for the reasons above stated, they were advised by their professional men could not be sustained; however, in a letter dated Liverpool, Nov. 21, a few days only before his departure for America, Mr. Hussey says in a letter written to Mr. Garrett, "I knew, as a thing of course, that you would make and sell *my reaper*; and whether it was for my benefit or not, I wished you to make it in the right way for my own credit, as well as for the benefit of the farmer. I never was sanguine, neither am I now in the expectation of ever deriving any considerable profit on this side of the water, but I want Hussey's reaper to be kept in credit, and hope there will be no conflicting interest amongst manufacturers and agents to cast a shade upon it even if I get nothing." Taking all these circumstances into consideration, we cannot but regard the attack upon the Messrs. Garrett as unjustifiable, and we repeat our assertion that it is open to every agricultural implement maker in the kingdom to make Hussey's machines without let or hindrance; and they may consider themselves in great measure indebted to the Messrs. Garrett for that privilege.

ATMOSPHERIC INFLUENCES.

BY FRANKLIN COXWORTHY, AUTHOR OF "ELECTRICAL CONDITION."

Of the atmospheric influences of bye-gone ages we have no other record than is afforded in the remains of the animals of that period. These mostly possessed a powerful crushing or masticating apparatus, which enabled them to subsist on branches of trees; whilst in those of later date may be traced characters progressively partaking of the nature of the present class, which feed almost entirely on food of a nitrogenous property. The vegetable kingdom may, therefore, be supposed to have undergone a change calculated to produce these results; and it is within our remembrance that, when a boy, in Devon, the nature of the potato was totally different to the root now raised there—it having almost lost its mealy character; whilst grain and all other plants of a nitrogenous kind have increased in quality in a corresponding ratio. That this change is referable to some cause is beyond doubt; and we think that its demonstration is both simple and easy, without the slightest departure from the rule that has governed our previous inquiry—a strict adherence to facts.

On the operation of combustion and respiration we need not dilate, it being well determined, that for every 27 parts of carbon converted into carbonic acid, 73 parts of oxygen are abstracted from the atmosphere; whilst hydrogen combines with oxygen in the proportion of 1 to 8. Coals, wood, and turf or peat—the principal articles of combustion—contain a considerable proportion of hydrogen; but in order to simplify the question, although our argument will damage thereby, these materials will be considered as composed of carbon only: any estimate, in fact, that may be formed of the amount of ammonia generated being little more than approximative, and must unquestionably fall very far short of the actual quantity.

Of the amount of fuel consumed before the potato disease made its appearance we have not by us any statistical account; but it may be observed that Newcomen's engine was introduced in the year 1705; and with the improvements that have been made on it, including those by Watt, continued in use only as a land-engine until 1807, when Fulton practically applied the steam-engine to the propulsion of a boat; and from that period steam-vessels have progressively increased in number; and with their increase steam has been applied to locomotive and other purposes, consequent on the rapid improvements towards civilization that have been developed within these few years; whilst furnaces of all kinds have kept pace with the appliances of steam. That the potato disease has increased in virulence with the increased consumption of fuel is unquestionable. We will, therefore, endeavour to trace what are the conditions necessary to the production of this epidemic.

The following statement, on the authority of Professor Ansted, will give an approximative estimate of the amount of coal raised, and, therefore, consumed in the world; and to it is added the respective coal-fields:—

	Tons.	Square Miles.
British Islands	32,000,000	12,000
France.....	4,150,000	2,000
Belgium	5,000,000	520
Spain	550,000	4,000
Prussia	3,500,000	1,200
United States	4,000,000	113,000
British North America	—	18,000
Total	49,200,000	

Or about 50,000,000, to which is to be added wood, peat, and other combustible materials, also the carbon consumed in respiration, which certainly may be taken at 10,000,000 more, making a gross total of 60,000,000 tons; $60 \times 73 = 4380 \div 27 = 162{,}000{,}000$ tons of oxygen abstacted from the atmosphere; and if to this be added the 60,000,000 tons of fuel or carbon, it will give 182,000,000 tons of carbonic acid generated. Now, it is self evident that for every volume of oxygen abstracted from the atmosphere, there must be four volumes of nitrogen liberated; and although it is of rather less specific gravity than oxygen, its weight may be assumed at four times 162, or 648,000,000; and as this gas combines with hydrogen in the proportion of 5 to 1, we shall have a general annual increase in the amount of ammonia generated in the formation of snow—the *rationale* of which is given in No. VIII., and brought down to the earth, of no less a weight than 777,000,000 tons. That rain and *snow-water* invariably contain ammonia is unquestionable; and although our principles were communicated to the editors of the *Philosophical Magazine* so far back as 1844, in the Journal for October, 1851, will be seen an article, extracted from the *Comptes Rendus*, expressive of surprise that in hailstones, analyzed by the writer, should be found ammonia and black matter, analogous to the carbon of the vegetable kingdom.

That such an amount of accumulating matter, to which should be added the increase of ammonia of putrefaction, should induce a putrefactive disease in a non-nitrogenous plant, under particular conditions, may readily be conceived; and it is but reasonable to assume that the amount of moisture that passes through a plant should be in proportion to the evaporating influence in the atmosphere. In 1846 and 1847, when the evaporating influence was great, and the earth was negative, the potato disease prevailed; but with a similar amount of evaporation in 1849, and the earth positive, it totally disappeared. If, then, our position be correct, the remedy for this epidemic is self-evident—the abstraction of the ammonia being all that is requisite; and in 1847 we suggested to a friend that, for the preservation of his crop, he should plant the esculent between cabbages—a highly nitrogenous plant; and in half of a plot of ground which he so treated, he had not half a dozen rotten tubers; whilst in the corresponding half, but without the cabbage, he had not as many sound. We are also informed by Mr. Bickerton, an experimental farmer in Wales, that he has tried the plan with singular success.—Mining Journal.

THE LONDON FARMERS' CLUB.

"ARE THE INTERESTS OF LANDLORD AND TENANT PROMOTED BY THE LAW OF DISTRESS FOR RENT?"

The usual monthly discussion took place on Monday, Dec. 8th, at the Club Rooms, New Bridge-street, Blackfriars: subject, introduced by Mr. Shaw, of the Strand, "Are the Interests of Landlord and Tenant promoted by the Law of Distress for Rent?" The chair was taken by Mr. Payne, of Felmersham.

After a brief opening address from the chairman,

Mr. SHAW rose to introduce the question. He said: Gentlemen, there are many of you who recollect the first occasion on which the question of tenant-right was submitted to the club, in this room. You also recollect the impression which the discussion of that question created, both in this room and out of it. The impression in this room was so favourable that a resolution was passed, on the occasion of the first discussion, in favour of the principle; and the committee proceeded to give notice of a special general meeting of the members, in order that it might be discussed before the club at large. That meeting took place; and to it were invited the chairmen and secretaries of all the local clubs in the kingdom, and also the chairmen and secretaries of all the local agricultural societies and of all the protection societies then in existence; the object being to afford as ample an opportunity as possible for its being again discussed, that the principle contended for might be made known as widely and extensively as possible. It will be recollected that on the occasion of the general meeting, our friend, Mr. Bennett, who has always taken a lively interest in the subject, proposed that a committee should be appointed to communicate with members of Parliament. I well remember that I differed from him on that question, thinking it premature then to take such a step. But the sense of the meeting was against me. A committee was appointed; and I need scarcely say how beneficial have been the results. I believe that no other question has made such rapid progress, in so short a time. I am, therefore, in one sense, glad that I was defeated. I think, however, that both my friend Mr. Bennett and I were partially right and partially wrong. He was right in proposing a step which gave to the question greater publicity, and I was right in my notion that the time had not yet arrived when we could hope for legislation. Now I have made these few introductory remarks because I feel that there is a very material distinction to be drawn between the question of tenant-right and that which I am about to introduce. If I were not sanguine on the occasion referred to, as to the speedy adoption of the principle of tenant-right, I confess I am much less sanguine with regard to the question now before me. And I will tell you why. It is well known that, although tenant-right has not been adopted to the extent to which we could desire to see it adopted, the principle has been established, and is in operation in a very important locality. It is well known that, acting on the principle of tenant-right, the landlords and tenants of the county of Lincoln, and of part of the county of Nottingham, have made such progress, that a gentleman, who certainly knows what good farming is, after visiting the Lothians of Scotland, gave the palm to Lincolnshire. We are able to point to Lincolnshire and say, "There the principle of tenant-right is to be seen in practice;" and this is an argument which must always go a long way, not only with those who are usually termed practical men, but with all who seek to arrive at a right conclusion from sound premises; for however we may dilate and theorise with regard to principles, no one can pronounce principles sound till they have been tried and proved by practice. Hence it is that I do not feel sanguine as to any immediate practical result from the discussion of the question which I have to submit to you this evening. But I feel that there have been occasions on which doubts have arisen: there are persons who entertain doubts whether the power of distress for rent is so advantageous as might be supposed; and believing, as I do, that there is a growing feeling in that direction, I think it may not be improper, quietly, calmly, and dispassionately to consider the abstract principle, and see what can be said on the one side and on the other. And I am quite confident that on this subject, as on all others, if truth and justice be on its side, and it be kept constantly before the minds of those who are competent to judge, the result will be ultimately a successful one. Having made these preliminary remarks, I will now proceed to submit to you the observations which I have put on paper, on this question; and although, when you enter upon a discussion on any question, it is difficult to pursue an absolutely unbiassed course, yet I do hope that when, through the usual channels, my own remarks, and those which follow, come before the public, they will be found tempered with such discretion and moderation, that no party will be enabled to say what was once said after the question of tenant-right had been discussed in this room—but which remark has, I hope, since been controverted—that in seeking for tenant-right we desired landlord-wrong. (Hear, hear.) For myself, I repudiate, as I always have done, and as I am quite sure you will all do, any such intention. (Hear, hear.) I feel, however, that in these days of altered circumstances, as compared with past times, abstract questions may fairly be discussed; and we may reasonably inquire whether any particular alteration would be for the benefit of all parties,

without justly exposing ourselves to the charge that we are seeking to deprive any class of persons of the rights which they are fairly entitled to possess. (Hear, hear.) I will now proceed to read what I have committed to paper:—"Historians are not agreed where or from whence the power of distress was introduced; it is, however, perfectly clear that from the earliest period of our history this power was used by the lords to compel the tenants to perform those services which they had engaged to render by way of rent or retribution for their farms, and was substituted for the more serious consequences which at an anterior date attended the non-performance of those services, namely, the absolute forfeiture of the land or farm. The distress was, originally, however, not so much a remedy as a means of obtaining a remedy, inasmuch as the goods remained in the possession of the distrainer as a pledge, he being bound to restore them in the same state as when he took them. Notwithstanding this power was so limited, being arbitrarily exercised by the lords, it not only became oppressive to the tenants, who, in disputes between neighbouring lords were frequently distrained upon by both, but enabled them to compel great numbers of vassals to take the field against their prince, thereby disturbing the peace of the kingdom. So great and insupportable did the abuse of this power become, that towards the end of the reign of Henry the Third, there were laws made to regulate the mode of making distresses, and not permitting the lords to extend this remedy beyond the object it was first intended for, which was no more than to empower them, by seizing the chattels, to oblige the tenant to perform his services; the detention being no longer lawful than while the tenant refused to perform the services which he had engaged to render. This power, although in some measure limited by the passing of the statute before referred to, was, as we learn from Barrington, still the means of great oppression; and various acts for the protection of the tenants were passed from time to time, up to and including the 1st and 2nd Phillip and Mary, c. 12. From the last-mentioned period down to the present time, the tendency of legislation has been to give more extended powers to the landlord, and to render the law of distress a more speedy and powerful remedy in enforcing the payment of rent. Distresses for rent, being in the nature of pledges, the distrainer had no power to sell them at common law until a power of sale was first given, under certain regulations, by the 2nd William and Mary, s. 1, c. 5, only about 160 years ago; and so strictly was the principle of a distress being regarded as a pledge maintained, that down to the passing of the statute last mentioned, sheaves or shocks of corn could not be distrained, because some damage must accrue in their removal, although a cart loaded with corn might be, as that could be safely restored; and until the statute 11th Geo. II., chap. 19 was passed, little more than 100 years since, landlords could not distrain corn or grain growing, or other products of the earth, or cut or gather them when ripe—which by that statute they are now enabled to do. From this it will be seen that for a very long period, and in accordance with the common law, the power of distress was regarded, and, in fact, only operated as a means to an end; whilst within the last century and a half, various statutes have, in the words of Blackstone, 'much altered the common law as laid down in our ancient writers.' Now, although I in a great measure concur in the high respect entertained for the common law by the learned commentator on the laws of England, who describes it as 'the first grand and chief corner stone of the laws of England,' still I do not regard it so sacred but that it may be beneficially altered by 'statutes,' provided such statutes are framed in a spirit, and in terms calculated to afford an equal measure of justice to all those whose interests may be thereby affected. I trust, however, I shall stand excused, if, looking at the period when some of these alterations in the common law were made, and the constitution of the legislature *when they were* made, I incline to the opinion that the tendency of legislation was more in accordance with the ancient spirit of feudalism than with those equal rights and privileges which cannot fail to mark the progress of an age advancing in civilization and intelligence. The third volume of *Blackstone's Commentaries* is devoted to the consideration of 'Private Wrongs,' and the first chapter is entiled 'Of the Redress of Private Wrongs by the mere Act of the Parties.' He defines 'Private Wrongs' as 'an infringement or privation of the private or civil rights belonging to individuals, considered as individuals.' He then enumerates several modes of redress of private wrongs, the first being 'that which arises from the sole act of the injured party;' and he mentions five cases in which a man may seek redress by his own act. 1st. The defence of one's self, or the mutual defence of such as stand in the relation of husband and wife, parent and child, master and servant. 2nd. Recaption or reprisals under certain circumstances, and without breach of the peace. 3rd. Entry on lands and tenements when another person without any right has taken possession thereof. 4th. The abatement of a nuisance; and 5th, he says, 'A fifth case in which the law allows a man to be his own avenger, or to minister redress to himself, is that of distraining cattle or goods for non-payment of rent or other duties,' which, he states, 'is intended for the benefit of landlords, to prevent tenants from secreting or withdrawing their effects to his prejudice.' It is apparent, therefore, from Blackstone's having placed distress for rent under this class of remedies, that he regarded it as one of those cases in which it was necessary that the law should allow a man to be his own avenger, or to 'minister redress to himself;' and in discussing the question this will be a most material issue. There can be no doubt that common and statute law may be pleaded in justification of the remedy of distress for rent; but the experience of every session of Parliament proves that such a plea is not maintainable at the present day, provided the altered state of circumstances demand an amendment. No rule of law has been more scrupulously respected in the relations of landlord and tenant than that 'whatever is fixed to the freehold becomes a part of

it;' and consequently that buildings erected by the tenant for the carrying on the business of his occupation could not be removed. The question has, however, been so frequently and effectively discussed, that at length the rule has been abrogated by an act passed in the last session of Parliament. That portion of the report of a committee of 'The Society for Promoting the Amendment of the Law,' entitled 'Report of the Committee on the Law of Property as to the Law of Landlord and Tenant,' applies so strongly to many other cases which mainly depend upon national usage and statutes passed in bygone days, that I cannot refrain from calling your attention to it. It is there stated that 'The rule that persons entitled to limited interests in land shall not take from it anything which has once been fixed to or united with it, was not carried to a very great extent by the common law, but owes its chief importance to the statutes concerning waste, passed as early as the reigns of Henry III. and Edward I. At those periods the views commonly held concerning property in land, and the relation between landlord or reversioner and tenant, were very different from those which now prevail; and we may fairly attribute the extensive application of the rule in question, and the severity with which it was enforced, to the very slight importance then attached to the tenant's limited interest as compared with the landlord's freehold, to the small value of any improvement or annexation which the tenant could make, and to the fact that laws were made by the landlord only. Above all, the landlord and tenant were not looked on simply as parties to a contract concerning property in which the rent on the one hand and the usufruct of the land on the other formed the only terms. They had personal relations which placed the landlord in the condition of a superior, the tenant in that of a dependant, and prevented the notion of a contract (which is founded on equality) from being fully developed. It is hardly necessary to point out how completely the state of things is altered. In point of value and of perfection of title, chattel interests now differ from freeholds only in duration: the ownership of the freehold gives no advantages, unless accompanied by superior wealth; the landlord brings the temporary usufruct of his land into the market, just in the same manner as the merchant brings his wares, and the only advantage he has, viz., that of possessing a commodity of which there is a limited supply, is one strictly commercial. The relation of landlord and tenant is really the same as that of two parties to a contract concerning a chattel, one of whom bargains for the use of the chattel for a given time, the other for a pecuniary return.' I do not mean to prejudge the question now under discussion by using this statement as an argument for an alteration in the law of distress for rent: I only refer to it as containing a clear and truthful description of the altered relations of landlord and tenant, and the presumed necessity for such amendments in the law as may render it better adapted to the present relative condition of both parties. The condition of the tenantry in Scotland was at the comparatively short period of 300 years back most lamentable. It appears from a 'Treatise on the Law of Landlord and Tenant,' by Robert Hunter, published in 1803, that—

"Besides the personal services, which of course greatly interfered with their management of their own farms, they were subjected to the still greater disadvantages of uncertainty of possession and insecurity as to the enjoyment of the produce of their land. Though holding a lease for a term of years, which was binding on the granter and his heirs, they were liable to be ejected by a purchaser, or by the creditors of the landlord attaching his estate, and the fruits reared by them, although in value greatly beyond the rents which they were owing, might be seized in payment of the landlord's debts. The first of these evils was remedied in Scotland by the celebrated statute of James II., 1449, c. 18. Its terms afford a proof of the miserable condition of the tenantry, whom it describes as the 'puir people that labouris the grund;' and it enacts that, for their 'safetie and favour,' 'they and all utheris that hes taken, or sall take landes in time to cum fra lordes, and hes termes and zieres thereof, that suppose the lordes sell or annalzie that lande or landes, the takers sall remain with thair tackes into the ischew of thair termes quhais landes that ever thay landes cum to, for siklike maill (rent) as they took them for.' The effect of this statute was to enable tenants holding tacks for a term of years to continue in possession of their farms till the issue of their lease, and at the rent stipulated therein, against purchasers, creditors, and all others into whose hands the lands might come, except the landlord's overlord entering to possession by default of the landlord—an exception which subsists to this day, and which, though practically of little importance, as an overlord's entry scarcely ever occurs, is in principle unjust and inconsistent with the spirit of our present enlightened system of legislation. To entitle a tenant to the benefit of this statute, he must have a *written* lease, with a *definite* term of endurance (though there is no restriction as to the *length*, provided it be definite), and specifying a certain rent, which must not be altogether elusory, and he must have entered to possession of the farm under this lease; but, holding such a lease, every tenant, since this admirable enactment, can with confidence expend his capital in the improvement of his farm, in the perfect certainty that he will continue in possession till the expiry of the period stipulated in the tack. The absolute necessity of such a provision is obvious; and it formed in Scotland the first step in the improvement of agriculture.

"The other evil mentioned above, of the liability of the tenant's crops to be distrained for his landlord's debts, was remedied by a statute passed twenty years after the act 1449, and in the reign of James III. (1469, c. 36), having for its title, 'That the puir tennentes sall pay na furthur than their terme's maill for their lordis debt, be the breife of distresse.' It enacts, that to 'eschew the great herschip and destruction of the kingis commons, maillers, and inhabitants of lordis landes thrugh the force of the breife of distresse'—'fra hynefurth the puir tennents sall not be distreinzied for the lordis debtes, furthur than his termes mailles extendis to,' and that 'gif the creditor takes the termes maill be virtue of the breife of distresse, it sall not be leifful (lawful) to the lord to tak it againe.'

"By these two statutes the condition of the tenant, so far as regards his legal rights, was placed on nearly the footing on which it stands at present."

The landlord in Scotland has also hypothec or power of distress for rent over the crop and stocking on the farm, which is thus briefly described in an article in

the Journal of the Highland and Agricultural Society of Scotland:—

"The hypothec over the crop is only for the rent of the year in which it is raised; while that over the cattle applies to them for the rent of the current year, and subsists for three months after the year has expired. In virtue of this hypothec, the landlord has a preferable right to the crop and stocking for payment of his rent, to the exclusion of the creditors of the tenant, excepting as to debts due to the Crown, feu-duties owing to the superior, wages due to farm-servants, or persons hired to reap the crop, whose claim is preferable to that for rent, and the funeral expenses of a tenant deceased. The right of hypothec, too, not only subsists while the grain, &c., remains on the farm, but is available against intromitters who may have removed it, although they be *bona fide* purchasers who have paid the price to the tenant. If the removal be discovered *de recenti*, the landlord may recover the property *via facti*; otherwise, he must take judicial measures; and he can only recover from the immediate purchaser, or intromitter, and not from any third party to whom it may have been sold. An exception to the landlord's right of recovery has, for the advantage of commerce, been admitted in cases of sale *by bulk* in public markets; the purchaser in such case being secure, although the tenant's rent may be unpaid. This exception was recently attempted to be extended to sales *by sample;* but it was decided, both in the Court of Session and the House of Lords, that the protection belonged exclusively to sales by bulk; in which case, the removal of the subject itself from the farm gave the landlord warning to interfere, and put his right of hypothec in force."

Having now given a brief account of the origin of the law of distress for rent, and referred to some of the alterations and extensions of its powers, I will submit a few points for your consideration, in order to raise a discussion upon the question, 'Are the Interests of Landlord and Tenant promoted by the Law of Distress for Rent?' It appears to me that there are three parties interested in the economical consequences of the law of distress for rent: 1st, The landlord; 2nd, The tenant; 3rd, The public at large. The landlord has *primâ facie*, the first and most prominent interest in the privilege which the law of distress confers upon him; although anterior to the statutes of William and Mary the goods distrained for rent could not be sold, yet in certain cases, as for a debt due to the Crown, or for an amerciament at a Court Leet, sale might be made, for which Blackstone assigns a reason, and attempting to draw a distinction between such cases and a distress for rent, he says—'Because, in the case before referred to, it is in the nature of an execution to levy a legal debt.' There is, however, in reality no distinction; and distress for rent is, in fact, a power 'in the nature of an execution to levy a legal debt,' that is, a debt which has been proved to be legally due and owing before some competent legal tribunal—and, for one year's rent at least this power gives the landlord priority over all other creditors, and without going through that course of proceeding for its recovery which *they* are required to do. This is in itself a privilege of sufficient magnitude to render it unnecessary to inquire whether there may be any other collateral advantages; and, indeed, so great, that it appears difficult to show any disadvantages which can outbalance such an advantage. As, however, we have to look at both sides of the question, we must inquire if there be any such disadvantage; and the first which occurs to my mind is, whether the knowledge that he possesses such a power does not induce the landlord to look to the amount of the rent offered, rather than to the responsibility of the tenant, inasmuch as if the tenant be possessed of a portion only of that capital which in strictness would be considered necessary to well manage the occupation, still that he will always have a sufficiency of stock upon the premises to meet the demand for rent, thereby granting the use of his land to parties who not only have not the means of improving it, but may, in fact, deteriorate its condition. I must confess I do not see any prominent inducement to the landlord to come forward and voluntarily waive so important a privilege, unless, in enquiring how far distresses affect the situation of the tenant, it shall be found that the tenant is prejudiced, and that the injury re-acts upon the landlord himself. In considering the effect of the power of distress upon the tenant, I shall, in the first instance, refer to that which is commonly regarded as an advantage—namely, that, in most cases, he is permitted to hold half a year's rent in hand; a privilege which, it is presumed, the landlord would not grant, if he did not possess the power of distress. Now, although in some special cases the giving credit for rent may be the means of aiding an industrious thrifty man who may be short of capital, I should regard the system to be unsound in principle; but, let me observe, I would not, by any means, were it in my power, make a sudden alteration in the present practice—I am too sensible of the evils resulting from such abrupt and sweeping changes. If there be one more fertile source of evil than another at the present moment, operating as an impediment to *good*, I do not mean the so-called *high*, farming, it is the want of sufficient capital by the tenantry, speaking of them as a body. This system of giving credit for rent tends to encourage the tenant to embark in an occupation beyond his capital. The man who is not prepared to pay his first half year's rent when due, without reference to the coming crop, cannot be in a situation to meet the difficulties of a bad harvest. In fact, to the amount of that payment, be it what it may, he is relying upon borrowed capital, repayable by force of law at a moment's notice. I am aware that this custom prevails upon many estates where the tenants would not come under the scope of these remarks; but, of course, they avail themselves of the privilege awarded. I only refer to cases where the half year's rent is really an object to the tenant as part of his capital. I consider that in this respect the law of distress, by inducing the landlord to adopt such system, operates prejudicially to his interest. I apprehend it will not be denied that capital does not flow so rapidly and abundantly over the land as the friends of the agricultural interest would desire to see it. Can any measure operate so prejudicially in preventing the tenant from borrowing a portion of the capital to work his farm as the power of distress? Who will lend money to an

individual who may have virtually an execution put in at any moment to sweep off all the produce of the farm? In ordinary debts or obligations, if a man starts fair and does not give a voluntary preference, the necessary legal proceedings must be had recourse to before execution can be obtained, and all the creditors have a fair chance; but the man whose property is subject to a distress is in the same situation as he who has a judgment entered up against him, upon which execution may be issued at any moment, and a great part or all of his effects swept away. How would any man of business act, upon being asked to lend a sum of money to a person against whom a judgment was in force? And is not the tenant subject to a power of distress much in the same situation? If we look at the general credit which the tenant may fairly expect to obtain, will it not be equally influenced by his being subject to this power? Will it not be contracted by the knowledge of the fact that goods supplied are liable to be taken summarily for rent, without the creditor having the chance of receiving a proportionate share in the event of a failure, as he would do in other cases? The pecuniary transactions of farmers generally are more of a ready-money character than in other occupations; and I much incline to the opinion that the practice originated in a feeling of insecurity, arising from the fact of the tenant's property being subject at any moment to an impending execution. Again—what is the situation of the man as regards his independence of mind, and freedom of action, whether socially or politically speaking, who knows and feels that, however great the confidence he has in his landlord, still changes unforeseen, and circumstances not anticipated, may occur; and, be they what they may, it is an actual existing fact that, so soon as his rent is due, if not paid on the appointed day he is liable to have his property seized and sold; and if we look at the covenants sometimes introduced into leases, in which heavy penalties are imposed for the infraction of them, and made recoverable by distress, it does appear to be a stretch of power far beyond the original intention of such a remedy. In respect to the interests of the public in this question, I believe numerous instances can be adduced in which tenants have obtained a credit and standing which they never could have done had not the landlord possessed the power of distress. Too frequently admitted into an occupation wholly disproportioned to the capital they possessed, and not uncommonly suffered to fall largely into arrears of rent, they have run into debt with tradesmen and others to a heavy extent, and ultimately the goods supplied have been swept away to satisfy the landlord. But one of the gravest consequences resulting to the tenant having capital from the power of distress possessed by the landlord, consists in the competition into which he is brought with parties having little capital, who ignorantly or recklessly bid a price for land which the tenant with capital cannot afford to pay, and submits to conditions to which he ought not to subject himself; but who would not be accepted by the landlord were he not clothed with such powers. It is natural for the public to inquire, why should land be better protected than property of any other description? To place all upon an equal footing, the tradesman who supplies a tenant with goods should have a judgment for the amount at a given period, so that if he saw fit he might issue execution on the day fixed for payment if default were made. I am well aware that it will be said the tradesman supplies his goods with a knowledge of all the circumstances; but that is no explanation of the principle that affords a peculiar privilege—if privilege it be—to a thousand pounds invested in land, which is denied to a thousand pounds invested in goods or manufactures of any description. I may observe that I was induced to bring forward this subject on reading the report of the Society for the Amendment of the Law, which I have already referred to, and particularly that part of it which states that 'the landlord brings the temporary usufruct of his land into the market, just in the same manner as the merchant brings his wares; and the only advantage he has, viz., that of possessing a commodity of which there is a limited supply, is one strictly commercial. The relation of landlord and tenant is really the same as that of two parties to a contract concerning a chattel, one of whom bargains for the use of the chattel for a given time—the other for a pecuniary return.'" Having occupied your attention much longer than the very general remarks which I have been able to offer to your notice on this question deserve, I submit it to your consideration, in the hope of eliciting such a discussion as may throw a light upon its real merits.

Mr. C. JOHNSON said: It was always with great regret that he even apparently differed from his excellent friend Mr. Shaw, but having now for some years been engaged in efforts to promote the interests of tenant farmers, whom he regarded as his clients, though he had no retaining fee (laughter), he could not compromise what he considered to be their true interest by any attempt to catch their applause. Whatever question his friend propounded, he was always inclined to think it must have some reference to the interests of tenant farmers; but he must confess that if it were proposed even by him to take steps for securing the abolition of the right which the landlord now possessed of distraining for rent, he could not bring himself to vote in the affirmative. In any case like that under consideration, it was always of vast importance to ascertain who were the parties really interested in the suit. A little reflection would show that the parties interested in this case were not tenant farmers with ample capital, not those who took farms with sufficient capital for all the purposes of cultivation, for to them it mattered not whether the landlord possessed the power of distress or not, seeing that they were both able and willing to pay their rent as soon as it was due. The question concerned only those farmers who took farms without having sufficient capital for their cultivation, and who were therefore obliged, as Christmas approached, to tell the steward the real truth of the case. Let them suppose him to be the advocate of parties so situated, and to go to the steward to ask on their behalf such consideration and accommodation as one English-

man might in such a case expect from another. The strongest and most powerful argument he could use was this—that if the landlord consented to give the accommodation, he would at all events be perfectly safe; that there was abundance on the land to make him secure—that at any time he could seize for his rent; that if he chose to give six months' accommodation he would not thereby incur any risk. This was an argument of a most convincing nature (Hear, hear); and he believed that in nine cases out of ten the landlord would be induced by it to show a proper consideration for an honest and struggling tenant. The case of rent had been compared by Mr. Shaw to that of a simple contract debt; but he must be allowed to remind him that there was very little similarity between the two cases. The landlord did not merely trust his tenant with one hundred or two hundred pounds: he placed in his hands an estate worth perhaps thousands, or even tens of thousands; exacting from him no security in the shape of a bondsman, no deposits of any kind; but placing him, for the time, in free possession of the land. They might, by sound and substantial arguments, induce the Legislature to do away with the law of distress. But after they had succeeded, what would the landlords do? Why he would say to the tenant—"You and I stand now, sir, in a different position; and, as I can no longer distrain for rent, I must have security" (Hear). He would thus reason as a merchant would in a similar case. The merchant would say to any one with whom he had dealings, "I'll trust you with a hundred pounds' worth of goods; but if you want the use of property worth thousands I must have security." On these grounds he was of opinion that, far from doing any good, it would do great and irreparable injury to the tenants of England to alter the law of distress. As to tradesmen and others by whom farmers were trusted, it appeared to him that they had no cause to complain. They knew that the law of distress hung over the farmer's head; and, if they went too far, they had no right afterwards to turn round and complain that they were not placed on an equal footing with the landlord.

Mr. J. C. NESBIT wished to point out two or three fallacies in the speech which had just been delivered. Mr. Johnson had observed that the tenant received from the landlord property worth thousands, or even tens of thousands. A little consideration would show that this was not at all like the case of depositing goods (Hear), hear). Let him do what he could, the farmer could not run away with the land; all he could do was to inflict on it a very slight injury. Again, Mr. Johnson said that the landlord, by having the power to put in a distress whenever he liked, was enabled with safety to allow the tenant to postpone payment of his rent. He had omitted to notice that the power of distress for rent prevented the tenant from borrowing money of any one but his landlord; and that, but for the law of distress, the whole of the goods and chattels on the farm might be used as instruments of borrowing money to carry on cultivation (Hear, hear). Mr. Johnson said also that the law of distress did not affect those who had money in their pockets; but he forgot to state that its indirect operation was to cause a bidding for land, and to raise its price far beyond what it would otherwise be (Hear, hear).

Mr. MECHI said he could not see any real distinction between a landlord and tenant in the case of land, and a landlord and tenant in any other case. He apprehended that the general charge for rent was about five-and-twenty or thirty per cent. on the gross produce, or the gross amount of business; and a tenant would be much more likely to obtain credit when all the creditors were placed on an equal footing than when one particular creditor had a prior claim to all the rest. To be able to obtain credit in such cases was always a great advantage. Every one, perhaps, knew some persons who, having at first nothing but ability and integrity, had succeeded in raising themselves in the world by means of borrowed capital. He had, therefore, come to the conclusion that it was injurious to the farmer for the landlord to have a preference; and it might fairly be argued that what was injurious to the tenant would react injuriously towards the landlord (Hear, hear). One effect of the present system was to induce landlords to accept tenants who had not sufficient capital for the purposes of cultivation. On the whole, he thought it would be better for the landlord to be placed on the same footing with other creditors; better for himself, better for the tenant, and better for the country at large.

Mr. PARSONS said: When he entered the room, he did not expect to hear a proposal to abolish the power of distress for rent without providing some substitute. In what position would the landlord be placed if the present law was abolished? Living, as he did, in the Weald of Surrey and Sussex, he had seen the working of the present system; and in a district of 12 miles, though distresses had been put in, he had never in his life seen a party sold out. In the last 12 months there had only been two distresses in the district he had named, and in both cases friends had come to the relief the tenants. He regretted the introduction of such a topic at a time when landlord and tenant were both lying under such immense disadvantages, and when the landlords throughout England were reducing their rents to such a large amount (cries of "No, no," and "Yes, yes"). He appealed to all present whether throughout the whole of England landlords were not reducing their rents to a large extent (expressions of assent and dissent). As regarded distress for rent, the tenant, knowing beforehand that he would have to pay within a certain number of days after the rent became due, had no right to find fault if he were distrained for non-payment.

Mr. WALTON felt very much obliged to Mr. Shaw for introducing a subject so interesting to all parties—interesting even to those who had capital, because the power now possessed by the landlord prevented him from looking out, as he otherwise would do, for men of substance as tenants. To himself it would be a very ungrateful task to go pleading to his landlord for time. It would be far better to resort to some other person who would be likely to grant accommodation; but this the tenant could not do now, because the landlord retained a sort of feudal power over him. He believed the present system injured the tenantry, and raised their rents, on an average, three or four shillings

an acre; but he was especially opposed to it as a remnant of feudalism.

Mr. RAMSAY said he must demur to the conclusion of Mr. Pusey, mentioned by Mr. Shaw, that the agriculture of Lincolnshire was superior to that of the Lothians. No sound conclusion could be arrived at through such a visit; and he would pay as little respect to an opinion so formed as to a report of the *Times* or the *Morning Chronicle* Commissioner on the state of agriculture in a whole county, written after a few hours observation and labour. (Hear, hear, and laughter.) They must look at the report of the Committee of the House of Commons, presided over by Mr. Pusey himself, for the different usages of England and Scotland, including the payment of rent. It was of no use to talk of laws having been made by landlords. The constitution gave them their law-makers, and the laws, whether for good or evil, must be observed so long as they remained laws. (Hear, hear.) It was, he thought, undesirable to place landlords under the necessity of searching the pockets of those who offered themselves as tenants; and even if this were done, in nothing was there greater deception than with regard to the amount of capital which any one possessed. They all knew that the most prosperous farmers in this country were not all persons who began with capital. (Hear, hear.) And, on the other hand, by giving his son a large capital, a man did not make him a farmer. (Hear, hear.) He confessed he did not see any disadvantages in the law of distress for rent; he thought it was a very easy way of giving security, and far preferable to the finding a bondsman. In fact, he could not conceive an easier or more simple way of obtaining possession of a farm. It should not be forgotten, by them that the law of the land gave every landlord the power of distraining furniture for rent, and even of following goods for twenty-one days after their removal. Even if the present law were to be abolished, there must be devised some other simple and efficacious mode of accomplishing the same object.

Mr. SIDNEY said he regarded Mr. Shaw's speech as one of the signs of the times, showing that all the relations of landlord and tenant were in a state of transition, and that it was time for tenant farmers to consider what they were really entitled to, instead of taking it for granted that they held land as a favour. (Hear, hear.) He could not advocate the abolition of the law of distress, because that appeared to him to be opposed to the excellent tendency of recent legislation, which was to simplify rights. The County Courts afforded an example. Every one knew that the landlord was entitled to his rent; and when the tenant took land, he knew perfectly well that he would have to pay the rent on a certain day. Why should the tenant of land be placed in a different position from the tenant of a house? The abolition of the law of distress would immediately send the landlord to his lawyer, who would be set to work to ascertain how he could tie up the tenant (Hear, hear). He hoped the club would not allow itself to be frightened by names. One gentleman had remarked that the law of distress for rent was a relic of feudalism: another might say that something else was a sign of radicalism. For his own part he was not afraid of either feudalism or radicalism. Both had perhaps done some good in their day; but both, also, were now pretty well used up (laughter). They must look at things as they were and not take a course with regard to landlords which might react injuriously to themselves.

Mr. WILLIAMS, of Wilts, said he had foreseen that this discussion would bring out great diversity of opinion, and he had left home at great inconvenience in order to be present. Some years ago he would have been the last person to seek to take part in such a discussion, being convinced at that time, that whatever tended to uphold the landlords and aristocracy of the country would tend also to support the cultivation of the land. But the tenant farmers were now placed in another position: they had been thrown from an artificial state into a real one; and believing that now, at least, landlords and tenants were not in the same boat, the former ought not to retain the advantage which they had over the ordinary creditor (Hear, hear). Did the landlords of England come to the rescue of the tenant farmers as they ought to do? (Hear, hear). He asserted that, as a class, they had made the tenantry the scapegoats; and such conduct he considered a disgrace to them. Sir J. Graham, in his celebrated reply to Mr. D'Israeli, on the motion respecting agricultural distress, said he had perceived that since the repeal of the corn laws there had been a competition for land arising among a class of persons who had formerly never interfered—shopkeepers, retiring corn merchants, and small merchants in country towns, attracted by the pleasures of an agricultural life (laughter). Owing to this cause, the competition of farms, or the falling in of leases, had, according to Sir James, been unusually great. But why did landlords open their farms to such persons? Because they had a prior claim over the ordinary creditor. (Hear, hear.) As a practical man, he thought that the rent of England was raised 20 per cent. by that priority; and when the produce of England had been reduced in value 25 per cent., was it just that landlords should enjoy such a privilege? In his own county, in many cases, the tradesmen's bills which had been running for two years had not yet been discharged. By-and-bye, perhaps, the landlords throughout England would seize all, and the tradesmen would not get 6d. in the pound. In corroboration of the statement of Sir James Graham, he might mention that on an estate in his own neighbourhood, that of Lord Aylesbury, five or six farms had been abandoned by old tenants, because those who occupied them could not get a living; and an old tenant told him that no application was made for either of them by a practical farmer. One farm was let to a banker, another to an auctioneer, another to a shoemaker; and so on. Much to the grief of Lord Aylesbury, the farms had to be advertised. Sir James Graham said, the soldier and the plough-boy "knew the reason why" free trade was so sweet. In like manner, he knew that the reason why he himself was a free-trader was that he had a prior right to distrain for rent (laughter).

Mr. BROWN thought that, instead of seeking to get rid of the present law, they should endeavour to get a limit affixed to the power of distress. He thought the best alteration would be to limit the power of distress

to a year and a-half or two years. He had just had a case in which six years' rent in arrear had been recovered.

Mr. TATTERSALL would be glad to know why the man who invested his money in land was not equally entitled to a dividend with the man who invested his money in the funds. He maintained that to alter the law as it stood would be to confiscate the estates of the landowners of England. The gentleman who spoke last was for limiting the power: there was a wide difference between that and abrogating it altogether. Some of the speakers had spoken as if the landlords of England were a hard hearted body of men. He (Mr. Tattersall) denied that they were so. He knew many of them who would give six, or even twelve months' credit; and those who wanted more than that were not in a fit position to carry on farming operations.

Mr. SHAW then replied. He was astonished that two gentlemen, one of whom was very acute, should have started with the assumption that he had proposed to abolish the law of distress. He had guarded himself most carefully against such a charge; it was controverted by the very mode in which the question was stated upon the card; and, moreover, he stated distinctly, in introducing the question, that he did not think any useful decision could be come to without a full discussion of the subject throughout the country. His friend Mr. Johnson said that tenants with capital were not interested in the question, as they were always ready with their rent: it was to tenants with insufficient capital that the law of distress was of importance. That was just what he (Mr. Shaw) complained of—that it gave such parties an undue advantage over those tenants who did possess capital. But then, says Mr. Johnson, the landlord does not, like the tradesman, give the tenant credit for a hundred pounds or two—he entrusts him with an estate worth many thousands of pounds, perhaps. This is a fallacy. The power of distress does not protect the estate—it only extends to the rent; the estate itself is only protected by covenants in the lease or agreement; redress for the infraction of which can only be obtained in a court of law. He was perfectly astonished at the remarks made by Mr. Parsons, who, whilst he recommended that the question should be discussed dispassionately, by no means set the example himself. In the first place, he commenced by expressing his surprise at a proposal to abolish the power of distress for rent, without substituting some other remedy. Now he (Mr. S.) had made no such proposition. But he was still more surprised to hear Mr. Parsons, as a lawyer, state that the power of the law of distress had been extended in bankruptcy and insolvency, whereas the very reverse had been the case; and which disposition to limit the power of distress he (Mr. S.) regarded as the best evidence of public opinion on the subject generally. As regards the question being as inopportune as tenant-right, he would say, if it should so turn out it would speedily make great progress. His friend Mr. Ramsay animadverted upon his (Mr. Shaw's) reference to Mr. Pusey's opinion on the agriculture of Lincolnshire: whether Mr. Pusey were right or wrong, did not affect this question. He perfectly concurred in the observation, that laws must be obeyed. True; but, then, they remained laws no longer than the legislature chose, and their merits when made were open to discussion. (Hear, hear.) As regarded the observation that it enabled the landlord to assist farmers who began with insufficient capital, he must state in reply that such assistance was not business, it was friendship. Many a tradesman, beginning with a hundred pounds, and assisted by a friend with an additional fifty, had got on, and ultimately made a fortune; and if the landlord stood in that stead he ceased to be a party to a business contract, and acted the part of a friend. He might do that if there were no law of distress for rent. But then, says Mr. Ramsay, landlords sometimes ask for some return, and perhaps something which the tenant does not like. That is a most important admission, adverse to the system. He was, however, by no means dissatisfied with his friend Mr. Ramsay's opinion, upon the whole, inasmuch as he admitted, at least, that some new measure was desirable, which, while it secured the landlord, would protect the tenant. Mr. Sidney thought the alteration of the law of distress would run counter to the present course of legislation, and had referred to the county courts to illustrate his meaning. Now he really could not understand that objection. The increase of facilities for securing a speedy settlement of disputed questions was, of course, highly desirable; but then the landlord had an execution already in hand. He enjoyed an especial privilege, which another creditor could not acquire until after a full hearing of his case in a court of law. The analogy sought to be established did not appear to him to be borne out. Was Mr. Sidney prepared to give the general creditor immediate execution, in the case of ordinary contracts, which alone could put him on a footing with the landlord? As regarded the competition referred to by Mr. Williams, he (Mr. S.) did not object to tradesmen and others taking farms, and employing their capital in farming; he held such course perfectly legitimate: what he objected to was the competition of large numbers of farmers one with another, as tending to give an unfair value to land. Mr. Brown's suggestion as to the limitation of the law appeared to him extremely judicious (Hear, hear). That would be going in the direction in which the Legislature had already proceeded; and the proposal was the more acceptable because it steered clear of the difficulties which generally attended violent and rapid changes. Mr. Tattersall said he saw no reason why the man who invested his money in land was not equally entitled to a dividend with the man who invested his money in the funds. He (Mr. Shaw) could see no analogy between the case of money invested in land by a private individual, and that of money invested in the public funds, for the dividend on which the whole nation was answerable (Hear, hear). The one case was that of stock on the public account; the other was the affair of a private individual. He had hoped Mr. Baker, of Writtle, would have been present, having heard him state a case in that room, in which a number of creditors had been defrauded to a large amount, through the power of distress which enabled the landlord to recover several years' rent in arrear; nobody dreaming

that such a sum could have been owing for rent. Mr. Shaw concluded by proposing the following resolution :

" That the law of distress for rent, as it influences or bears upon the interests of landlord and tenant, is deserving of the most serious consideration."

Mr. J. C. NESBIT seconded the resolution, which was adopted unanimously.

A vote of thanks was given to Mr. Shaw before the proceedings terminated.

ANNUAL DINNER OF THE LONDON FARMERS' CLUB.

The annual dinner of the club took place on Thursday, Dec. 11, at Radley's Hotel, Bridge-street, Blackfriars. The chair was taken by Mr. W. Bennett. Amongst the company were the following gentlemen :—Lord Berners; Mr. R. Baker, of Writtle; Mr. Shaw, of the Strand; Mr. R. Smith, of South Molton, Devon; Mr. Hudson, of Castle Acre, Norfolk; Mr. G. F. Young, M.P.; Mr. Curling, of Gosmore Itching; Mr. S. Bennett, of Bickerings, Woburn; Professor Simonds, of the Royal Veterinary College; Mr. Paulet, of Beeston, Biggleswade; Mr. Allan Ransome, of Ipswich; Mr. George Jocelyn, of Ipswich; Mr. T. Knight, of Bobbin Court, Kent; Mr. T. Knight, of Edmonton; Mr. R. Hedley, of Lorton, Lincoln; Mr. Stokes, of Kingstown, Kegworth; Mr. S. Skelton, of Lincolnshire; Mr. Payne, of Felmersham, Beds.; Mr. Cheetham, of Eling, Southampton; Mr. Mandy, of Farningham.

After the company had partaken of an excellent dinner, served up by Mr. Holt in his best style,

The usual loyal and national toasts were drunk with customary enthusiasm.

Lord BERNERS then rose to propose the principal toast. He said he should make no apology for thus early intruding himself on the notice of the company, as he did so under the direction of the secretary; and if he were unable to give them any details as to the business part of the toast, the only excuse which he could offer was that he was in the position of a barrister without his brief (laughter). But, though he had nothing whatever to tell with regard to the financial position and prospects of the club, he could with the greatest sincerity declare that he wished it all the success and prosperity which it deserved (cheers). Some, at least, of those present would not be surprised to hear him say that he heartily wished the club prosperity. It would be in the recollection of many that fifteen or twenty years ago, when the Royal Agricultural Society was established, he suggested that there should also be in London a central farmers' club; feeling that the bringing together, at stated periods, of those who were engaged in the same pursuits, and the affording them an opportunity, like that which was now enjoyed monthly, of discussing matters of common interest, was necessary in order to give those who were scattered over the country similar advantages to those which were derived by manufacturers in towns from their being able to consult and unite for mutual purposes. When they had consulted and temperately discussed the state of their affairs, it was no small advantage that by means of such a club they were enabled to act unitedly. (Hear, hear). He thought the discussions which took place in that club, and in many kindred clubs, were of the greatest possible advantage. If he might be allowed to give an opinion with regard to the selection of subjects for discussion, it would be this—that they should be rather of a practical and scientific, than of a theoretical nature. (Hear, hear). It appeared to him highly desirable that from such a society as that, there should go forth nothing wild or visionary; that nothing should be done to lead others to adopt or follow theories which might not have been sufficiently considered (Hear, hear). He was sensible that he ought not to intrude any longer on their notice. He did feel, however, very strongly the advantage of their meeting for social intercourse, as they were met at that moment. He was quite sure that their meeting in that way, and calmly discussing questions connected with their interests—and when he said " their" interests he meant the interests connected with land—he was quite sure that that was the only means of arriving at the truth: it was the only means which they had of enforcing their principles and securing a favourable result. He should not doubt the prosperity of the club so long as it was partly presided over by a gentleman whom he had known for many years, and with whom he had had the pleasure of associating in the Royal Agricultural Society, and when he knew that there were many around that gentleman who were equally bold, equally independent, and equally determined to assert their views fearlessly, whatever personal consequences might be likely to follow (cheers). He should have no fears for the prosperity of this club while it was supported by men like their worthy chairman. He (Lord Berners) had never attended a meeting at which he had not insisted upon an identity of interest between landlord and tenant (Hear, hear). He had never entertained a doubt, and he felt it now more than ever, that the interests of the landlord and the tenant were identical. On that subject he could only say, that it had ever been, and would ever be his delight, as he felt it to be his duty, to cultivate the most friendly intercourse with the farmers of England, to assist in uniting them in one bond of union, and to encourage those feelings of amity and sympathy which ought to exist between the landlord, the tenant, and the labourer. Such being his desire, and such being his feelings, it was with the greatest pleasure that he now proposed

"Success to the London Farmers' Club;" and he would couple with the toast the name of Mr. Shaw—a gentleman who had ever done his utmost to promote the welfare of the club (cheers).

The toast was most cordially responded to.

Mr. Shaw, in acknowledging the toast, said the noble lord had told them that he was not acquainted with the details of the finances and the progress of the club. He (Mr. Shaw) could not think on that occasion of obtruding on them details which might be found in the balance-sheet printed for the use of members at this period of the year. He was, however, happy to be able to inform them that, although the club was not making that progress in numbers, and consequently in pecuniary means, which they could all desire to see it make, yet during the last four eventful years, in the course of which there were few institutions purely agricultural that had not in some degree suffered, it had at all events not retrograded (Hear, hear). And he could fain hope that circumstances (to which he would not then particularly allude) would by-and-bye stimulate members of the agricultural body to add not only to the numbers of this club, but of all other farmer's clubs throughout the country (cheers). The noble lord had adverted, and very properly, to that identity of interest which should subsist between landlord and tenant. Now this was one of the great and important questions, which might be discussed at clubs like this (Hear, hear); and he was free to confess that he thought a great deal was required to be done to maintain that unity between landlord and tenant which he, in common with the noble lord, earnestly desired to see established (Hear, hear). He believed that not only practical agriculture, but everything which related to the economy of agriculture, including especially the relations between landlord and tenant, must progress with the times; and he much feared that unless those relations were adapted to existing circumstances, identity of interest would not be maintained (Hear, hear). It would be useless to disguise from themselves that there were yet in what might be termed the relation of landlord and tenant many relics of ancient and bygone times ill adapted to present circumstances, but which he thought might be altered and amended, without in the slightest degree dissociating the two classes; nay, he would go farther, and say that it would tend to bind and knit closer together those two classes if the relations in which they stood to each other were judiciously amended (Hear, hear). The time had gone by for anything like that subserviency on the part of the tenant towards his landlord which existed at former periods (Hear, hear). He said this with due respect for landed proprietors; for he knew that those amongst them who went with the spirit of the times—he meant a proper spirit, and not an improper one—were prepared to adapt themselves to circumstances, and to admit the tenant to that position which his altered circumstances, his increased capital, and his general advancement required that he should occupy (Hear, hear). It would not, he believed, be denied that the tenant of the present day bore little resemblance to the tenant of 150 years ago. It would be strange indeed if farmers had not advanced with the progress of the times; and all he (Mr. Shaw) asked was, that when the tenant was possessed of sufficient capital (his capital amounting often to one-fourth of the value of the fee-simple of the land,) and possessed intelligence for the good cultivation of the soil, his rights should be respected, proper liberty of action should be conceded to him, and he should be protected in the use and enjoyment of that capital as much as the landlord himself was protected in the ownership of his estate (Hear, hear). No man was more gratified than he was at the circumstance of a landlord being deeply respected by the tenantry around him; but he liked to see that respect the result of moral obligation and moral feeling, and not that of personal control (Hear, hear). This club was established for the express purpose of enabling tenant-farmers to meet together to discuss, and to arrive at conclusions upon questions bearing upon their interests. If its discussions and conclusions as sent forth to the world caused a beneficial influence, how much greater influence would be exerted by the hundred farmers' clubs that existed throughout the kingdom, were they but carried on with that energetic spirit which he would like to see more in operation—that spirit, he meant, which was sometimes spoken against as the commercial spirit, but which stimulated men to meet together to discuss their common interests! In introducing the health of her Majesty, their Chairman had complimented the yeomanry of England as being eminently loyal. However much they might be complimented on their loyalty, he (Mr. Shaw) was exceedingly sorry that he could not compliment them on their attention to their own interests (Hear, hear). If there were one class of men in the whole kingdom more than another unconnected, dissociated, and most commonly a rope of sand for any purpose requiring union, he would tell them fairly that that class was the one to which they belonged. He had, for more than twenty years day by day, week by week, and year by year, associated with that class, and had been constantly bringing his mind to bear upon matters connected with the agriculture of this country; and although he might have peculiar notions, as they all had more or less, still he never had but one object in view, namely, that of inducing the farmers of England to unite together for the protection of their own interests, but which he regretted to say had never yet been realized (cheers). During those twenty years, as all must admit, there had occurred some of the most eventful circumstances recorded in the history of British agriculture. He had seen three associations established which were intended to unite the whole of the agricultural classes of this country, but he had never yet seen the agricultural body itself taking up any question with that spirit or union which was essential to success. He would only repeat now what he said last year and the year before, that he trusted they would in future associate together as much as possible; that they would not be so chary as they had been of occupying time in meeting together; and that when they did meet they would not be contented with valiantly expressing their sentiments, at the market-table or elsewhere, and then mounting their horses and riding home, to care no more about the matter till that day week, that day month, or perhaps not at all (Hear,

hear). This was, he believed, too faithful a description of the past course of British farmers. He did hope that in future they would take better care of their interests by means of farmers' clubs, since those interests were so important to themselves and to the country at large (loud cheers).

Mr. CHEETHAM said he had been requested to propose the health of their worthy chairman (cheers). That gentleman was too well known to need any eulogy; yet he was bound to say that he discharged his relative duties with honour to himself and with advantage to all around him (cheers). He was quite sure the agricultural interest had not a better advocate and exponent than Mr. Bennett; and if all who were engaged in agriculture were as energetic in promoting its interests as Mr. Bennett, it would not be in its present position. He had, then, great pleasure in proposing their chairman's health.

Drunk with three times three.

After the cheers had subsided, the CHAIRMAN rose and said: Mr. Vice-Chairman, my Lord, and Gentlemen,—The very kind and unequivocal expression of your esteem and good-will, believe me, is fully appreciated; and I can find no suitable words to convey to you my heartfelt gratitude, but I will not waste your time in speaking of myself, but pass on to give you "Better success to our agriculture." At this our annual banquet, when hilarity and good cheer are the order of the day, it might appear unseemly to brood at any length over our troubles, or attempt to take the gauge of the miseries which unhappily surround our different localities (Hear, hear). But, Gentlemen, if I were to give so important a toast in total silence at the present crisis, I feel I should be doing dishonour to the high position to which your committee so kindly and unanimously invited me, as well as to the cause with which we are all so closely identified. That our agriculture has not of late been successful, but languishing, and many of her sons are coming to ruin, is a truth which can hardly be disputed (cheers). Not even the high-farmers, as they wish to be styled, will venture to assert that the farming interest is in a healthy state. Some amateur farmers there are, on particular spots, who, by selling off the land everything it produces, and returning nothing to the soil, have sought to gull the public by still showing a profit in farming—a system which a mere schoolboy in agriculture would condemn, and one, in fact, justly prohibited on ninety-nine farms out of every hundred in the country (loud cheers). Other oracles of this order there are, who talk year by year of a certain balance-sheet, but take good care never to produce it. These gentlemen attend agricultural shows, and have the temerity to ascribe the distress of farmers either to a want of capital or to their vulgar prejudices in refusing (forsooth!) to adopt all the costly vagaries which they, in their wisdom, think fit to recommend (Hear, hear). What their object can be, as I am unwilling to impute unworthy motives, I will not attempt to divine. In the manufacturing world we hear of nothing of the sort. In the time of depression of the silk trade, the glove trade, or hosiery, I never recollect any wiseacre coming forward and declare that, while all was distress around him, there was nothing the matter. No, Gentlemen; this extraordinary farce has been reserved to be played off in these latter days. No wonder that the real high farmers, who by their skill and capital have literally given fertility to barrenness, and changed the face of large districts of the country, should feel outraged at such (I had almost said) monstrous impudence (great cheering). We are not, however, dependent upon any such dubious authorities as to the actual condition of agriculture. Gentlemen, whatever be your respective views of the wisdom or folly of the policy which has been recently adopted, you are all aware that we have seen within about six short weeks the close of the first three years of the operation of the new measure, and from the best authenticated sources within reach, I sincerely believe that by the 1st of February next the agriculturists of the kingdom will find themselves despoiled of about 195 millions of money, or 65 millions annually. Mr. Villiers made the saving to the consumers the first year about 90 millions; and if food now came from the skies without cost to produce it, well. But he compared it with the year 1847, said to be a year of famine; consequently there was no fairness in taking that as the basis of the calculation. In the estimate I have made I pass over entirely the first twenty years of the present century, which was mainly either a time of war or of foreign imports, and no reasonable man desires a recurrence of those high prices. But I confine myself to the average of the last eight-and-twenty years previous to 1849, during which wheat had averaged as near as may be 7s. per bush., and other farm produce in like proportion; to which state of things it is fair to presume the value of land, mortgages, rents, and the various other monetary arrangements in the country, had pretty well adjusted themselves. As compared, then, with the average of those eight-and-twenty years, the three last (I repeat it) will show a diminution of income from the soil of at least sixty-five millions a year (loud cheers). This fact, however, I know is quite inexplicable to many. Because the tenantry of the country, as one man, have not abandoned their holdings, and some farms still find tenants, induces them to suppose we exaggerate. But what, I ask, is this tenantry to do, and where are they to locate themselves to avoid the wide-spread misery (cheers)? You all know, gentlemen, that the competition still remaining for farms *is a competition for home and for country*, rather than for land; and you are aware how a man clings to his father land, and how wishfully he looks to the spot where he has spent his money, made his home comfortable, and formed his early associates (Hear, hear). Hundreds, however (I might say thousands), have been compelled to break through all these ties, and are taking their families and their little wreck of fortune to other lands, where they hope to meet with that encouragement for their industry which is now denied them in their native country; and thousands more, if they could get away, would follow. Some very considerate gentlemen are disposed to moralize on this state of things. A very respectable commercial gentleman said to me the other day, "I quite agree with you, Mr. Bennett, that the agriculturists have been cruelly dealt with by the legislature; but I sometimes think there must be a Provi-

dence in all this, as farmers, you are too numerous here, while there are immense tracks of land in the world that only await the hand of cultivation"—a sentiment I was by no means disposed to controvert. But I do contend this abates not a jot from the cruelty of those who have placed the farmers of England in their present position, having by legislation deprived them of the means to pay, and not abated scarcely an iota of their payments. Another popular delusion is the mere adjustment of rent. Far be it from me, however, to advocate exorbitant rents; for I think not only is an adjustment called for, but in most instances a great reduction is imperiously demanded, but most of all from those landlords who, whether in Parliament or out of it, have lent their aid to extinguish rents on poor land, or ruin the occupiers (cries of "Shame!"). But if it were a mere question of rent, what is to be said of that important class of the community who farm the paternal estate, left them subject to certain fixed payments to other members of the family (Hear, hear)? It would seem, however, in the opinion of some, that landlords have no rights—that the hired demagogues who have gone through the land to defame them had literally succeeded. But surely men could not talk more ignorantly or foolishly on this subject, if the entire land rental of the kingdom was all boxed up the moment received, and sent over to the transatlantic regions (loud cheers). But, viewed on its own merits, on what principle, I ask, is the estate of the landlord to be confiscated, and the money-monger to remain unscathed? These parties have about the same sympathy for the tenant as for the landlord, and betray the greatest ignorance of the relative position of both. They view the tenant as simply sowing the seed and reaping the crop, and then both coming in to share the spoil, with scarce another obligation, and little else to pay—a monster delusion! (Cheers.) The importance of the tenantry of the country to the body politic is, however, so admirably portrayed in an article which has recently appeared, that I cannot refrain giving it you. It is as follows: "The farmer is the great middleman between poverty and wealth, between labour and capital, between the many and the few. In the hour of distress the battle always falls back upon him. According to the constitution he is the responsible man! The tenant pays the wages, the poor-rates, the way-rates, the church-rates, the county-rates, and the tithes; and, directly or indirectly, he is the assessor of all but the last two. Add to these payments rent and taxes and the numerous small tradesmen who live on the tenant-farmer, and he presents himself in the light of the *universal paymaster*. In half an hour's walk, from almost every market-place in the kingdom, you find yourself under the sway of these powerful and responsible, though unassuming, potentates." (Hear, hear). "Once among green fields and hedgerows, and the tenant-farmer is your immediate superior. The road you are riding upon, the ditch you leap over, and the bridge you cross, are maintained by him. If you damage a fence, it is his. The cattle are his. The labourers are in his pay, and the cottages are in his letting. He keeps the carpenter's bench, the sawpit, and the forge incessantly at work. The village shop and the village public-house are filled by his servants and labourers. If profits fall, he has to draw on his capital to keep things going. If wages are reduced, he has to bear the odium. If disaffection spreads, his ricks are burned. When he can no longer pay wages, he must still pay rates. If there are widows, or orphans, or old men, or cripples, or sick, or vagrants, the tenant-farmer must maintain them. If they die without friends, he must bury them." (Loud cheers). Who would have imagined that this truly graphic description of the farmers of England could have emanated from the very pen that has with equal talent and untiring zeal been employed in writing down this same body of men (Hear, hear)? But it is, gentlemen, verily the production of the *Times*; and if the editor of that powerful organ shall at length say, "Hold, it is enough!" although he may have no sympathy with you in the miseries he has assisted to bring upon you as farmers; yet, as the "universal paymaster," he has evidently some apprehension. To despoil you of a revenue of about £65,000,000 a year as a class "standing between poverty and wealth, between labour and capital, between the many and the few," may, after all, prove rather an awkward affair for the nation (loud cheers). Aye, and true enough; although you, the farmers of the country, have as yet been the chief sufferers, *the many, the vast majority of the nation*, will, ere long, be most assuredly involved in the common ruin. I lay no claim to the gift of prophecy, nor do I know whether our ancient rivers are destined at the command of my Lord Palmerston to reverse their wonted course or not—(vociferous cheering)—but I am prepared to say that no adjustment of rent that is practicable, that no reduction of taxes that can be effected, and last (though not least) no improvement in agriculture within our reach, can *alone*, under the withering one-sided anti-British policy that is now adopted, restore the nation to a healthy and prosperous condition. Let me not, however, be misunderstood; the whole of these ought to be attempted, as far as practicable, in justice to the consuming public (Hear). The first duty of the State is most assuredly to lower the cost of production by all legitimate means. That accomplished, a wise and paternal Government would raise a revenue from every foreign production brought in competition with that produced by the industry of our own people; whereas duties are mainly levied now on the introduction of articles we either cannot or do not produce, absolutely raising rather than lowering the cost of home production (cries of "Shame!") Why, if the labouring people are to have bread at a low price (I will not say cheap), made from foreign flour, why not beer on the same terms, made from British barley? If they are to be fed with foreign meat without tax, why not with foreign tea? (cheers.) If we are to have no fiscal regulations to assist British agriculture, why have government interference to impede it? (Cheers.) Look at the immense Bedford Level, with a soil adapted almost beyond example for the growth of beet, where poor occupiers, with blighted wheat last year, and blighted potatoes this, are ruining by scores, and yet not allowed to grow this beet for making sugar, on pain of being exchequered. These,

gentlemen, are some among the many discouragements under which our agriculture is suffering (Hear, hear). What then, do I advise you to despair? By no means! Do I recommend you to turn Chartists and resist the laws? Oh, no! What! the farmers of England resist the laws? The very idea is a paradox; they have always been foremost to maintain them, either as peace-officers, or, if needs be, as soldiers, to rally round the crown and the institutions of the country! That such devoted loyalty should not have been a sufficient safeguard to the yeomen of this country from misrule and oppression, I confess is a most disheartening and humiliating consideration (great cheering). But I repeat it—never despair! Many have fallen, and many more must go; but a brighter day will ere long dawn upon you (Hear, hear). True enough, it is not in man to command success; but with God's blessing we may deserve it. With these sentiments I call upon you, upstanding, with three times three, to drink—"Better success to our native agriculture" (the toast was received amidst great cheering).

Mr. BAKER, of Writtle, on rising to propose "Success to the Royal Agricultural Society," prefaced his remarks on the immediate subject with some observations on the present position of agriculturists and the practical difficulties which impeded their operations. He saw little cause for hope in the schemes propounded by such men as Messrs. Huxtable and Mechi. The latter gentleman had informed him that he was that very evening going to present his balance-sheet before the Society of Arts, and had invited him to attend for the purpose of criticising it if he thought proper to do so. His reply was, that it was impossible to judge accurately on such a subject the moment the figures were stated, but that he might depend upon it everything he said would undergo a proper testing (Hear, hear, and laughter). Lord Malmesbury said, the other day, that he saw light in the horizon, and instanced a small advance in barley as affording ground for hope. If there were really light he (Mr. Baker) would be happy to recognize it; but, as regarded his lordship's statement that 28s. was almost as good a price for barley now as 32s. was 20 years ago, because the cost of production and the burden of taxation had been greatly diminished in the interval, he need scarcely remind them that it took half as much again of their produce to obtain the same sum as was obtained formerly. Money for the payment of taxes could only be secured by the sale of produce, and, having reference to that fact, he maintained that taxation was higher now than it had ever been before during the last 50 years. The toast which he had undertaken to propose, related to a society which had done much for agriculture, and which, if its energies were led in a right direction, might, he believed, do a vast deal more. He held that, in the present juncture of affairs, politics were indispensable—(Hear, hear)—and he was sorry that the Society had thrown politics overboard as regarded agriculture. If it saw its interest aright, it would throw politics overboard as regarded everything else, and cultivate them as regarded farming. With the utmost sincerity he proposed the toast.

The toast was well received.

Mr. R. SMITH, a Member of the Royal Agricultural Society, returned thanks. In reference to Mr. Baker's observations upon the course pursued, he must remark that the Society thought it best to occupy peaceful ground—to be, as it were, a temple of peace, where all parties might meet together for the promotion of the common good, on points on which all agreed (Hear, hear). In his opinion the Society was a most important national institution. The Windsor Meeting presented a display of energy, enterprise, and industry on the part of the British farmer, which must have produced a most favourable impression on the foreign visitors; and he could not but think that a society which numbered from six to eight thousand subscribers, and whose excellent publications were so extensively circulated, must be exercising a very powerful and beneficial influence (Hear, hear).

Mr. PAYNE, of Felmersham, proposed the "Smithfield Club," in connection with the name of Mr. Samuel Bennett.

The toast was well responded to by the company, and in his reply by Mr. S. Bennett,

The CHAIRMAN proposed, "Agriculture, Manufactures, and Commerce," coupling with the toast the name of Mr. Allan Ransome.

After a good response to the toast,

Mr. RANSOME said, whatever difficulties and embarrassments he might, under any circumstances, feel on being called upon to respond to a sentiment which involved such large subjects—subjects the consideration of which extended over so large a space—he did, more especially on the present occasion, regret that the Committee had not entrusted to more able hands the duty of setting profitably before them the general consideration of the close and intimate union which should ever exist between these three main branches of industry. Agriculture, manufactures, and commerce seemed necessarily, by long usage, to be associated in their minds; and the day, he hoped, had long since passed away when any one could be found who would, for a moment, deny that the interest of the one could not fail to minister to the interest of the others. He felt, with reference to the association of these main branches of British industry, that it was interesting, it was profitable, it was pleasant, at all times to view them happily together in their bond of union. He trusted that they would long and ever remain, not as the rope of sand of which one of their friends had spoken, but as the three strands of that three-fold cord which was so soundly and sufficiently twisted as to form a fitting cable for the maintenance of the prosperity of this great country (cheers). It might not be unprofitable to take a somewhat different view from that ordinarily taken of the aspect under which these three great features of British industry presented themselves for consideration. Important as they were in themselves, closely connected as they were, and accustomed as they were to be viewed respectively by each class engaged in them as the means by which they were enabled to provide for themselves what ministered to their wants and comforts, and perhaps even to their luxuries, there seemed to him to be a still higher view in which at times they might profitably be regarded. It was a

for more and higher view to regard them as part and parcel of a wise dispensation of events which ministered to the good of mankind. Far, far beyond the fact that they conduced to individual aggrandisement, was the fact that these things were in themselves missions of no ordinary character—instruments not only to supply them with that for which they individually laboured, but by which the good of the universe might ultimately be carried out, in co-operation with the designs of the great Giver of all good (applause). Agriculture had its mission, and a most important mission it was—that of providing the sustenance for thousands and tens of thousands who had to live by the bread they ate. It had also an important mission as forming part of that which, to a greater extent than anything else, tended to repeal a portion of the curse, to convert the desert into fruitful fields, and to cause flourishing produce to arise where once were briars and thorns; and whilst he who endeavoured by any means to produce two ears of corn where only one grew before, or to fatten an animal at an earlier period than such an animal was previously fatted, while such a man followed his pursuits for his own immediate advantage, he had also the satisfaction of knowing that he was at the same time carrying out a mission which would conduce to the public good (cheers). Not a less important mission was that of the manufacturer, diving deep as he did into the very bowels of the earth, taking therefrom that which in its existing state was useless, receiving at the hands of the agriculturist that which he afterwards formed and fashioned to clothe the naked, and moreover giving to raw products those forms of usefulness and features of beauty by which this world was not only enriched, but embellished (cheers). And from a rapid survey of those two great branches of industry which related more especially to the products of the soil they trod, they might turn with even greater interest to the still more important mission of commerce (Hear). Firmly did he believe that commerce was designed to be one of those high and holy instrumentalities by which the civilization of this world was ultimately to be worked out: commerce, carried on not merely in a sordid spirit of self-aggrandisement, but in order that the bounties which a beneficent Creator had spread over all lands might, by the enterprise and energy of those who were engaged in it, be made to minister to the comfort of all. And while surveying the wise order and the beautiful harmony which marked these three branches of industry, he earnestly desired for each that it might understand its mission—that it might perceive that there was something in the cause that lay deeper, and had a wider range and extent than the breeches pocket; and that all would endeavour so to feel and so to act, as to carry out, to a far greater extent than they had hitherto done, that which was the ultimate object of their several avocations. He thanked them for the attention which they had paid to him while responding thus far to the toast. He felt unwilling to trespass on their attention any longer. (Cries of "Go on.") There was, however, a subject which was so intimately connected with that of which he had been treating, that he would like for a moment to refer to it; it had reference to those by whose hands this great work, whether in agriculture, in manufactures, or in commerce, was mainly carried out—he meant the working classes. (Cheers.) He had long believed, having been much associated with those classes in their various characters—he had long thought that employers had fallen short of their duty in what should be accounted by them a privilege, in not having endeavoured more to advance the interests of those whom they employed. He spoke not simply of their physical interests; he spoke not, at least, of wages, being persuaded that the question of wages was, to a considerable extent, one of supply and demand (Hear, hear); but independently of such things, he was convinced that there were large means at the disposal of every employer, the use of which would not only minister to the comfort of the labourer, but also tend to make him a better man and a better member of society; and while great attention was being paid to the improvement of agriculture, and to the improvement of breeds of cattle, he was perfectly persuaded that no part of their time could be more profitably or more pleasantly spent than that which was spent in endeavouring by all means within their power to improve the resources, intellectual as well as social, of the working classes. (Cheers.) On that subject he trusted a better feeling was every day extending, and he hoped that in fulfilling that portion of his mission the British farmer would not be behind any other part of the community. (Cheers.)

The CHAIRMAN then proposed, "The Committee of Management," to which, after a due response from the company, Mr. J. C. Nesbit replied.

The CHAIRMAN gave "The Local Farmers' Clubs," coupled with the name of Mr. Ramsay, Vice President of the Newcastle-on-Tyne Farmers' Club.

Mr. RAMSAY, in responding, insisted with much ability on the necessity of the local farmers' clubs generally supporting the London Farmers' Club, and so endeavouring to place it in that position which it ought to occupy.

The CHAIRMAN proposed "The Secretary."

The toast was received with the customary enthusiasm.

Mr. CORBET responded, as usual, with laconic brevity. He felt very much obliged, and if the members were satisfied, he was (cheers and laughter).

The CHAIRMAN then gave the concluding toast of the evening, "The Visitors;" and this having been responded to by Mr. G. F. Young, the company soon after dispersed.

FARMERS' CLUB HOUSE.

General Annual Meeting, December 11. J. Pain, Esq., of Felmersham, in the Chair. Mr. Corbet, the Secretary, read the following Report from the Committee, which was received and adopted:—

The Committee, in accordance with an annual custom, have again to report on the position and prospects of the Farmers' Club, as gathered from the experience of the year, and the subjoined Balance Sheet of Income, Expenditure, and Liabilities incurred.

Since the formation of the club, now more than eight years

past, it has continued to receive a steady support—if not to the extent its originators may have expected, still perhaps in as great a degree as the trying nature of the times would allow. The committee feel convinced that they have the well wishes of many who, under better circumstances, would, by their presence and subscriptions, have tended more substantial aid. As it is, the new names added to the list of members more than counterbalance those retiring during the past year.

On another point the committee consider that they have every reason to congratulate themselves and the members of the club: the discussion meetings have again been well attended, while the reports of them are received with increasing interest and attention. The committee, in giving the card of last year, can refer to it with sincere satisfaction; and they trust to do as well in selecting subjects for the future:—

On February 3, 1851.—"How far Taxation enters into the Cost of Agricultural Produce," was introduced by Mr. S. Cheetham, of the Grove, Eling, Southampton.

March 3, 1851.—"On the Adulterations of Artificial Manures, and the best practical means of Detection," introduced by Mr. J. C. Nesbit, of Kennington-lane.

April 7, 1851.—"To what extent the cultivation of land in England and Scotland is affected by Soil, Climate, and other circumstances," introduced by Mr. R. Baker, of Writtle, Essex.

May 5, 1851.—"On the best means (legislative or otherwise) of inducing capital to be more freely invested in Land, and the benefits which would result therefrom to all classes," introduced by Mr. E. Tattersall, Jun., of Hyde Park Corner.

June 2, 1851.—"On the advantage of Covered Homesteads, as regards the fattening of Stock and manufacture of Manure," introduced by Mr. J. Beadel, of Broomfield Lodge, Chelmsford.

November 3, 1851—"On the Injurious Effects of the present Beer-shop System in the Agricultural Districts," introduced by Mr. W. Fisher Hobbs, of Boxted Lodge, Colchester.

December 8, 1851—"Are the Interests of Landlord and Tenant promoted by the Law of Distress for Rent?" introduced by Mr. W. Shaw, of the Strand.

The Committee, on the other hand, feel that they should scarcely be doing their duty did they close this report without some reference to the amount of arrears of subscription. The collection of them has long had their attention; and they are happy to add that during the past year many subscriptions long overdue have been paid. The Committee, however, would not stop here, while they hope in this, as in other efforts they may make, to meet with the approbation of the majority of members, and best supporters of the club.

The following members of the Committee went out by rotation:—Messrs. J. Beadel, J. Carter, S. Cheetham, G. Emery, R. Garrett, W. Gray, J. J. Mechi, T. Mount, J. C. Nesbit, W. Shaw, jun. (of Coton), R. Smith (of South Molton), R. B. Smith (of Edmonton), H. Trethewy, G. Turner, and J. Tyler.

Messrs. J. Beadel, J. Carter, S. Cheetham, G. Emery, W. Gray, J. J. Mechi, J. C. Nesbit, R. Smith, R. B. Smith, H. Trethewy, G. Turner, and J. Tyler were re-elected, and the following gentlemen elected on the Committee to fill up vacancies which occurred:—Mr. W. Carter, of Boughton, Faversham; Mr. W. Pain, of Compton, Winchester; Mr. S. Sidney, of Clapham; and Mr. R. Caparn, of Holbeach, Lincoln.

Messrs. T. Barker, W. Bell, and E. Purser, were re-elected Auditors.

A discussion subsequently took place on the general arrangements of the Club, at the conclusion of which votes of thanks having been passed to the Chairman and the Secretary, the meeting broke up.

STATE AND PROSPECTS OF AGRICULTURE IN IRELAND.

The following are extracts from the Annual Report of the Commissioners of Public Works in Ireland:—

"In making this our annual report of the works in operation under the Landed Property Improvement Act, we have the pleasure to state, that during the year 1850 the Act has continued to work in the same satisfactory manner as during the three previous years; and as will appear by the extracts from the reports of our several inspectors of drainage hereinafter quoted, the spirit of agricultural improvement, which revived in some measure through the operation of this Act, has continued unabated throughout the country, the proprietors as well as many of the tenant-farmers being convinced by experience that deep thorough draining, followed by subsoiling, effects such an increase in the productive qualities of the soil as to enable it, when moderately excited by manure, to produce returns sufficient to repay the entire expenditure, in some cases in one, and frequently in two years.

"But we must again repeat the caution expressed in former reports, that if the operations under the Land Improvement Act be confined to thorough draining alone, comparatively little advantage will be derived from the expenditure, except perhaps in pasture lands of superior quality.

"In our last report we suggested that improvements might advantageously be carried on jointly by the landlord and tenant, the landlord to undertake the cost of the thorough draining, and the tenant the subsoiling: by this arrangement both would be benefited, the land would be more than doubled in value, at the average cost to the proprietor of about £3 per acre, and thus his rent would be amply secured, and the tenant, receiving a double return, would be transformed from a struggling pauper to a thriving farmer.

"Several successful examples of this joint arrangement have come under our notice during the last year, and we have the pleasure to state that they are on the increase; and we feel assured that the extension of the principle, by creating a unity of interest and ac-

tion between the landlord and tenant, will tend much to the agricultural improvement of the country.

"At the present moment a feeling of hope has succeeded to apathy, and a spirit of industry prevails from the highest to the lowest. All agriculturists agree that dependence can alone be placed on an improved system of husbandry.

"The cultivation of flax, hitherto confined to a few of the north-eastern counties, has now become more general. The extent sown this year, exclusive of the northern district, will more than double that of the last or any previous year; and the quantity would have been considerably increased if scutch mills had existed at convenient distances throughout the southern and western districts. One ton of dried flax straw is reduced to 5 cwt. by the process of scutching; and it is to be observed that wherever a scutch mill has been erected, the proprietors and tenant-farmers of the neighbouring district have this year sown flax extensively.

"There can be no doubt that the mild and humid climate of Ireland is peculiarly suited to the growth of flax, as well as of root-crops of every description; and as this country has been at all times proverbial for its pastures, it becomes evident that the attention of farmers should be directed, in addition to the flax crop, more to the breeding and feeding of cattle, sheep, and pigs. In fact, except in a very few favourable localities, oats is the cereal crop which is best suited to the moist climate of Ireland, and in the production of which it can compete with any country. Barley and rye succeed well; but owing to a deficiency of heat at the season when it is most required, samples of wheat are rarely produced which will bear comparison with those grown in more favoured climates.

"If the foregoing view be assented to, deep draining and subsoiling become doubly important, for unless the soil and subsoil be dry, finely pulverized, and accessible to the influence of sun and air, the root-crops, as well as flax, will be deficient in quantity and quality.

"The only novelty which has occurred connected with our land-improvement operations during the last year is the authority given by the Act 13 and 14 Vic., cap. 31, to make loans for the erection of farm-office buildings, in addition to the loans for thorough draining, fencing, &c., given by the original Act, 10 Vic., cap. 32.

"This power was necessary to enable landed proprietors who possessed large tracts of land at present unoccupied to fit them for letting in extensive farms to superior agriculturists, by the erection of farm-buildings suited to the modern system of improved husbandry.

"At the time of passing the Act it was anticipated that a considerable number of experienced tenant-farmers, possessing sufficient capital, would have taken large farms in the country, but hitherto such has rarely been the case; in consequence, the applications for loans for the erection of extensive ranges of farm-buildings have been limited to a few.

"But, perhaps, under the circumstances of the country, it is fortunate that such has been the case, as by this means more time will be allowed for maturing plans, and the proportions and internal arrangements of those buildings in process of erection will have been tested by experience as well as criticised by farmers of the modern school.

"Up to the end of the year 1850, though many personal inquiries were made, and much correspondence took place relative to farm buildings, still only thirteen regular applications for loans were received. The schedule gives the names of the applicants and amounts applied for, together with the loans made or declined in each case, from which it appears that up to December last only seven loans, amounting in the aggregate to £5,650, were actually made. Several of those are now in progress, and will be completed during the present season.

"Up to the present time, April, 1851, the total number of applications which have been received are thirty-three, of which fourteen have been approved, amounting in the whole to the sum of £7,650. We have found much greater difficulty in making final arrangements relative to the proportions of the buildings connected with the small loans, varying from £200 to £400, than for the large ones; but still matters are progressing regularly and steadily; and we feel assured that on the completion of a few squares of farm-offices in any district, that the number of applications will increase in proportion as the benefit derived from the buildings becomes apparent to the neighbouring proprietors and principal tenant-farmers.

"SUMS EXPENDED, AND PROGRESS OF THE WORKS DURING THE YEAR 1850.

"In our report for the year 1849, we stated that up to the 31st December of that year the total sum applied for amounted to £3,501,776, while the gross amount of loans granted, deducting those relinquished, was £1,617,529, leaving a balance on hand up to that date, exclusive of £57,730 allocated, of £124,741 out of the sum of £1,800,000 previously voted by Parliament.

"During the last session of Parliament, the Land Improvement Fund having been further increased by an additional vote of £200,000 (Act 13 and 14 Vic., cap. 31, sec. 1), a great number of applications which had been postponed, or of which only a portion of the sum applied for had been sanctioned, were entertained, and loans perfected to the amounts requisite to complete the works previously approved of by us. In consequence, a number of new loans have been made during the period which has intervened between December 31, 1849, and December 31, 1850, to which our present statement refers.

"Up to December 31, 1850, the total sum applied for amounted to £3,835,734, and the amount of loans sanctioned, deducting those relinquished, amounted at that time to £1,777,954, leaving an apparent balance on hand of £222,046 out of the £2,000,000 allocated by Parliament; but at that period investigations had been completed, and allocations made relative to new loans not then recommended for your lordships' sanction, but which either have been or will be immediately

submitted for your lordships' approval, amounting to £91,286, leaving only an unappropriated balance of £130,760.

"The gross amount of instalments on loans which have been issued from the commencement up to the 31st December, 1850, is £1,042,617, of which £250,609 has been issued between 31st December, 1849, and 31st December, 1850.

"According to the several reports of our inspectors, it appears that the sum of £719,452 has been expended in thorough draining, subsoiling, making farm-roads, &c., up to the 31st December, 1850, and the sum of £323,165, being the amount of the instalments which have been last issued to the several proprietors, may be said to be in progress of expenditure.

"In our last report we expressed our regret that a few proprietors who had obtained loans, either in the autumn of 1847 or early in 1848, and to whom an instalment had been issued, had not then expended the money. We have now the pleasure to state that, in consequence of the pressing expostulations which have been made to such defaulting proprietors, the greater number commenced operations, and having expended the money advanced in a satisfactory manner, have since received additional instalments. On the whole, then, when we consider the pecuniary difficulties which press upon a large portion of the landed proprietors of Ireland, and that 2,281 distinct loans have been made, on which £1,042,617 has been issued, we are happy to say that the amount of instalments which have not yet been brought to account is insignificant when compared with the total amount which has been issued.

"The number of acres that have been thorough drained under the Land Improvement Acts, from the commencement up to the date of this report, amounts to 107,660, giving an average cost of £4 10s. per acre, of which 30,000 acres have been drained during the year 1850, and a considerable portion of the land drained has been subsequently subsoiled."

PROBUS FARMERS' CLUB.

The following paper on "Land Drainage" was read by Mr. Silvanus W. Jenkin, of Redruth, at the monthly meeting of the Probus Farmers' Club, on Saturday, the 8th November. The paper is valuable not only from the clearness with which the principles are laid down which should govern draining operations in this county, but from the successful examples of pipe draining which have been carried out in this county under Mr. Jenkin's direction, the details and cost of which are herein given.

"No one who is in the habit of travelling much through this county can help being struck with the constant occurrence of sometimes considerable tracts, sometimes single patches, of land rendered unfit for agricultural purposes by the presence of water; and few such can, I think, help lamenting that this is the case, and querying with themselves why it should be so. It must be very evident that every acre of land now unprofitable, which can be reclaimed and rendered productive, *at a remunerative cost*, benefits not only those who reclaim it, but the consuming public at large. More than this, there can be little doubt that the climate of a district is materially improved by bringing into a state of regular cultivation, land on which water has been constantly lying, and from which cold and injurious vapours have been rising. I am fully convinced that were a large extent of our now unprofitable moorland drained and cultivated, nothing whatever would be found in its climate to prevent successful farming of all kinds being carried on.

If this be so, and if we are really able to get a remunerative return for our outlay and at the same time effect such an important change in the aspect of our county, and, what is of still greater importance, in its productive capacities, as these thoughts seem to point out, then surely it is at least important that those who are interested in its welfare should make themselves acquainted with all that can be said on the subject, and seriously inquire whether there really is any thing utopian in the idea that vast tracts may at a comparatively small cost be brought into a state fit for a high degree of cultivation.

But even without these there is hardly an estate in Cornwall on which a greater or less number of acres might not, with a little judicious outlay, be either reclaimed from utter worthlessness or made doubly productive; and as every little helps, these scattered acres would in the aggregate give an addition to our productive acreage, such as few would imagine who have never had their attention called to the subject. It therefore appears to me to become the bounden duty of all who are in possession of any facts or experience, however slight, which may be useful in this inquiry, to give others the benefit of them; and it is this which induces me to trouble you now with the few straggling thoughts and opinions which follow; and the more so in the hope that it may induce some one who has more experience and more time to follow the subject into its details and put it into a more tangible and complete form.

The abstract principles of land drainage appear to be very simple, and to be somewhat these —

1st. Water falling on and percolating through the soil will never (except in very great excess) do it any serious injury; on the contrary, it will impart strength and vigour to vegetation, and supply it with ingredients necessary to its healthy growth; and

2ndly. Any quantity of water, however small, remaining stationary or stagnant about the roots of plants will do mischief; since experiment has proved that no amount of nutriment afforded to them, whilst their roots are immersed in water, will ever produce a healthy growth.

On these two propositions the whole theory of draining hangs: and it is merely the simplest and most effectual method of getting rid of this stagnant and therefore injurious water that we have to consider; hence the manifest advantages of irrigation combined with drainage, by which the greatest possible amount of benefit is derived from the former, without the attendant injury; for the soil acts as a filter, retaining all the nutritious particles held in solution by the water, which comes off into the drains clear.

Draining naturally resolves itself into two heads —Spring Drainage, and, as it is usually styled, Thorough Drainage.

In *Spring Drainage* we have to deal with a source or spring, from which water issuing, runs over and settles upon land not naturally wet; and in this case the remedy is to cut off the supply at its source.

In *Thorough Drainage*, on the contrary, we have to convey away rain water falling immediately on the land in question, and prevented by a subsoil of retentive clay, or some other obstacle, from properly percolating through and running off from the soil, in such a manner as the maintenance of healthy vegetation requires.

Again, lands requiring thorough drainage, may be divided into two sections:—

1st. Where the water accumulates and is visible on the surface; and

2ndly. Where it accumulates at a greater or less depth from, and is not visible on, the surface.

The most simple form of the first case presents the following characteristics:—A thin soil, retentive clay subsoil, ground comparatively flat, and free from undulations, with no evidence of strong springs existing in the immediate neighbourhood. It will be usually found to possess a scanty herbage which the cattle do not like, and to abound with aquatic plants. This land approaches as nearly to the character of worthless as any we shall have to consider.

1st. In dealing with such land, the first point to consider is the final outfal; and this is often very difficult—in water meadows for instance, lying close to a sluggish and tortuous stream where any sudden flood will cause it to overflow the adjoining land; and in this case it is highly desirable to cut the river straight, if possible, thus decreasing the distance which the water has to flow, and consequently increasing the rate of inclination and velocity, and enabling the channel to carry off a much greater surplus. If the land wants irrigating, it can be done much better by artificial means.

In this sort of ground it is necessary not to have too many outfals. As a general rule it is not desirable to have more than one to one field, indeed sometimes three or four fields may be drained with advantage with only one; of course the size of the main drain must be proportioned to the water it has to carry, and must increase as it approaches the outfal.

One great advantage of this plan is that the drain may throughout the greater part of its course be under the level of the stream, and yet come out perhaps almost to the surface where it empties. Whether the river be straight or not, this main drain should be so; and if necessary, tributary drains may be brought into it from the river side where any bend or elbow requires it. In this way a great deal of land may be easily drained where there is no apparent possibility of doing it. Indeed I do not remember ever to have seen a field which could be pronounced incapable of drainage, as far at least as levels are concerned.

Smaller Drains.— In the arrangement of these the greatest care is required, as on their efficiency depends the success or otherwise of the operations. It will perhaps be desirable to consider them at first with reference to the case already stated, as being the simplest and most intelligible. There are three points to be considered in the arrangement of small drains, viz.: 1st. Their direction 2nd. Their distance apart. 3rd. Their depth. The second and third are frequently altered by circumstances and situation; the first, never.

It will not be necessary to enter at any length into the various arguments that have been advanced on this subject, as all draining authorities are now, I believe, agreed that wherever practicable, the drains should always be laid in the direction of the slope of ground. A few years ago the contrary opinion was almost universally adopted; it was held that drains, in order to be efficacious, must run across the slope, and it was argued that otherwise the water would never find its way into them, as it would naturally run down the hill until its course was intersected by a drain, into which it would then, as a matter of course, flow.

It was not until the erroneousness of this opi-

tion had been over and over again proved by practical men that any attempt was made to alter the theory. It was found, as I have myself seen in very many instances, that immediately on the lower side of the drain, however deep it might have been sunk, the ground was as wet as ever, and that the distance drained on the higher side was by no means commensurate to the deficiency below. The fact was that the true principles which regulate the percolation of water through the soil, and its discharge from thence through the medium of drains, were altogether misunderstood. When the water falls upon the surface of the land, it immediately finds its way, following the roots of plants and other vegetable fibres, to as great a depth as possible; that is, either as deep as the fibres extend, or until it is stopped by retentive clay or some other opposing substance. Meeting with such obstruction it is dammed back and accumulates around the roots until it reaches the surface. The object of the drains then is merely to enable the water to percolate through this retentive bed; and this is best done by opening such cracks or fissures as will at once establish a connection between the water above and the drains below; since experience proves that, once established, the force of capillary attraction will constantly maintain and enlarge them.

It will therefore be evident that the best position for the drains is that in which they will exercise the most regular amount of attraction on the greatest surface of ground, and this will be found to be best obtained where they are placed in the direction of the slope of the ground and at regular distances from each other. This will, as I have before remarked, apply universally to thorough drainage; but not in any great degree, and sometimes not at all, to pure spring drainage.

2nd. The distance apart; and 3rd. The depth for these drains. These points depend very much on the locality and a variety of other circumstances. Taking the case now under consideration, viz.: flat land, a thin soil, and a retentive clay subsoil; I believe, but do not speak very confidently, that shallow drains placed at short intervals will be found to answer best, especially in such a climate as ours here in Cornwall.

It has been proposed by Lord Wharncliffe, in a paper in the Journal of the Agricultural Society for this year, to lay two sets of drains where the land is very wet and the climate rainy; one set deep and at considerable distances apart, and intermediate ones at a less depth, falling into them. Whether this plan be feasible or not, it is certain that in Cornwall the attempts that have been made to drain retentive soils with deep drains at wide intervals, have often failed of perfectly effecting their purpose.

It would appear as if the constant succession of damp weather, rather than the actual quantity of rain falling, prevented the clay from becoming cracked by the sun and opened into fissures, as is so soon the case in parts of the country where there is a longer continuance of dry weather. The practice that I have thus far found most efficacious with the data already given, has been to sink the drains about three feet as a minimum depth, and place them at a minimum distance of sixteen feet apart.

Their direction should be, generally speaking, at right angles to the main drains; but this is not of much importance; it is much more important that they should accurately follow the slope of the ground, since the junction with the main drain can easily be made by bend-pipes at any angle.

The next point is the material to be used in the drains. This also has now become pretty much a settled question. Drainer after drainer has abandoned his former practice, and become a convert to the economy and efficiency of pipes.

It is not very easy to argue this question theoretically, the strongest point being the numberless practical failures of stone-drains; but still there are some reasons which appear to be worth mentioning.

In the first place stone-drains are much more liable to choke than pipes. When water once finds its way into a pipe, it is immediately conveyed away over a smooth surface, and can cause no further trouble. Not so with a stone drain; the loose stones of which it is composed are constantly impeding the flow of the water, and altering its direction, and thus particles of the surrounding soil are washed in and choke the drain. Moreover, the water always keeps as near the bottom as possible, making it soft and muddy, and causing the stones to sink by their own weight, thus constantly impeding its efficiency, and forming pools and stoppages which, of course, still go on increasing the evil. Again, stone drains are much more liable to be destroyed by moles and rats. A pipe drain, properly laid, presents an insuperable barrier to these animals; whilst from its small size they have no difficulty in passing on, either above or below it. A stone drain, on the contrary, they must pass through; and they have no very great difficulty in doing so, for as they dig against the side, stone after stone falls into the opening they have made, and so, a passage once begun, they go on till the efficiency of the drain is either entirely destroyed, or very greatly diminished. Add to this, that except under very peculiar circumstances, the pipe drain is the cheaper of the two, and we shall not have much difficulty in determining which is in ordinary cases the preferable material.

The next, and a most important question to determine is, the best size and shape for these pipes.

This question is probably yet unsolved. The first sort of tiles used in drains was the rounds and flats; that is, a half round pipe resting upon a flat bed. These are now almost entirely disused, from the evident disadvantage of their being so liable to derangement by any accidental shrinkage of the ground. The shape now almost universally adopted is cylindrical, either simply laid end to end, or connected with a collar. So far as our experience has yet gone, it has been that in Cornwall, where we are so liable to meet with stones and other hindrances to a continuous straight line, we are not safe as a general rule in laying small pipes without collars.

It is very likely that before long, an oblong or egg-shaped pipe will be substituted for a cylindrical one, this being the form best calculated for the speedy passage of water; but as the pipe is never more than half full, except on extraordinary occasions, it does not seem to be of much importance.

As to the size of the pipes, continued experience has considerably modified the opinion with which we started a few years ago, that *one inch* in diameter was sufficient under ordinary circumstances. No doubt, theoretically, it is abundantly sufficient to carry all the water that will ordinarily come into the pipes; but we have to provide for extraordinary occasions, in laying drains of such permanency as these ought to afford. Moreover, our climate must be considered, and the excess of rain falling in Cornwall over that in the inland counties is very considerable. Again, roots of trees or vegetable matter may get into the pipes, and partially choke them; and moreover, in practical operations we are generally safe in giving theoretical size and strength a pretty wide berth. All things considered therefore, we do not now often lay pipes less than one and a half inches, and sometimes two inches in diameter.

It is not easy to enter into the question of the cost of pipe draining, because it will vary in almost every field. As a general rule I have found that straightforward draining, as in the case we have considered, will not exceed £8 per acre. Of course, however, this may and will be considerably increased by the occurrence of bogs, banks of rocks, springs, and other impediments. In almost every case, however, that I have yet known, it may be safely asserted, without fear of contradiction, that draining will afford as good a per-centage on the outlay as any sort of improvement that can be effected on land.—(At the end of this paper I have given some examples of the actual cost of draining.) There are a great many varieties of the conditions before-mentioned which will in many cases modify the practice of thorough drainage. For instance, a very common case is where the flat land lies immediately at the base of a rocky hill, or at all events, of an out-crop of rocks of some kind. In this case we have to provide, not only for the rain water falling upon the land itself, but for a large extraneous body of water following the fissures or veins of the rock or ground above, and flowing over the surface of the land below. To meet this, one of two methods must be adopted; either the drains must be run deeper as they approach the rocky ground, and continued as far as practicable into the hill, so as to relieve the ground from the water arising from above, or else a longitudinal deep drain must be cut all along the base of the rocky ground, and carried to an independent outfal. Of these two plans, I have always found the first answer by far the best; for by penetrating the rocky ground at different points, it carries off the water equably and without throwing an undue proportion on any one drain. The ends of the drains may also be curved so as to avoid jutting points of rock, or take off any particular spring; or two drains may, and in many cases should, be brought to bear upon the same spot from opposite directions.

Another rather common case is the occurrence of bogs on such land; and these require to be dealt with especially carefully, for they frequently run to a considerable depth, and will never be cured by shallow drains. When these are found, we usually run an independent drain into each of them at as great a depth as we can obtain, taking care, if possible, that these drains shall be about midway between two ordinary drains, in order to insure the proper surface drainage after the bulk of water has been taken away from the bog itself. After this extra drain has been running a few weeks, the surface of the ground above will frequently sink as much as *two feet* below its former level.

It is always desirable, before commencing the thorough drainage of a piece of ground, to inquire whether there are any modifying circumstances rendering a departure from the usual course desirable; and these causes should always be dealt with first, and, as it were, independently of the general drainage of the land.

We now come to the second case with which we set out, viz., where the water accumulates at a greater or less depth below, and is not visible upon the surface.

The characteristics of this kind of land are usually very different from those last described. The soil is often rich vegetable mould, being frequently an alluvial deposit from the adjoining high lands. It almost always is more or less peaty and boggy in its nature; although perhaps almost im-

perceptibly so except after heavy rains. The soil is frequently deep and naturally fertile; but a careful examination will detect unceasing injury doing to the long roots of all crops by the chilling exhalations from, if not by the water itself. Aquatic plants too will be found growing on it, and probably rushes.

Here, whilst a more expensive system of draining is required, the advantage gained is more striking; for, once freed from its superabundant water, this soil will probably make the best land on an estate. The great point to be attended to is to go deep, to keep certainly and in all cases under the soil itself, and as near as possible to the bottom of the clay soil. It frequently happens that this can easily be done, as in these situations the bed of clay is often shallow and lying on a pretty hard substratum.

Four or even five feet drains will often not be found at all too deep, and they may safely be laid pretty much further apart, since the water percolates easily through the soil, and the drains will consequently draw from a greater distance. Eighteen, twenty, or twenty-two feet apart will do, sometimes even more; but this must vary pretty much in proportion to the thickness of the clay subsoil. I have found it cost £10 per acre to drain land of this sort, as the expense is often increased by the difficulty of keeping the drains open; but then, as before remarked, the advantage is correspondingly great. Of course it will follow that the drains being further apart, must have larger pipes in them than the shallower ones.

It will be evident from what has been said, that thorough drainage is no simple matter, following always in the same beaten track, and always sure to be effected by the same means. It requires, on the contrary, very much careful consideration, weighing of conflicting circumstances, and pretty accurate examination of all the causes likely to act for or against what we are about to do. Thus, the following amongst other points are most important to be inquired into, previous to commencing any drainage operations: The depth and porosity of the soil; the depth, character, and tenacity of the subsoil; the inclination not only of the surface but of the rock on which it lies; the occurrence of any lodes or veins in the adjacent strata tending to draw a superabundance of water to one spot; the existence and position of any bars of clay or other retentive strata tending to throw the water to the surface along some particular line; the nature of the outfal afforded by adjacent rivers or streams, their liability to overflow or fret away their banks after floods, with a variety of other circumstances requiring to be accurately determined and carefully weighed in order to prevent failure and disappointment in our attempts. It has often appeared to me that, considering the way in which draining operations have been usually conducted, it is so far from being extraordinary that they often do not succeed, that it is almost wonderful they ever do.

All this applies with additional force to spring drainage, because there we have to deal with a source of supply often very difficult to discover and yet absolutely necessary to be discovered; we have here to make one drain instead of many; but this one must be in the right direction and must arrive at the right point and at the right depth, or all that we have done will be often fruitless.

In dealing with a piece of ground where a spring is pretty evidently the cause of its wetness, the first point to ascertain is as nearly as possible from observation on the surface where it rises. This is often not easy to do, and requires some little knowledge both of the subsoil and of the strata underneath it. Having ascertained this, the next thing to observe is how a drain can be best brought from the lowest outfal it will command to this point. In a new district a few pits sunk at intervals will frequently help a good deal in deciding this. Having, from all the information that can be gained, decided upon the best direction for the drain to take—that is, the shortest compatible with attaining the requisite depth—it is best to begin by making its levels from the outfal as dead as can be prudently done, because we can always rise as fast as we like afterwards, and it is very possible we may find the want of every inch of levels we can possibly procure. A rise of about one inch in a chain, or 1 in 700, with well laid pipes, is abundantly sufficient for the water to flow easily; and as long as this can be maintained without meeting with either rocks or any other obstruction, there is no danger of its being too deep.

It often happens that a drain brought in at a depth of twelve or fourteen feet will effectually remove the water from many acres of land, when a drain two or three feet shallower would fail altogether. As a general rule, indeed, a drain intended to carry off a spring cannot be brought in too deep—it is always easy to bring the water in from above, generally difficult to do so from below. If, however, after having brought the drain in as deep as the levels will allow, the water is still found to rise in the bottom of the trench, the only plan is to sink a vertical shaft till the water rises powerfully into the drain: then put pipes into this vertical shaft; secure them carefully around, make a good connection with the horizontal ones, and the probability is, there will be no more trouble with

it; but this of course involves additional trouble and expense, and it is always best to get the drain under it at once if possible.

The pipes used in spring drainage should always be large. Four-inch should be used in all cases where the water rising is at all considerable; because it must be remembered that one drain has here to do the work of many.

The two greatest difficulties to be contended with in draining operations are the occurrence of deep pits and bogs in the course of the drains, and the injury done to the pipes by roots getting into them. The first may, as before remarked, be generally cured by putting independent drains into these pits or bogs—independent, I mean, of the general drainage of the ground. Of course, if one drain can be made to take the water from two or three pits, so much the better. The second is a far more serious evil, and one that there is, I believe, no effectual mode of guarding against. The roots of the mangold wurtzel are particularly apt to grow into drain pipes, and do a great deal of mischief, not only by partially filling them, but also by lifting them out of their places. In boggy ground, too, there is a sort of close matted net-work of roots, which frequently very much interferes with the flow of water through the pipes.

The only remedy for these evils is, first, to avoid as much as possible putting drains near hedges or roots of trees, except at a considerable depth; and, secondly, wherever there appears a danger of the presence of roots, to make the pipes proportionably longer. Neither of these precautions, however, will do more than decrease the evil; and it is therefore important that whenever the appearance of a wet spot near a line of pipes after drainage indicates some stoppage, they should at once be taken up, examined, cleaned, and relaid, otherwise the evil will go on increasing.

In conclusion it may not be undesirable to give a few instances in which these principles have been applied in practice, with the success attending them.

We have within the last two years drained two or three moors on Clahar Garden estate, in the parish of Mullion. These moors lay in the bottom of a valley, with a very tortuous stream running through it, and possessed a tolerably fertile soil, carrying good grass for a month or two in the year, but lying upon a very retentive clay subsoil some two or three feet thick, with rubble underneath. Here we first of all straightened the stream, and thereby prevented its overflowing its banks, which it frequently did after heavy floods. The first moor was drained with one-inch pipes throughout; except the main drain, which ran parallel with the river, and was laid with two-inch. The drains were about three feet deep and sixteen feet apart, and were continued at the *same depth* until they reached the dry soil. The adjoining land rises precipitately from the moor, and is very rocky. The lower part of this piece of ground is now perfectly dry, although it was previously difficult to walk over; and, last season, it produced as fine a crop of wheat as was grown in the parish. A few wet spots, however, remained in the immediate vicinity of the rocky ground. Benefiting by our experience in this case, we have drained the next moor more effectually.

Many of the drains are laid with two-inch pipes, and they are curved round at the upper end and carried as deep as possible for a short distance into the dry ground. As far as we can yet judge, for this has not been long finished, it appears to have been perfectly successful.

Another example is a moor on Gilly Estate, in the parish of Mawgan. This was so wet that the farmer had frequently lost cattle in it. It had a thin soil, very retentive subsoil of yellow clay, was quite flat, and had no extraneous water to carry off. We drained this principally with one inch pipes, sixteen feet apart, and three feet deep, without any main drain, but with all the pipes entering the ditch at the bottom. A small part was drained with the drains four feet deep and twenty-two feet apart; but these did not answer quite as well, although they invariably began to run just after a heavy fall of rain. This moor has been cured effectually, although a wet spot or two sometimes remain a few days after heavy rain where the deep pipes were. It is now in regular course of tillage with the rest of the ground, and bears good crops.

The cost of draining this moor per acre was as follows:—

2,500 1-inch pipes, at 25s. per thousand including freight	£3	2	6
Labour, including opening and filling the trenches, laying the pipes &c. ..	7	5	0
	£10	7	6

The cost of labour here is much too high; the men were all unaccustomed to the work, and did not know how to use the tools. The increased value of the moor, however, was at least £1 per acre per annum.

A very wet field at Trewarnevas, in the parish of St. Anthony, cost as follows:—

Pipes as before	£3	2	6
Labour, including an open ditch made at the bottom of the field	4	0	6
	£7	2	0

This was an arable field on the top of a hill lying on a stiff clay over the Serpentine, and very stony.

The spring corn was never able to be put in till the end of May.

The first place in which we laid a main drain the cost was as follows:—

Small pipes as before	£3	2	6
Main drain, 316 feet, at 75s. a thousand	1	3	10
	4	6	4
Labour	4	0	10
	£8	7	2

At a moor in Merris, in Mullion, the cost was £7 5s. 5d. per acre.

And in another, at Trenance, in Mullion, £7 10s.

All things considered, therefore, £8 appears to be a pretty fair average.

The excess of cost over similar works in the inland counties arises principally from the increased cost of pipes, which is nearly double. When we make our own pipes, which will, I hope, before long, be generally the practice, the cost per acre will be considerably reduced.

In another moor, on Trevitho estate, in the parish of Mullion, we had to contend with some very deep and wet bogs of the most formidable character, so as to be obliged sometimes to lay double rows of pipes in one trench, and sometimes 4-inch pipes for two or three drains in succession. Besides running out short side-drains in all directions, where it appeared necessary, we kept our drains as deep as we possibly could—eight, ten, and twelve feet—laying our pipes bit by bit, and filling in at once above them; and the result has, so far, exceeded our most sanguine expectations. The ground has sunk considerably in level, and the quantity of water coming out of the main drains, which was at first nearly a four-inch pipe full, has decreased very much; indeed, there is no difficulty in ploughing or working the ground in any way, whilst before it would, as the men said, have buried a house, to say nothing of horses and cattle.

Again, in a small moor, near Mullion Churchtown, we have been exceedingly annoyed, by a constant net work of fibrous roots filling the pipes, making the water run sluggishly and come out a dirty red colour, instead of clear as it should have done. This moor was first laid with one inch pipes, and we are now taking up such of them as appear to be choked and relaying them with two inch; probably three inch would be better still.

I will only allude to one more example—a field on Merris in Mullion. Here we found one part of a field on the side of a hill constantly wet, whilst the remainder was tolerably dry; I suspected the existence of a spring; but as, on sinking pits, we could not discover one, and found the subsoil a retentive clay, we determined on thorough draining. We accordingly began at one end and carried our drains up sixteen feet apart. Drain after drain ran pretty freely for a day or two and then stopped. Whilst cutting one of the last drains, however, the water suddenly burst out into the trench (so that the men were glad to get out of it as quickly as possible), and continued running a strong stream for some days. As soon as we were able to work at it, we continued this drain pretty deep into the hill-side, laying four inch pipes in it; and there it is now running half a pipe full, whilst the others are all dry. It need not be added that the field is cured. This was a case for spring and not thorough drainage.

Having already, I fear, exhausted your patience by a long string of opinions, theories, and facts, following no regular order, and as yet but partially borne out by experience, I have only to add, in conclusion, that I do earnestly hope that both *landowners* and *land-occupiers* will ere long see the importance of bringing into cultivation the thousands of acres of land now lying either wholly or partially useless in this county, solely for want of draining; that they will at all events make the calculations, and see if they find that it will amply remunerate them for the required outlay; and of the result of these calculations, if fairly conducted, I have no fear. And I hope, too, that when they do undertake it, they will do it in accordance with right principles; that is, in such a way as to avoid, not only the cost and annoyance of failure, but the liability to have to do it all over again in a few years.—West Briton."

DAIRY HUSBANDRY.

A very much neglected branch of farming is the system of dairy husbandry. In many districts it does not pay. In some few it is pursued as a business, but there is sad mismanagement; whereas, compared with corn-growing, it, when well managed, will often be found a more remunerative process.

Combined with arable land it is often sadly neglected, left to chance and circumstances, and supposed to devolve mainly, if not altogether, on the

female part of the farmer's establishment. One great disadvantage of the farming class pursuing any of the great branches of profit is that they cannot thoroughly divide their labour. For instance, animal and vegetable life depend on each other; and one farmer cannot cultivate one, and another another branch of the business. A spinner, a cloth-finisher, and a dyer, divide the labour and care and skill and energy of their several operations. A piece of wool goes to one, who selects, and combs, and spins it into yarn; a second takes this, and weaves and finishes; and a third, again, takes this and applies to it the finishing dye.

But the farmer who keeps stock, whether for the pail, the carriage, or the butcher, must grow corn and straw and roots. He must know the manual operations of animal chemistry and vegetable physiology; must know the movements, practically at least, of almost the whole cycle of the sciences. But he does not. His operations are fitful and empirical; he reasons not for what he does. He grows crops at too great expense—grudges, perhaps, his cattle a little artificial food; treads down his straw in winter, and calls it manure; but buys bones and guano. Sometimes he feeds his cattle on the one hand with plenty of good food, and allows it to waste again by the chilling effects of the rain and cold and frost. Others can manage vegetable and animal life better, but make sad work with their products: ruin and spoil the cheese and butter and pork for want of special knowledge of the best modes of treating these productions.

To such, the last of Richardson's series of handbooks, "The Cow,"* will be an invaluable guide. It aims at avoiding all circumlocution, and dashes at once into the substance of all that science and experience have taught the agriculturist and dairyman, up to the present period; and the facts and principles it contains, together with its advice and directions, cannot be obtained except with a very critical eye, alembecising the contents of a vast pile of authorities.

Commencing with an introduction on the origin of British cattle, it goes on to divide classes of cattle, not as has been usual by the length of the horn, as short-horned, middle-horned, long-horned, and hornless herds, but classes the breeds as "fat-producing and milk-producing." He says—"It is usual in works on cattle to classify them by the length or shortness of their horns; and as a matter of natural history it may be the most correct mode of dividing or classifying the different tribes of animals which prevail in one or other of the districts of Great Britain and Ireland. But for practical purposes it is by no means either advantageous or convenient. There are certain breeds which have certain peculiarities; and as the size of horn has no connexion whatever with those qualities, it is by far the most desirable course to classify them according to their *properties* rather than by any mark of distinction altogether unindicative of their peculiar capabilities" (p. 15).

The writer then goes on to describe the conformations of the animal indicative of tendency to secrete milk; and in passing, reviews Guenon's theory, and gives a history of its reception and treatment in France, leaning rather to the idea of *flatness of make* of the animal generally as indicative of milk-secreting tendencies, as roundness is of the fat-forming. He then instances the Ayrshire, the Alderney, the Yorkshire, and several other breeds, and passes on to the other class—the meat-makers. Here he enters upon points and symmetry, and with the illustrations of course first selects the short-horn, then the Hereford, then the Highland Scot, and among the last the Devons, paying, however, a well-deserved tribute to such men as Mr. Turner, of Barton, for his efforts to improve the breed.

We do not intend to follow him through the chapters on cattle breeding, feeding, calf-rearing, or cow-leeching, to which he administers a well-deserved castigation; but his chapter on dairy-management is so different from most works on the subject, which are nearly all reprints from Aiton, who was indeed the best of the writers on this difficult subject, that it deserves attention.

After a very clear and elaborate description of the different parts of milk, chemically, and a description of the changes it undergoes, he goes on to say—

"The object of the dairyman is sometimes to assist and sometimes to retard these natural stages of decomposition, into which the milk will run when left to itself; sometimes it is necessary to defer, sometimes to hasten, these stages; and he possesses great power for controlling them. Thus heat, it will be seen, is necessary to all these stages of action. Hence, in winter, he can easily arrest, and by artificial application as easily advance, the manipulations of his craft. But in summer it is not easy to control. He has often to be in his dairy watching his milk under the influence of the sun's rays, and he contrives the dairy so as to keep out the hot rays of the sun as far as possible; or he endeavours, by evaporation or profound shade, to counteract their influence" (p. 61).

The different kinds of butter come first under review, and the circumstances affecting its manufacture and preservation; the preservation of milk,

* The Cow: Dairy Husbandry and Cattle Breeding. By M. M. Milburn, Author of Prize Essays of the Royal Agricultural Society of England. London: W. S. Orr & Co.

and its adulterations, are also succinctly described.

Take the following hint for a connoisseur, as to the *inoculation of cheese* :—

"The inoculation of cheese is one of the refinements of modern taste and luxury. A blue mould is by some considered the *sine quâ non* of a tasty cheese; while others prefer the decay to be grey, and the cheese to be in a state of putrefaction so absolute as to be soft and wet—a nidus for mites and jumpers. If it be desired to give a cheese, especially a Stilton, the flavour peculiar to one of its kind, it may easily be accomplished. A dozen holes may be made in the specimen to be operated upon, with the common cheese-trier, and the pieces taken away. The same trier may cut as many pieces out of the favourite cheese, and insert them in the places from which the others were removed. This covered up in a close place for a month will, if free from mould before, turn out absolutely ripe, and be of the same flavour as the cheese from which it was inoculated, always premising that the moulding process had not first set in in the inoculated subject" (p. 69).

The writer goes on to describe the mode of making the various kinds of cheese so celebrated in the country—the Dunlop, the Cheshire, the Stilton, the Glo'ster, the Wensleydale, the Chedder, the Parmesan, and the Mascarponi, giving not only the *modus operandi* of the making, but the *temperature* at which they are most successfully made. The temperatures given are—

Dunlop	85 degrees.
Cheshire	83 „
Stilton	85 „
Parmesan	120 „

Pasturage, treatment, and proportions of new to old milk, make much of the difference in different kinds of cheese.—Gardeners' and Farmers' Journal.

THE AGRICULTURAL DISTRICTS OF ENGLAND.

[FROM THE TIMES' COMMISSIONER.]

CARLISLE, Jan., 1851.

The lower lands of East Cumberland chiefly rest on the red sandstone formation, and the upper district on mountain limestone. In the plains along the banks of the rivers and streams, the Eden, the Esk, the Irthing, the Caldew, and the Line, the soil is generally a fertile alluvial loam; on the low-lying ridges which divide the several plains, it varies from a strong retentive soil to good friable turnip land; and near the Scottish border, on the Sark and towards the Solway, there is an annually diminishing extent of unimproved bogs or peat moss. The lands along the valleys are very liable to be flooded by the sudden rise of the streams after heavy rains in the mountainous district on the eastern border of the county. The quantity of rain which falls during the year in this county is in the most favoured parts nearly twice as much as on land at the same elevation on the east coast, while the greater frequency of rainy days gives a character of humidity to the atmosphere much more beneficial to the growth of grass and green crops than corn. This humidity of climate has given to those who cultivate the soil with a wise desire to enlist nature on their side, instead of vainly trying to supersede an influence which may be modified but cannot be controlled, a preference for stock over corn farming. By keeping this in view we shall be better able to appreciate the value of the advice lately given by Sir James Graham to the tenantry of Cumberland, to "plough less and graze more," a corroboration of which is found in the management adopted by all the best farmers we visited in this county. The fact that agricultural labourers here are not in excess, as in some of the southern counties, removes of itself any objection on the score of diminishing employment; while all attempts which have been made to introduce on a large scale the corn system of the east coast, however successful for a time, have in the end been found unremunerative. A wet autumn has interfered with the proper season for sowing the wheat crop; or if got in during a favourable time, and after giving every promise of an abundant increase, the continued rains of a wet summer "lodge" the crop, and the farmer, when he thrashes out his bulky stack-yard, is greatly disappointed in the quality and quantity of the yield. Mr. Curwen tried the system 40 years ago on a large scale, and failed; and though for the introduction of the best breed of short-horns and the spirit he infused among all classes for agricultural improvement his name is still gratefully recollected, as a corn farmer his example has not been followed. The future range of the price of corn is likely still further to limit any desire for its more extended cultivation in this county, and the fact that the men who have really made money here have done so as breeders of feeders of stock, has become so generally understood that to the development of that branch of their business the attention of the best farmers is now chiefly directed. The farms, for example, of Mr. Ferguson, of Harker Lodge, a considerable extent of which used to be kept in cultivation, are now being laid to grass with such success that on an extent of 700 acres 3,000 hoggets and 200 cattle are fed during the summer, the hoggets being sent off to the market as they become fat, after yielding an increase of

10s. per head, on the average, for their keep from the end of April till November.

Netherby, the estate of Sir James Graham, occupies the north-western extremity of the county on the Scottish border, and extends from the Solway for seven or eight miles up Eskdale. It includes in one compact and undivided property the whole of the land between the lower part of the river Line and Dumfriesshire, and comprises altogether nearly 30,000 acres of land, between 2,000 and 3,000 acres of which are wood, much of it fine old timber. Sir James succeeded to the estate upwards of 30 years ago, and since that time he has been unintermittingly engaged in its improvement. Neither time nor large expenditure has been spared to make it what it is now confessed to be—the best conditioned estate in Cumberland. Time and money alone would not have done this had not both been expended with judgment; and it may surprise our readers to hear that a statesman, who during the greater portion of that time has occupied so conspicuous a place in the councils of the nation, is more minutely acquainted with the details of arable farming and the general management of land than many men of inferior capacity who devote their whole lives to the business.

The leading feature in the management and improvement of the Netherby estate has been the timely consolidation of the good land into large farms, and the proper subdivision and enclosure of the inferior lands. An idea may be formed of the extent to which this principle has been acted on, and the consequent diminution of an overgrown agricultural occupying population, from the fact that the number of rent-paying tenants holding land in 1820 was 340, and in 1850 only 165. Fine farms of 300 and 400 acres now occupied in one holding by an enterprising tenant, were then held in seven or eight separate possessions. The demolition of useless clay buildings and superfluous hedges caused an immense saving of horse power; and, as one great feature in the management seems to have been the careful selection and encouragement of good tenants and the unsparing weeding out of bad ones, Sir James was at every step assisted by his tenants in the further improvement of his property. He had not to work single-handed against ignorance or indifference, but enlisted on his side both energy and capital. In planting sheltering woods to enhance the value of his farms, he was at the same time laying by an improving capital; and in erecting new farm buildings, in draining, removing, and replanting fences, making open water-ways and embankments, and constructing roads, he was assisted by his tenants, who contributed in labour a material part of the cost. The buildings on the estate, which were then chiefly of mud and thatch, have all been replaced by substantial stone and slate. Year after year sees a diminishing extent of moss, the landlord contributing the material for drainage, and the tenant performing all the other cost of the reclamation. During the currency of his lease he enjoys the benefit of his industry, but at the close of it the landlord participates in the increased value caused by the improvement. In constructing new fences the same principle is adopted, and the tenant is bound to maintain them constantly in good order. This is strictly attended to, and the neatly trimmed thorn fences along all the lines of road traversing this extensive estate mark its boundaries on every side. Great though the expenditure of the landlord has been, it could not have effected so much without the aid of an enterprising and industrious tenantry—wisely directed it is true, but still rendered in addition to the rent.

The farms are all let on lease at money rents for a period of 14 years, free of all manner of tithes. The tenant enters on his farm at the term of Candlemas, and pays his rent at two terms in the year —Whitsuntide and Lammas. He pays all taxes, rates, and burdens, already imposed or that may be imposed, by law upon farmers during his term of possession. The stipulations as to management are very stringent, but we were assured that a good tenant is never interfered with.

With regard to drainage, the former custom on the estate was for the landlord to furnish the tiles free of charge and the tenant to put them in. This system was commenced many years ago, but the drains were then made too shallow, and a great portion is now being taken up and relaid at greater depth. Sir James now executes all drainage at his own cost, the tenant performing carriage and paying 5 per cent. on the net outlay. Two-inch pipes, with a flat side to lie on, are the size chiefly used; they are 13 inches in length when burned, and cost at the kiln 16s. per 1,000 for all sizes as required (a due proportion of large mains being furnished at the same price), the cost of coals, inclusive of cartage, being 10s. per ton. The drains are made, according to the nature of the soil, from three to four feet in depth and seven to ten yards apart, and the highest charge for interest to the tenant is 3s. 6d. per acre.

In the management of his woods Sir James does not fail to take advantage of a new outlet afforded by the increasing wants of our manufacturers. We heard that he is at present in treaty with a thread manufacturer of Manchester for the erection of a steam-power mill at Longtown, at which the small wood of the estate is to be cut into bobbins. This trade is already largely established at Windermere, and supplies an excellent market for the tops, boughs, and rubbish, which used formerly to be burnt to get them out of the way. For this purpose beech, hazle, elder, birch, and ash coppice are all suitable, and are now sold, where the trade is fully established, at 1s. per cubic foot. At a sale lately in that district a coppice of this description brought £30 an acre, free of all expense of labour, to the owner of the land, and in about 14 years more the same coppice will be again ready to cut. Such prices cannot, of course, be looked for at first, but when the trade is fully organised the manufacturers compete with each other, and as higher rates call further on their ingenuity, powder factories are established, where all the wood under one inch in diameter, and which is therefore unsuitable for the bobbin mill, is turned to profitable account. Besides the direct benefit to an estate in affording a good and accessible market for the small wood, a mill of this description employs 50 or 60 hands, and

in process of time it may lead to the manufacture of the thread as well as the pirns.

There has been no abatement of rent on the estate, nor are there many complaints. The prices of corn are low, and the returns from cattle have not been remunerative; but Sir James Graham's tenants draw a large proportion of their annual receipts from the feeding of sheep and pigs, both of which have been paying well. Considering the condition of the farms as regards drainage, fences, and buildings, the rent appears to be fairly charged, and the tenants have no doubt that Sir James will not permit them alone to bear all the burden of unforseen low prices, should they continue. The present leases were entered to in 1843. Rents vary considerably, according to the quality of the soil; from 20s. to 26s. an acre may be the average for arable land, about a tenth of which is reclaimed moss. The highest rent for a large farm of excellent land, completely drained, fenced, and housed, is 36s. an acre, the tenant also paying rates, the whole of which do not together exceed 1s. 6d. per £1.

The usual course of husbandry adopted on the estate is the five course, the land remaining two years in grass. A good farmer who desires to change the system is at once permitted to do so, and on land of superior quality it is understood that the landlord would not object to such a tenant taking wheat every alternate year if he found such a practice advantageous.

As an example of the mode of farming practised on the estate we may shortly describe that of Mr. Birrel, of Guards. He occupies the extreme north-western boundary of England, his land lying a few yards from the shop of the famous Gretna blacksmith who used to bind for ever the runaway lovers who presented themselves at his forge. In extent the farm comprises 475 acres, 50 being reclaimed moss, for which the landlord supplied the tiles and the tenant expended the rest of the cost of the reclamation. This was a condition of the lease, the landlord providing tiles, and the tenant binding himself to reclaim a certain number of acres annually. The farm is divided into three natural divisions, (1) of moss, (2) weak land unsuitable for wheat, and (3) good land fit for the growth of any kind of crop. These are each subdivided into five fields, and the rotation being a five course, there is thus annually a field of each quality of the farm bearing the same kind of crops—there being three fields of oats, three of green crop, three of wheat, barley, or oats, three of "seeds," and three of pasture. This, with steady management, insures as nearly an uniform result as can be attained. The green food and fodder bear a pretty constant proportion to the quantity of stock, and the amount of horse and manual labour are regulated in the same manner. The rotation begins with oats, which are sown broadcast on one furrow, and yield 27 bushels an acre on the inferior land, to 36 and 48 on that of better qality. The oats are followed by green crop, one-third of which is potatoes, one-third white and yellow turnips, and one-third swedes. The potatoes are manured with the best dung of the farm, and yield from 6½ to 7½ tons an acre, of the Prince Regent variety, which is at present selling at £3 per ton. The turnips and swedes receive about 20 tons of dung and 2 cwt. of guano per acre, all that have been dunged for being drawn for consumption in the feeding-houses. The turnips which are to be eaten on the ground by sheep receive no dung, but have three cwt. of guano per acre. The swedes are all taken up in December and stored for use in spring, as the farmers here are quite sensible of the injury done both to the soil and the root by leaving it in the ground during the winter and early part of spring. Two-thirds of the land, after green crop, is sown with oats, one-third with wheat, the average yield of which is 30 bushels an acre. 20 fat cattle, reared on the farm, are sent to market annually, and 500 Cheviot lambs are bought in September, and, after being wintered on turnips, are sold fat off the grass during the summer. They receive cake or corn from the end of January till sold, and leave an average advance of 20s. each. 60 pigs are bred and fattened annually on the produce of the farm, and bring about £200. They are bought by dealers, who take them by railway to Leeds, Nottingham, and other midland towns, whence a brisk demand has arisen, accompanied by paying prices. Five pairs of horses, assisted occasionally by two young ones, do all the horse-work of the farm. They are chiefly fed in the stable, except during the summer, when they are turned out nightly on a good pasture.

So little do the farmers wish to increase the extent of their arable land, and so sensible are they of the great advantage of laying their land to grass with a full plant of "seeds," that it is not uncommon to see the farmers themselves, and of their own choice, sowing out their fields without a corn crop. This practice is attended with much success. On the fine farm of Mr. Gibbons, of Burnfoot, a large extent of strong land is now being laid to grass in this way. It is fallowed and thoroughly cleared of weeds, and in the month of June or July, as soon as it can be got ready, it is sown with a mixture of grass, rape, and clover seeds, in these proportions—5lb. perennial rye grass, 7lb. white clover, 7lb. cow grass or perennial red clover, and 3lb. or 4lb. of rape-seed per acre. This is stocked with sheep the same autumn, the 40-acre piece which we saw having yielded excellent keep for the sheep for upwards of eight weeks. It is now a deep rich green, very refreshing to the eye at this season, and will keep and feed a heavy stock of sheep during the coming summer.

Bordering with Sir James Graham on the Scottish side is the estate of Lord Mansfield, who has lately concluded an arrangement with his tenants which is said to have given complete satisfaction. The basis of that arrangement is that the rent during the last leases of 14 years is converted into a grain rent at the average price of the county for these 14 years, and, that being ascertained, 10 per cent. is deducted, and the balance, as a fixed money rent, becomes the future rent of the farm. On these terms the whole of the tenants have willingly entered into new leases. By this arrangement an improving tenant reserves to himself the whole benefits of his improvements, whereas a new valuation taxes the improving tenant unfairly and lets the sluggard go free.

The tenants of East Cumberland are an industrious, hard-working, and economical class of men.

Their families are brought up to industry, the young men working in the fields, and the daughters assisting in the dairy and the house. The in-doors work of a Cumberland farmhouse is a serious matter, as all the farm servants, married and single, receive the whole of their food in the farmer's kitchen. They have bread, porridge, and milk to breakfast, broth, meat, and bread to dinner, and milk porridge and bread to supper. Besides preparing all this, the daughter of a substantial farmer or independent yeoman may be seen on market-day at Carlisle selling her poultry and dairy produce while her father or brother is disposing of and delivering his corn and potatoes.

DERBY, February, 1851.

A description of Chatsworth, the magnificent residence of the Duke of Devonshire, does not fall within our province, though no one ought to pass through that part of Derbyshire without spending a few hours among its varied beauties, both natural and artificial. It is a privilege which the humblest is alike capable of enjoying with the haughtiest; and it is a trait in the Duke's character worthy of being mentioned, that he takes a particular pleasure in witnessing the gratified and happy countenances of the wondering artisans and their families, who are brought up in crowds from the "black" country in Staffordshire by the excursion-trains, and are permitted to walk through and inspect his superb apartments and ornate grounds.

But the village which the Duke has erected within the park for the accommodation of his labourers, and the arrangements he has made for their comfort, may be briefly described. The village of Edensor is entirely the property of the Duke of Devonshire, and within his park. It comprises the parish church, a very handsomely-built school, and a considerable number of cottages, standing singly or in groups, and all disposed in such a way as to produce the most pleasing diversities of effect. They are constructed substantially of white freestone, with variegated roofs, and interspersed with pretty green slopes and shrubs. Their pointed gables, Italian towers, and snug picturesque little porches show that here the labourer has both a comfortable and an elegant home. The park itself is partly devoted to their comfort, the best of it being reserved for the cows of the cottagers and labourers on the estate. The rates paid by the labourers for joisting a cow are from 50s. to 55s., which are very moderate, and must be a great boon, and add much to the comfort of a labourer's fireside. Another part of the park, about 300 acres in extent, is joisted to the tenants, who are thereby enabled to ease their farms of young stock in summer, and to reserve part of their grass for hay. The rate charged to the farmers for four-year-olds is 25s.; for two-year-olds, 35s.; for young horses, 50s. each; and for a mare and foal, £5. We are persuaded that this is a plan which might be advantageously adopted on many large estates, and which would afford, on moderate terms, very useful keep to the neighbouring tenantry, and possibly with more direct advantage to the proprietor than he, on the average, secures from speculating in the grazing of cattle on his own account.

The principal proprietors in this part of the county are the Dukes of Devonshire and Rutland. On neither estate have there been any reductions of rent, but both are believed to be moderately let. On the Duke of Rutland's estate it has been thought proper, on account of the complaints of the tenants, to order a revaluation. That has not yet been completed, but so far as it has gone the farms are now revalued at the same rent, with the average of wheat under 40s., as they bore eighteen years ago, when the average was 65s. This is considered by the authorities on the estate a wonderful result, and only to be accounted for by supposing that at that time the farms were greatly undervalued. The solution, in our opinion, may be found without casting any imputation on the skill or good faith of the former valuators, by considering that in a district where nine-tenths of the land are in grass, the price of wheat cannot truly regulate the value of soil to the farmer. His main dependence is on stock; and the price of meat of every kind, and of dairy produce, wool, and vegetables, is as good as it was then, while the demand for these articles is constantly increasing. Not a farm on this extensive division of the Duke of Rutland's estates has been given up. If by any chance one becomes vacant, there are many competitors for it, the Duke's character as a landlord standing very high with his tenantry. But not only are there no farms vacant, but we were told on most competent authority, that at the rent audits there had not been more than one defaulter for the last five years, and at the last audit only one complaint of the times, among a tenantry numbering 1,100, including village and cottage as well as farm tenants.

The farms are generally small, being from 50 to 100 acres in extent. Where drainage is required the Duke pays half the expenses, the tenant charging all team work as part of his share. The stock being chiefly for dairy purposes and fed in stalls, the liquid flowing from them is collected in tanks made at the landlord's expense. In the neighbourhood of Rowsley the tenantry used to suffer very serious loss by the strictness with which game was preserved; but the hares and rabbits have been greatly reduced, and the winged game only is now preserved so strictly. The damages paid by the Duke to the tenants last year for the destruction of their crops by game were £600. His Grace makes no charge for repairs or additions to farm buildings, looking upon this outlay as a landlord's investment, which is as requisite to enable the tenant to pay his rent as the possession of the land itself. There are few changes of tenancies, but the farms are periodically revalued. One case, of rather an instructive character, may be mentioned, where a man of slovenly habits fell into arrear with his rent, and got behind in every way. He was warned that he must either improve his habits or leave the farm. He did improve, and has now paid off all arrears, and has his farm better stocked than ever it was before.

The rent of the best grass land may be stated at £2 per acre; arable, 15s. to 30s.—all tithe free.

The eastern district of North Derbyshire is more of an arable country. Great improvements have been and are being made by Mr. Arkwright, of Sutton, on his extensive estates, which we regretted that we had not an opportunity of visiting and inspecting.

In the southern division of the county, near Duffield, the land is chiefly in grass, the best of which lets from 40s. to 60s. an acre. In preparation for hay it is top-dressed with dung. The hedges are neatly trimmed, but the fields are small, and encumbered with numerous hedge-row trees. The corn is sown broadcast. Some miles further to the north, the land, while under crop, is not uncommonly cropped in this succession—(1) oats, (2) wheat, (3) oats, (4) fallow, (5) wheat, (6) "seeds," (7) wheat. Good green crop land is fallowed when it becomes too foul to bear a crop. It is then limed and cropped again. Many farms have no turnips whatever, and the accommodation for stock is generally defective. There are cases, however, of much better management. The following particulars of a farm in the parish or district of Shottle may convey an idea of the system pursued. The farm consists of 130 acres, between 30 and 40 of which are under tillage. A portion is under meadow and old pasture, and the rest in pasture in rotation with arable. Two successive crops of oats are taken when the land is broken up from grass, then fallow, limed and dunged, then wheat sown out with "seeds," which remain in grass two years more. The oats are said to average 32 bushels an acre—certainly a very moderate crop, considering the quality of the land. There are 22 dairy cows kept on this farm, short-horns or crosses. They are housed during the winter, and get very few turnips, but are kept in fresh condition by the following mixture of food, in addition to their fodder of oat straw:—The refuse of the oat straw in the cribs, and any damaged or inferior hay, are cut into chaff, over which is poured half a peck of ground linseed, which has been previously steeped twenty-four hours in cold water. The mixture, which is damped a little, begins to heat in twenty-four hours, and is then given to the cows once a day with a handful of bruised oats, but the half-peck of linseed mixture serves the whole stock three days. When the cows calve, their daily allowance is doubled, with a few turnips besides. We were assured this feeding kept the dairy cows in good healthy condition when not giving milk, and it certainly is not costly. The dung on this farm was carefully managed, and mixed with absorbent earth, and the whole liquid is collected in a tank, whence it is pumped over the dung-heap during the winter, and taken out to the meadow in spring.

On the land farmed by Mr. Bell Crompton, of Duffield Hall, a stock of Ayrshire dairy cows has been successfully introduced. Mr. Crompton finds them excellent "doers," and more profitable than any other stock on his land, considering the quantity and quality of food they consume. The produce of these cows by a short-horn bull are very fine animals. For feeding his cows he grows the large drumhead cabbage, the young plants being transplanted into the field in June, at one yard apart every way, and manured with 7 tons of dung per acre. The plants are laid in every third furrow, a fork-ful of dung being placed on each plant, which is then covered up by the next furrow. They are taken up when most convenient in winter, the good cabbages being carted off to a plot of ground near the feeding-houses, and there placed top downwards, each plant on the ground, where they remain fresh till wanted. The bad plants are used at once by the pigs and young stock, but none by the milch cows, as they would affect the taste of the milk injuriously.

We may mention a top-dressing which has been used here with great success on poor pasture. It consisted of 2 cwt. of rape dust, 3 cwt. of superphosphate, and 1 cwt. of salt per acre, mixed together and applied early in spring. 3 cwt. of guano tried beside it caused a more rapid growth of coarse grass, but the former raised the thickest and most nutritious herbage, especially so of clover. Mr. Crompton finds it a good plan to mix his new mown hay, when only one day cut, in layers with oat or wheat straw. The juice and flavour of the hay make the straw palatable to the stock, and the mixture is eaten eagerly by the milch cows and young cattle in winter. The liquid manure is here also carefully collected in tanks, and used with much advantage as a top-dressing on grass.

There is still a great deal to be done by drainage in improving the moister parts of this district. The drains which are made are too shallow, 2 to 2½ feet being the general depth.

Labourers' wages are from 10s. to 12s. a-week; cottage rents, with gardens, from 3d. to 1s. 6d. per week; poor rates, 7½d. per pound; and the rent of land about 28s. an acre.

Before ending the description of Derbyshire we may mention the general impression made on us, and the contrast afforded with the county we had previously visited — Northumberland. The situation and soil of the two counties are certainly very different, but not more so than the state of agriculture. The rate of rent, wages, and taxes of all kinds, in Derbyshire is higher than in Northumberland. The farms are better cultivated, and the farmers infinitely more prosperous and contented. In Derbyshire the land is chiefly in grass, carefully managed, and the small proportion of ploughed land receives minute attention. The farms are small comparatively, being from 100 to 300 acres, and the farmers superintend their own business. They are not encouraged by their landlords to add farm to farm without being provided with adequate capital. They depend for their returns more on the produce of the dairy, breeding, and sheep stock, than on corn. The low country of Northumberland, again, is chiefly under the plough, most of it undrained, the small farms held by men of insufficient capital, the large ones by men who had capital, but who have been tempted to dissipate it over far too great an extent of land; the price of corn has failed them, and they have little stock to fall back upon. They have overploughed and entangled themselves with large undrained farms, the returns from which will not pay the expenses of cultivation. Derbyshire is a pleasant picturesque county, in which landlords,

tenants, and labourers seem tolerably content, where the pastures are well managed, the ploughed lands neatly cultivated, and the stock suitable to the soil and carefully tended.

Passing through Leicestershire, we traversed the small county of Rutland, which seemed undulating and well wooded. The grass land management appeared to be very good; the turnips inferior. Close round Stamford much of the land is still uninclosed, and held in little patches by farmers whose fields are intermixed with each other. Eighty years ago Arthur Young described it exactly as it is at present, adding then that "it is melancholy to think that, in an age wherein the benefits of inclosing are so well understood, such tracts should remain in such a comparatively unprofitable state." And yet so they remain to this day.

The following is a table of the prices in this neighbourhood in

1770.	1851.
Beef, per lb., 3d.	5½d.
Mutton, per lb., 3d, ...	5d.
Butter, per lb., 6d.	1s.
Pork, per lb.	5d.
Milk, per quart	2d.
Bread, per lb., 2d.	1½d.
Wheat per quarter, 41s. 1d.	40s.
Labourers' wages, 6s. per week	10s.
Women at weeding corn and haymaking	8d. to 1s. a day.
Boys who can plough	5s. a week without food.
Cottage rents, 20s. with an acre of land	30s. on great estates, with 1 rood of land; 80s. in open villages, with small garden.
Average produce of wheat on good sandy loam, 20 bush.	28 bushels.
Rent per acre of farms, 5s. to 7s.	20s. to 30s.

At Stamford we passed into Northamptonshire, obtaining a glimpse of the Marquis of Exeter's finely wooded park and mansion of Burleigh. This magnificent place, founded by Queen Elizabeth's Lord Treasurer Cecil, with its grand old trees and noble park, is just the place a foreigner should be taken to, to give him an idea of the wealth of our English nobility.

The tenants on this estate are represented as being in the most hopeless state of despondency on account of the present low prices of agricultural produce; and as they were complaining vehemently, the Marquis offered to have the farms of any tenants who desired it revalued. Only one on this great estate accepted the offer. There have been no farms of any consequence yet given up, and for those which do come into the market there are plenty of offerers, though men of capital are become chary, and will only look at very desirable farms. The estate is said to be low-rented. Small farmers, of whom there are many, are suffering most severely, as they have not saved anything in good times to fall back upon now. Some of them are, indeed, greatly reduced, and we heard of one who had applied to his parish for relief. Others have sold everything off their farms; and some, we were told, had not even seed corn left with which to sow their fields.

In a fine country, with a gently undulating surface and a soil dry and easy of culture, laid into large fields moderately tended, one is surprised to hear that there is so much complaint and so much real suffering among the poorer classes of farmers. It is only in part accounted for by the devastation of game, which on this and some other noblemen's estates in North Northamptonshire is still most strictly preserved. On the 24th of January last, seven guns, as we were told, on the Marquis's estate, killed 430 head of game—a most immoderate quantity at such a late period of the season. The fields are all stuck about with bushes to prevent the poachers netting; and the farmers feel most severely the losses they sustain in order that their landlord and his friends may not be deprived of their sport. The strict preservation of game on this and some other estates in the northern parts of the county was described to us in the bitterest terms, as "completely eating up the tenant farmer, and against which no man can farm or live upon the farm." It is "the last ounce that breaks the camel's back," and men who might have made a manful struggle against blighted crops and low prices, are overborne by a burden which they feel to be needlessly inflicted, and of which they dare not openly complain.

In consequence of the distress among the small farmers many of the labourers would have been thrown out of employment had work not been found for them by the Marquis in stubbing and clearing woodland, which will thus be reclaimed for cultivation. The improvement is expected to be highly remunerative in the end, and it is one of the unlooked for results of free trade, which are to be met with in every part of the country, that a landlord is compelled by circumstances, various in kind, to improve the neglected portions of his estate, and which, without such impelling cause, might have long lain unproductive. Every such improvement is not merely an addition to the arable land of the kingdom, but it becomes also an increased source of employment to the labourer.

The offer of a revaluation, which is made by many landlords, may be declined by their tenants, and yet be no proof that they complain unjustly. On every large estate there are tenants of various degrees of enterprise and skill; and one farm, of the same soil naturally with another, may be doubled in its productive qualities by the superior skill and industry of its occupier: the want of these qualities may have actually reduced the natural fertility of the other farm. Now, these farms may have been originally valued to their respective occupiers at the same rent, and a revaluation now would increase the rent of the one and diminish that of the other. In the one case, the landlord would obtain a benefit from the skill and capital of the tenant over and above the intrinsic value of his land: in the other, he would be deprived of its fair value on account of the mismanagement of the tenant. The tenant of industry and skill, who had employed his capital to the advantage of his neighbourhood, would be actually fined for his enterprise; while the indolent or incapable man, who had benefited neither himself nor others,

would obtain a premium for his misconduct or negligence.

We may mention an offer which was made by one landlord in this district to his tenants in order to meet the difficulties of the time. He proposed that an outlay of 30 per cent. on the rental should be expended in cake, manure, and any other beneficial object the tenant preferred, on condition that this outlay should be borne equally by landlord and tenant. It was equivalent to the offer of a reduction of 15 per cent. in the rent, with this important difference, that that reduction was to be made the basis of future fertility. An outlay of 30 per cent. could not fail to be attended by the best results, inasmuch as the crops would all be greatly increased and the groundwork be laid for solid prosperity.

CULTIVATION OF COTTON.

The cultivation of cotton on soils which, as they form part of the British empire, may not inappropriately be called British, has been a subject of speculation with several theorists since the failure of the production of the cotton plant in America has so much injured the success of British manufacture. This, however, is a subject with which we have little to do. India may or may not be capable of growing that plant to a great or small degree; it may answer or it may fail in Natal or Cape Coast: on these investigations we have neither practical information nor physical data enough to enable us to determine; nay, hardly, indeed, to examine.

But the anxious and painful inquiries made in America on the subject of the failure of cotton have much to do with the principles of vegetable physiology and vegetable chemistry, and promise to throw a little light on investigations of a more domestic and closely interesting character.

Why is it that our once far-famed "wheat and bean land" has become "cold clay"? Why has the tobacco failed to grow in Virginia?—the sugar-cane in Jamaica? Chemistry says that it is because we took out of the soil more than we put in, and therefore it could not bear the depletion, any more than the arterial system of a man, or the pocket of a bankrupt. So far there can be no possibility of error. Some argue, however, that it is only the mineral ingredients which are required; others say the ammonia; others, again, carbon. Perhaps all are right: it needs the whole. Upon this a theory is based which is not found truthful in practice. Men have imagined that if they could put into the soil exactly what the plants took out, they might grow one crop for ever on the same soil. But this is not so. Hence the excretory theorists have claimed a victory. But the simple question has been asked over and over again in this Journal, Is it not also necessary to put the materials into the soil so as to afford them to the plant in the *state* most fitted for its wants? Here is the problem.

Professor Norton, in his recent investigations on the cotton plant, has done something to solve the difficulty. He took for examination two soils from the same plantation, of precisely the same character, the one, however, had grown cotton until it was completely exhausted, and the other produced fine crops of cotton. The exhausted soil had nearly two per cent. more of organic matter than the other, nor was there so great a disproportion in the inorganic materials of the two soils as might have been expected.

But then there was another element of essential difference which accounted for the whole. This was in the degree of solubility in the relative elements:—

The exhausted soil had....	0.147	per cent. only of its elements soluble in water.
The unexhausted soil had..	2.170	,, ,,
The former had	5.19	,, in acid.
The latter	4.96	,, ,,
But the exhausted soil had	88.373	insoluble in acid.
The unexhausted	87.83	,, ,,

Thus while the absolute elements differed in no very striking degree—at least not by any means so far as to account for the one being decidedly productive and the other decidedly barren—yet as regards ready solubility, the exhausted soil has only some one-seventeenth as much ready soluble matter available for the plant as the other. As if it had been said, the soil has indeed all the elements necessary for growing cotton—it has them indeed, but so locked up that the plant cannot disintegrate the cohesion in which their affinities hold them, and hence it fails for want of free and available food. Though rest might restore the balance, it is not so kept at present as to be capable of growing the desired crop. Professor Norton, however, went into the very pith of the matter: he examined each part separately, and the following were the results:—

	Fresh soil.	Worn-out soil.
Organic matter	4.740	6.290
Soluble in water—		
Silica	1.299	0.072
Alumina, iron, and phosphoric acid	0.230	0.019
Lime	0.189	0.020
Magnesia	0.090	0.000
Manganese	0.034	0.000
Potash	0.248	0.120
Chloride of sodium	0.107	0.000
Soda	0.000	0.015
Sulphuric acid	0.144	0.009
Soluble in acid—		
Silica	0.409	0.920
Alumina	1.644	1.820
Iron	1.448	0.670
Lime	0.535	1.340
Magnesia	0.576	0.080
Manganese	0.002	0.000
Potash	0.348	0.070
Soda	0.000	0.180
Sulphuric acid	0.070	0.080
Phosphoric acid	0.092	0.003
The portion insoluble in acid gave—		
Silica	78.845	84.930
Iron and alumina	5.946	2.370
Lime	1.091	0.260
Magnesia	1.142	0.680
Manganese	0.623	0.000

Now, in this case, it seems the great elements of difference were in the soluble alkalies and salts. True, the exhausted soil had very little phosphates or sulphates; it was destitute of magnesia and manganese and chlorine. But as it is known that lime will replace magnesia, and soda will replace potash in vegetables, it might have been imagined they would live. But in these elements it was deficient comparatively: it had only about one-fifteenth of the lime, and little more of the alkalies altogether than one-third.

Thus not only is the element of solubility a very important one in the application of manures, but it merits still more investigation. Water is the first, the most common, and the readiest solvent; but who shall say that acid of any kind is the next? It will dissolve out, which water will not; but may there not be some nearer approximation to nature's operations in testing this, than the use of any acid?

When we see such mistakes made by great and able men as a destruction of one of the elements of plants—the sulphur—in the very act of investigating its presence, we ought to be cautious at every step. And it is possible there is some mode of decomposition more in accordance with nature's own operations than any solution in acid at all. We hope to hear that the subject will be investigated thoroughly.—Gardeners' and Farmers' Journal.

SMITHFIELD CLUB CATTLE SHOW.

LIST OF PRIZES.

JUDGES OF CATTLE AND LONG WOOLLED SHEEP.

Messrs. James Quartley, Henry Chamberlain, Thomas Greetham.

JUDGES OF CROSS-BRED SHEEP, SHORT WOOLS, AND PIGS.

Messrs. Edward Pope, John Ford, jun., John Farncomb.

STEWARDS OF CATTLE AND LONG-WOOLLED SHEEP.

Messrs. George Turner, John Buckley, William Loft.

STEWARDS OF CROSS-BRED SHEEP, SHORT WOOLS, AND PIGS.

Messrs. Jonas Webb, James Burgess, J. Saxby.

(The names of the butchers purchasers of the several animals are given in Italics.)

OXEN OR STEERS.

Class 1.—The first prize of 30 sovs., to Mr. William Heath, of Ludham-hall, Norwich, for a Hereford ox, *purchased by Mr. Mann, of Croydon*—a silver medal to the breeder, Mr. John Oakes, of Afcott, Church Stretton; the second prize of 15 sovs., to Mr. William Henry Brickwell, of Leckhampstead, for a shorthorned steer *(not sold)*; the third prize of 5 sovs., to his Royal Highness Prince Albert, for a Hereford ox, *purchased by Messrs. Pratt and Best, of Bridport.*

Class 2.—The first prize of 30 sovs., and silver medal as breeder, to Mr. Edward Longmore, Adforton, near Ludlow, for a Hereford steer, *purchased by Mr. Nott, of Birkenhead*; the second prize of 15 sovs., to Mr. William Heath, of Ludham-hall, Norwich, for a Hereford ox, *purchased by Messrs. Righton and Farrow, of Reading;* the third prize of 5 sovs., to his Royal Highness Prince Albert, for a Hereford ox, *purchased by Mr. Jeffery, of Foubert-place, Regent-street.*

Class 3.—The first prize of 25 sovs., to Mr. Joseph Phillips, of Ardington, near Wantage, Berkshire, for a Hereford steer, *purchased by Mr. Copeland, of Abingdon*—a silver medal to the breeder, Mr. Thomas Carter, of Dodmoor, near Ludlow, Salop; the second prize of 15 sovs., to his Royal Highness Prince Albert, for a Hereford ox, *purchased by Mr. Alder, of Egham;* the third prize of 5 sovs., to Mr. Isaac Niblett, of Conygre Farm, Filton, near Bristol, for a Hereford ox, *purchased by Mr. Harris, of Chertsey.*

Class 4.—The first prize of 20 sovs., to the Right Hon. the Earl of Leicester, of Holkham-hall, Norfolk, for a North Devon ox, *purchased by Mr. Collingwood, of Lambs' Conduit-street*—a silver medal to the breeder, Mr. William Baker, of Bishop's Nympton; the second prize of 10 sovs., to Mr. Daniel Maydwell, of Ashstead, Surrey, for a Hereford ox, *purchased by Mr. Minton, of Windsor.*

Class 5.—The first prize of 15 sovs., to the Right Hon. the Earl of Leicester, of Holkham-hall, Norfolk, for a North Devon ox, *purchased by Mr. Webber, of the Edgeware-road*—a silver medal to the breeder, Mr. George Turner, of Barton, near Exeter; the second prize of 5 sovs., to Mr. Thomas Bond, of Bishop's Lydeard, near Taunton, for a Devon steer, *purchased by Mr. King, of Paddington.*

Class 6.—The prize of 10 sovs., to Mr. G. H. Kinderley, of Kilpaison, Pembroke, for a Pembrokeshire ox, *purchased by Mr. Collingwood, of Lambs' Conduit-street.*

COWS AND HEIFERS.

Class 7.—The first prize of 20 sovs. and silver medal as breeder to Mr. Samuel Druce, of Eynsham, near Oxford, for a Hereford heifer, *purchased by Mr. Collingwood, of Westbourne-place, Paddington;* the second prize of 10 sovs. to Mr. Richard Stratton, of Broad Hinton, near Swindon, Wilts, for a short-horned cow *(not sold);* the third prize of 5 sovs. to Mr. John Phillips, of Ardington, near Wantage, Berkshire, for a short-horned heifer, *purchased by Mr. Copeland, of Abingdon.*

Class 8.—The first prize of 20 sovs. and silver medal as breeder to the Right Hon. Lord Feversham, of Duncombe-park, Helmsley, York, for a short-horned cow, *purchased by Mr. Cragg, of Mount-street;* the second prize of 10 sovs. to Mr. Joseph Gillett, of Little Haseley, near Wheatley, Oxon, for a Durham cow *(not sold).*

Class 9.—The first prize of 20 sovs. and silver medal as breeder to Mr. William Holland, of Lightcliff, near Halifax, for a short-horned cow *(not sold);* the second prize of 10 sovs. to Mr. Robert Beman, of Moreton-in-the-Marsh, Gloucester, for a Durham cow *(not sold).*

LONG-WOOLLED SHEEP.

Class 10.—The first prize of 20 sovs. and silver medal as breeder to Mr. R. L. Bradshaw, of Burley-on-the-Hill, Oakham, for a pen of 3 Leicester wethers, *purchased by Mr. Glass, of Lambeth Walk;* the second prize of 10 sovs. to Mr. R. F. Hall, of Hesley, near Bawtry, for the like, *purchased by Mr. Barclay, of Tichfield-street;* the third prize of 5 sovs. to Mr. George Walmsley, of Rudston, near Bridlington, for the like *(not sold).*

Class 11.—The first prize of 20 sovs. and silver medal as breeder to Mr. Lawrence Willmore, of Whetstone, near Leicester, for a pen of 3 Leicester wethers, *purchased by Mr. Caldwell, of Portland-place, New Kent-road;* the second prize of 10 sovs. to Mr. Thomas Pulver, of Broughton, near Kettering, for the like, *purchased by Mr. Brooks, of Hampstead-road;* the third prize of 5 sovs. to the Marquis of Exeter, of Burghley-park, Stamford, for the like *(not sold).*

LONG-WOOLLED (NOT BEING LEICESTERS).

Class 12.—The prize of 10 sovs. and silver medal as breeder to Mr. Robert Beman, of Moreton-in-the-Marsh, Gloucester, for 3 Cotswold wethers, *purchased by Mr. Lucking, of Walbrook, City.*

CROSS-BRED SHEEP.

Class 13.—The first prize of 10 sovs., and silver medal as breeder to Mr. J. R. Overman, of Burnham Sutton, near Burnham Market, for a pen of 3 cross-bred Southdown and Leicester wethers, *purchased by Mr. Collingwood, of Islington;* the second prize of 5 sovs., to Mr. Samuel Druce, of Eynsham, near Oxford, for a pen of 3 cross-bred long and short-wool wethers, *purchased by Mr. Pecklington, of Old 'Change, City.*

Class 14.—The prize of 10 sovs. and silver medal as breeder to Mr. J. R. Overman, of Burnham Sutton, near Burnham Market, Norfolk, for a pen of 3 Southdown and Leicester wethers, *purchased by Mr. Holmes, of Fore-street, City.*

SHORT-WOOLLED SHEEP.

Class 15.—The first prize of 20 sovs. and silver medal as breeder to his Grace the Duke of Richmond, of Goodwood, Chichester, for a pen of 3 Southdown wethers, *purchased by Mr. Jeffery, of Fourbert's-place, Regent-street;* the second prize of 10 sovs. to Mr. William Sainsbury, of West Lavington, Devizes, for the like, *purchased by Mr. King, of Paddington.*

Class 16.—The prize of 10 sovs. and silver medal as breeder, to Mr. William Sainsbury, of West Lavington, Devizes, for a pen of 3 Southdown wethers, *purchased by Mr. King, of Paddington.*

Class 17.—The first prize of 20 sovs. and silver medal as breeder, to his Grace the Duke of Richmond, of Goodwood, Chichester, for a pen of 3 Southdown wethers, *purchased by Mr. Kirkby, purveyor to Her Majesty;* the second prize of 10 sovs., to Mr. J. V. Shelley, of Maresfield Park, Maresfield, for the like, *purchased by Mr. Phipps, of Lower Belgrave-street.*

SHORT-WOOLLED (NOT BEING SOUTHDOWNS).

Class 18.—The prize of 10 sovs. and silver medal to the breeder (withheld).

PIGS.

Class 19.—The first prize of 10 sovs. and silver medal as breeder to Mr. John Coate, of Hammoon, near Blandford, Dorset, for 3 Dorset pigs, *purchased by Mr. Haymoier, of High-street, Poplar;* the second prize of 5 sovs. to Mr. William Mills Barber, of Langley Broom, Slough, Bucks, for 3 Middlesex pigs, *purchased by Mr. Squire, of Tottenham Court-road.*

Class 20.—The first prize of 10 sovs. and silver medal as breeder, to Mr. John Coate, of Hammoon, near Blandford, Dorset, for 3 Dorset pigs, *purchased by Messrs. Hedges and Co., of the Harrow-road;* the second prize of 5 sovs. to His Royal Highness Prince Albert, for 3 Bedford and Suffolk pigs, *purchased by Mr. Wall, of Jermyn-street.*

Class 21.—The first prize of 10 sovs. and silver medal as breeder to Mr. John Coate, of Hammoon, near Blandford, for 3 Dorset pigs; the second prize of 5 sovs. to the Earl of Radnor, Coleshill, near Farringdon, for 3 Coleshill pigs—*both pens purchased by Mr. Garland, of Market-place, Oxford-street.*

GOLD MEDALS.

The gold medal for the best ox or steer in Classes 1, 2, 3, 4, 5, or 6, to Mr. Edward Longmore, of Adforton, near Ludlow, Salop, for his Hereford steer, in Class 2.

The gold medal for the best cow or heifer in Classes 7, 8, or 9, to Mr. Samuel Druce, of Eynsham, near Oxford.

The gold medal for the best pen of long-woolled sheep in Classes 10, 11, or 12, to Mr. R. L. Bradshaw, of Burley-on-the-Hill, Oakham.

The gold medal for the best pen of short-woolled sheep in Classes 15, 16, or 18, to his Grace the Duke of Richmond, of Goodwood.

The gold medal for the best pen of pigs in Classes 19, 20, or 21, to Mr. John Coate, of Hammoon, near Blandford, for his pen of Dorset pigs.

SILVER MEDALS FOR EXTRA STOCK.

A silver medal for the best beast in extra stock to Mr. William Heath, of Ludham-hall, Norwich, for a Hereford ox, *purchased by Mr. Bromwich, of Notting Hill.*

A silver medal for the best long-woolled sheep to Mr. Lawrence Willmore, of Whetstone, near Leicester *(not sold).*

A silver medal for the best short-woolled sheep to Mr. William Sainsbury, West Lavington, near Devizes, *purchased by Mr. King, of Paddington-street.*

A silver medal for the best cross-bred sheep to Mr. John

Hutchman, of Little Milton, Wheatly, *purchased by Mr. Adds, of Epsom.*

A silver medal for the best pig to Mr. William Culliford, of Hayling Island, Havant, Hants, for his old Hampshire and Sussex pig, *purchased by Mr. Sturt, of Brighton.*—This animal attracted great attention, crowds surrounding the pen from morning till night: its weight is said to be half a ton, less seven pounds.

HIGHLY COMMENDED.

Class 2.—Mr. Alfred Beisley, of Timsbury, near Romsey, a Hereford ox, *purchased by Mr. Haustie, of Winchester.*

Class 7.—Mr. William Gibbs, of Bishops Lydeard, near Taunton, a Devon heifer, *purchased by Mr. King, of Paddington.*

Class 15.—Mr. John Williams, of Buckland, near Farringdon, a pen of Southdown wethers, *purchased by Mr. Maynard, of Queen's-road, Chelsea;* William and Thos. Arkell, of Langney, near Eastbourne, a pen of Southdown wethers, *purchased by Mr. Botterill, of Rochester-row, Westminster.*

Class 20.—Sir John Conroy, Old Arborfield pigs, *purchased by Mr. Woodley, of Reading;* Mr. Stewart Majoribanks, York and Suffolk pigs, *purchased by Mr. Sinkler, of Brompton;* and Mr. Thos. King, of Paddington-street, a pen of Old Bedfordshire pigs, *purchased by Mr. Taylor, of Little Pultney-street.*

COMMENDED.

Class 2.—Mr. Richard Stratton, of Broad Hunton, near Swindon, a shorthorned steer, *purchased by Mr. Botterill, of Rochester-row, Westminster;* Sir C. E. Isham, of Lamport, Northampton, a Hereford ox, *purchased by Mr. Collier, of Coventry.*

Class 7.—Mr. Richard Healy, of Laughton, near Folkingham, a shorthorned heifer *(not sold);* Mr. Joseph Phillips, of Ardington, near Wantage, a shorthorned heifer *(not sold);* Mr. Isaac Niblett, of Conygre Farm, near Bristol, a shorthorned cow *(not sold).*

Class 15.—A pen of Southdown wethers, Lord Walsingham—*purchased by Mr. Lancefield, of Camberwell*—and Mr. J. R. Overman, of Burnham Sutton, near Burnham Market, for the like, *purchased by Mr. Collingwood, of Westbourne-place, Paddington.*

Class 16.—The Duke of Richmond, a pen of Southdown wethers, *purchased by Mr. Kirkby, purveyor to Her Majesty.*

Class 19.—Mr. William Goodson, of Hill Farm, Carshalton, a pen of Essex pigs, *purchased by Mr. Haymaier, of High-street, Poplar;* Sir John Conroy, of Reading, a pen of improved Arborfield pigs, *purchased by Mr. Woodley, of Reading;* and Mr. Stewart Majoribanks, of Watford, a pen of York and Suffolk pigs, *purchased by Mr. Russell, of Watford.*

B. T. BRANDRETH GIBBS, Hon. Sec.

Another anniversary of the exhibition which the country annually affords the metropolis has just taken place—an exhibition open to the sight of all, either in the living cattle themselves, or afterwards in the butchers' shops, ornamented with holly and misletoe—an exhibition not, like the majority of shows, for the eye alone, but which, it is to be hoped, will supply many a poor as well as rich man with his Christmas dainties, in the "roast beef of Old England," or in the suet of the plum-pudding, in the sausages not German, and in the pork as certainly not town-fed.

It is plain that Londoners owe much to this institution for what they are supposed to value highly at all times, and more especially at Christmas—good living. How much fatter this competition causes stock generally to be made than it would if no Smithfield Club existed! How much does the fatting of these animals improve the general character of live stock over the whole of England, by the sight of them in London, and the report carried down into the counties, of the extraordinary fat stock, to say nothing, at the present moment, of the effects of these shows in improving breeds, in proving which fatten earliest, and which are the best fatting kinds, as shown by the perfection of particular specimens! We allude merely to its effect this year and this Christmas on the fatness of the stock sent up to Smithfield for the immediate consumption of Londoners; and that this is considered a point of no mean importance, is proved by the number of Londoners who favour the show with their presence this year, as in years gone by. The Bazaar in Baker-street, although considerably enlarged, is throughout the day, and until a late hour in the evening, filled with crowds of people, the majority of whom, to judge from their criticisms on the cattle, are inhabitants of the metropolis. While we congratulate ourselves upon the unabated interest taken in this exhibition, it is also gratifying to perceive that each year brings with it improvements in the arrangements as regards additional space for the stock, and for the convenience and comfort of the visitors.

With regard to the show itself there is, we believe, a diminution in the number of cattle exhibited as compared with the entries of last year; but this is made up by the improved character of some of the classes for sheep, more particularly the Southdowns and half-breds between the Leicester and Down. We did not observe so many of those enormous animals with ugly protuberances of fat, whose chief merit was to excite the wonder of a gaping public; but we saw what was far more gratifying—a great increase in the number of young animals, which are as remarkable for their size and symmetry as they are for their early maturity. As a whole, it was the general opinion that the Herefords had a decided advantage over the shorthorns and other breeds. In the classes for oxen and steers the Herefords carried off most of the prizes; and it is only in the classes for cows and heifers that the shorthorns have been the most successful. However, the most remarkable feature of the show is the perfection and earlier maturity of the cattle, which is of itself an abundant proof, if it was wanted, of the benefit of the Club to the farming interest; in fact many of the advances the farmers of this country have made may be fairly attributed to this and similar societies. To the stimulus given to the makers of agricultural implements by the annual gatherings of the Smithfield Club in Baker Street, and at the periodical meetings of the Royal Agricultural Society, may be attributed the pre-eminent position of our implements and machines when compared with those of foreign nations shown at the Great Exhibition. Nor, if it had not been for these, should we now number foreigners of high rank as customers for superior and high-priced specimens of live stock.

Among the successful competitors, we observe in several classes the name of his Royal Highness Prince Albert, who is a larger contributor than usual, and obtains in addition to prizes for pigs, three prizes in classes 1, 2, and 3, for very creditable Hereford oxen.

In class one, for oxen we mention as deserving of particular notice, the Hereford oxen shown by Mr. William Heath, of Ludham Hall, Norwich, who is also the successful exhibitor of several excellent animals of the same description in other classes. The second prize is awarded to a compact shorthorn steer, four years and six months old, shown by Mr. Brickwell, of Leckhamstead, Buckingham, who, we believe is for the first time an exhibitor. The symmetry and compactness of this ox, formed a very striking contrast to others of the same breed, which, although large and fat, were far from being handsome. A four years and four months old Durham bullock, shown by Mr. Leeds, of West Lenham, Norfolk, was very large and useful.

In class two, oxen or steers, of any breed, above three and not exceeding four years old, a remarkable level Hereford, bred and fed by Mr. Edward Longmore, of Shropshire, took the first prize, the silver medal, and also the gold medal, as the best ox in the first six classes. Mr. Longmore was also the breeder of a commended Hereford shown by Sir C. E. Isham : this ox was three years and nine months old, and from the same lot as the one with which Mr. Longmore was successful; but although a symmetrical beast, it was scarcely so well fed as the latter; we may mention also Mr. Heath's three years and nine months old Hereford ox, to which the second prize was given. Prince Albert's was firm and fleshy, but not a level ox.

In class three, the first prize was given to Mr. Phillips, of Ardington, Berks, for a very good and level Hereford two years and ten months old, which was remarkable for its form and early maturity. With a few exceptions, the shorthorns in the above classes, although numerously exhibited, were generally too big and coarse for prize animals. The Herefords were superior to them in squareness of form, firmness of touch, and compactness.

The Earl of Leicester is successful in classes four and five, with two good beasts of the North Devon breed.

Cattle of the Scotch breeds were more numerously shown than we remember to have seen them on former occasions; but, if we except a useful Highlander or two, and one of the Galloway breed, these animals would not bear comparison, either for fatness or in the signs of an aptitude to fatten, so well developed in the more improved breeds of England. We should scarcely think the cattle of this class so good as we have seen them at local shows, and we are justified in this remark by the judges having awarded the prize to a well-fed Pembrokeshire ox, 4 years and 6 months old, belonging to Mr. G. H. Kenderley.

In class seven, for cows and heifers under 5 years old, the shorthorns maintained their reputation by carrying off the prizes. The first prize and the gold medal were awarded to Mr. S. Druce, of Eynsham, Oxford, for his shorthorned and Hereford heifer, aged 3 years and 4½ months—a very complete and perfect animal. The same may be said of Mr. Stratton's cow, and of many others in this class.

In class eight—there being only three exhibitors—but little judgment was required in making the award of the first prize to a shorthorned cow belonging to Lord Feversham.

Three or four good animals were shown in class nine. The first prize shorthorn was certainly a good and well-fed cow; but its appearance was spoilt by the ugly protuberances of fat on its rumps. Mr. Beman's roan cow, 5 years old, and of the Durham breed, was deservedly an object of much attention. We observed also a fine old cow shown by Mr. Chas. Knightley.

The extra class contained very few objects worthy of admiration for symmetry: in fact, the only exception we need make is Mr. Heath's Hereford, removed from class 4, being over weight—a level, short-legged ox, to which the silver medal was given.

A cross-bred Brahmin and Ayrshire heifer, shown in class seven, and a young Brahmin and shorthorn ox, shown in class three, might, we think, have been classed as extra stock. They stood no chance of a premium; but they were certainly well formed and well fed, and showed much improvement by the cross from the original breed.

Of the sheep exhibited, those which attracted the most attention were the Southdowns bred and fed by his Grace the Duke of Richmond, and by Mr. Sainsbury, who very nearly divided the prizes between them; as examples of feeding these were considered almost perfect. There were also many other pens of good Southdowns shown by Mr. Shelley, Mr. Williams, Messrs. Arkcoll, and other gentlemen. Altogether this was a most excellent class. In the class for short-woolled sheep (not being Southdowns), the prize was withheld: the only exhibitors were his Royal Highness Prince Albert, Mr. Wm. Humfrey, and Mr. Stephen King. The sheep shown by Mr. Humfrey, although certainly inferior in their touch and fatness to the other prize sheep; yet, in the opinion of many, were sheep well suited for the purpose of the butcher; and, although perhaps inferior to some, they illustrated the character of a valuable breed—the Hampshire Downs, which has as yet been little encouraged by our national agricultural societies. As a class, the Leicesters were scarcely equal to the Southdowns; nor did they, although numerously exhibited, attract an equal amount of attention. We have already given the names of the successful exhibitors, so that in this instance we must refer to the report of the judges for the list of awards.

We observed only two pens of Cotswolds; the three fine sheep shown by Mr. Beman took the prize.

Mr. Cother, whose letter on the subject of Cotswold sheep in this paper has most likely attracted attention, exhibited, at a butcher's shop just opposite the entrance to the Bazaar, a most extraordinary carcass of mutton, weighing no less than 336lbs.—about four times the weight of an ordinary carcass. The sheep was of the Cotswold breed, and three years and nine months old.

The valuable class of cross-bred sheep was well illustrated by the Southdown and Leicester wethers, shown

by Mr. T. R. Overman, of Burnham, Norfolk, who was again successful in carrying off the prizes, in competition with some good sheep shown by Mr. Druee, of Eynsham, and Mr. John Hitchman, of Little Milton, Oxon, and some others of scarcely equal merit.

Our limited space will not admit of our giving a lengthened report of the pigs; and perhaps we shall be excused making mention of the exhibitors—the more so as the first prize in all of the three classes, with the gold medal, has been awarded to the excellent specimens of "improved Dorset pigs," shown by Mr. Coate, of Hammoon, near Blandford, Dorset—thus beating in a wholesale manner the best specimens that the far-famed breeds of Coleshill, Eynsham, Arborfield, and others could produce. We congratulate Mr. Coate upon his success.

However, we must not omit the enormous Hampshire and Sussex pig, said to weigh half a ton—but we will not vouch for the truth of this—two years and nine months old, bred by Mr. W. Culliford, of Hayling Island, Havant, Hants.

The alterations in the classification of the cattle recently determined upon, by which it is intended at ensuing shows to form the classes according to the different breeds, so that shorthorns will only compete with shorthorns, Herefords with Herefords, and Devons with Devons, &c., &c. With the other kinds will probably be a cause of increased competition amongst the members of the club for the honours it so liberally confers. It will also probably lessen the difficulties of the judges in making their awards; for the most unprejudiced breeder of cattle must be more or less biassed in favour of his own kind; and this may influence a person's judgment without he being himself conscious of it.—Mark Lane Express.

The approach of that season when almost every Englishman places upon his table the very best specimen of the national food of his country, brings with it the annual show of *fat stock*, for which the venerable and highly useful Smithfield Club Cattle Show has for many years been famous. It may be remembered how one member of the daily press a few years ago exerted itself to the very utmost of its great abilities, to put down this Smithfield Show; and many were the witty jokes it perpetrated against grease and tallow. But despite of this, the natural feelings of the English predominated, and year after year has rolled on, bringing with it meetings and exhibitions of a more extensive character, and, indeed, a more improved collection of animals: but in the present year it may have said to have outgrown itself, both in quantity and general quality.

In *quality* it has manifestly made the greatest strides. There was a time when the animals exhibited had laid on their fat in *parts*, until they became positively ugly. It was a system of strong physiological tendency to lay on fat, that made here and there cushions—more elegant in the showroom of the butcher, when cut in pieces, than presenting a *whole* perfectly symmetrical. Our meaning will be understood by a reference to Mr. Samuel Watson's short-horned ox—Number 15—as somewhat a specimen. Good in quality—wonderfully fat—still it loses its symmetry in lumps or cushions of absolute fat, deposited in various parts of the body. Such *were* the fashionable animals. But now a deep, square fleshy rump—a full, broad, muscular crop and sirloin, with a firm even covering of both muscle and bones with fat, combining light offals, is an animal which is more in favour, and, we think, rightly so.

Hence the Herefords, who present a short, thick, round lump of fleshy fat, are in great force; and as the award shows, they have a great preponderance of the prizes in the classes where they compete in any numbers; nor can it be doubted that there are some very excellent Hereford animals. In Class 1 a Hereford wins the first and third prizes. In Class 2 the first, second, and third prizes. In Class 3 the first, second, and third prizes; and in Class 4 the second prize. But above all, the gold medal is awarded to a Hereford as the best ox or steer in the 1st, 2nd, 3rd, 4th, 5th and 6th classes.

Now while we would be the very last to raise a question as to the decisions of judges the most honourable, the most accurate, the most upright of men, we must be aware that it is impossible to class together animals of breeds so different as the short-horn, the Hereford, and the Devon, one with another, and ask any set of judges to name a *best*, and expect a satisfactory decision, unless you first instruct them which breed *per se* is the best. But as this is the gist of the whole controversy, we fear that short-horn judges might be expected, other things being equal, to have preferred a short-horn; Hereford judges would prefer a Hereford; and Devon judges a Devon. This is so clear, that we believe the club has already decided not again to class these animals together. If it were possible to find a Chinese or a Hindoo judge, who was competent to decide on the qualities and conformations of cattle, and who did not know any feeling of preference to either the one or the other breed, they might be put together and so decided; but as a practical knowledge of the peculiarities of a breed, as indicated by its conformation, can only be known by a practical breeder, we fear a set of separate classes will have to be kept up, each compared with its fellows, and decided upon by parties who know the characteristics of their own peculiar favourites.

Another remarkable fact has also taken place

In the very respectable and valuable show at Birmingham a Hereford cow, an animal seldom shown, has taken, and we believe rightly taken, the society's medal for the best animal in the yard. She is a most extraordinary animal, and cannot be too much praised: she belongs to Mr. Vaughan, of Cholstrey, near Leominster; and was bred by the Rev. Henry Blissett. Her small bone, light offals, full, even, firmly laid-on fat, broadness, rotundity, straight back, good crops and rump, make almost a perfect animal; which, indeed, she would have been, had she possessed a better flank, which was decidedly deficient. But at the Smithfield show the merit of the winner of the gold medal was by no means so decided. Certainly the ox was an animal of good points, and prime quality. He was, moreover, but three years and eight months old; and as a butcher's animal he was, we might say, unexceptionable. Again, the short-horned and Hereford heifer which took the gold medal for the best in the 7th, 8th, and 9th classes was an animal of very excellent quality; but if symmetry had any weight in the judgment, we could not have resisted the awarding of the prize to Lord Feversham's short-horn—bred, as we believe, from the stock of the late Mr. Bates, of Kirkleavington.

It must be remembered, also, that many animals were shown as short-horns who had no such real pretensions. There were those who had been purchased at fairs and fed for Christmas beef, and possessed doubtless general blood of good short-horn animals; but they no more deserved the name of pure-bred short-horns than did the Brahmin cross of the Earl of Derby. True, there were a few of real excellence. Mr. Wiley's, Mr. Holland's, Mr. Davy's, and Mr. White's were all that short-horns should be; but the large, gaunt, coarse animals, called in some cases short-horns, had no pretension to the name.

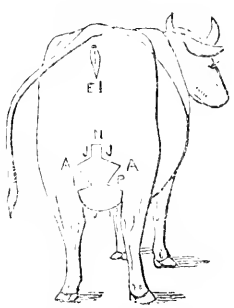
The sheep and pigs were extraordinarily good. The crosses of Leicester and Down are of quality so valuable that a lesson was, we think, taught to breeders. There is hardly anything more important just now than attending to the improvement of sheep stock; and the agriculturists who flocked in such vast numbers to the Smithfield show will learn some valuable lessons.—Gardeners' and Farmers' Journal.

TREATISE UPON MILCH COWS.

[FROM THE IRISH FARMER'S GAZETTE.]

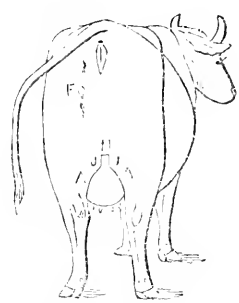
(Continued from page 543, vol. xxiv.)

FIFTH ORDER.—NO. V.



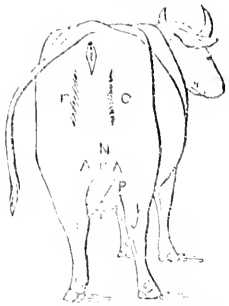
These cows give 8 quarts of milk per day, and hold their milk till 4 months gone in calf. The mark is more contracted. The points A A are more sunk in the bottom of the thighs, and are not so apparent as in order 4. Below the bearing there is a little hair, growing upwards, about 1¾ inches long, by not quite half an inch wide, marked E. The point N is much further from the bearing than in the other orders. To the right and left of the points A A are two scarcities or bareness of hair, growing upwards, which sink into, or upon each thigh, marked P P, 4¾ inches wide by 4 inches long.

SIXTH ORDER.—NO. VI.



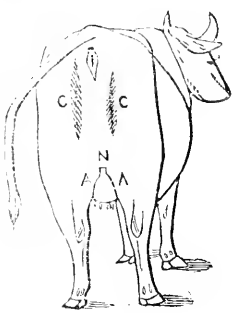
These cows give 6 quarts per day, and hold their milk till 3 months gone in calf. The gravure is more contracted, and lower than in the fifth order. To the left near the bearing, is a bristling ecusson of hair, growing upwards, marked F, which is about 4¾ inches long by 1½ inches wide.

SEVENTH ORDER.—NO. VII.



These cows give 4 quarts per day, and hold their milk till 2 months gone in calf. The gravure is still more low, and contracted. To the right and left of the bearing are two ecussons of hair, growing upwards, and bristling. That on the left, F, is about 5 or 5½ inches long; that on the right, C, is 4 inches long by 1½ inches wide. On the right, and below the point A, is a scarcity or bareness of hair, growing up, marked P.

EIGHTH ORDER.—NO. VIII.



These cows give 2 quarts per day, and only hold it till again in calf. There is hardly any mark, and the points A A are barely distinguishable. The bristling hair on the right and left of the bearing, marked C C, denotes degeneration or bad qualities.

MIDDLE SIZE.—FIFTH CLASS.

First order give 14½ quarts a day, and hold their milk till 8 months gone in calf.

Second order give 12 quarts a day, and hold it till 7 months gone.

Third order give 10 quarts a day, and hold it till 6 months gone.

Fourth order give 8 quarts a day, and hold it till 5 months gone.

Fifth order give 6 quarts a day, and hold it till 4 months gone.

Sixth order give 5 quarts a day, and hold it till 3 months gone.

Seventh order give 3 quarts a day, and only hold it till 2 months gone.

Eighth order give still less, and only hold it till again in calf.

SMALLEST SIZE.—FIFTH CLASS.

First order give 10 quarts a day, and hold it till 8 months gone.

Second order give 8 quarts a day, and hold it till 7 months gone.

Third order give 6 quarts a day, and hold it till 6 months gone.

Fourth order give 5 quarts a day, and hold it till 5 months gone.

Fifth order give 4 quarts a day, and hold it till 4 months gone.

Sixth order give 3 quarts a day, and hold it till 3 months gone.

Seventh order give 2 quarts a day, and hold it till 2 months gone.

Eighth order.—These are still less abundant in milk, and lose it when again in calf.

When the ecussons marked F F, are of the length and breadth specified in the designation of the third and fourth classes, they indicate cows bâtardes. Here, as before, the smaller ecussons indicate the best cows.

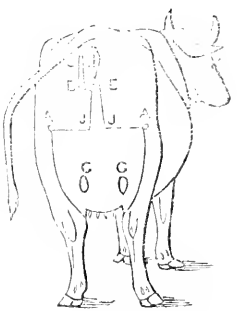
EQUERRINES.

SIXTH CLASS.

This name expresses the form of gravure or ecusson, which indicates a square—above. The description I am about to give will better illustrate this figure.

LARGEST SIZE.

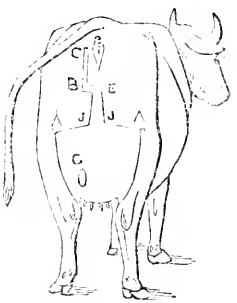
FIRST ORDER.—NO. I.



The cows of this size, and of this order, give, in full milk, 17 quarts daily, and hold their milk till 8 months gone in calf. The scarf-skin on the gravure is the same as in the first orders of the preceding classes, the hair, of course, growing upwards on it. The udder is fine, covered with a short and fine hair. The gravure springs from the bottom of the thighs within, and a little way from the houghs, rising upon the thighs, and flowing

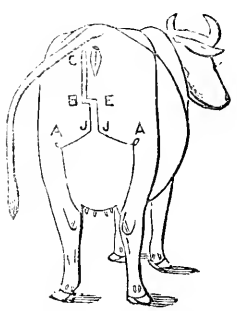
over towards the points A A; from that it forms a square, by a right line, which sinks into the thighs at the points J J, which are distant from one another about 4¾ to 5¾ inches. From the points J J two right lines in rising join, forming an acute angle at the letter E, which is distant from the bearing about 2 inches. From thence goes a line forming a square to the left, marked B, in rising at the same side to C, which is close to the opening of the bearing. The distances from E B and B C are nearly equal—viz., E B 4 inches long, and about 1 inch wide; above, and opposite the hinder teats, to the right and left on the udder are two small ovals, formed by some hair, growing downwards, in the middle of the hair which grows up, and marked G G, about 4 inches long, and 2½ inches wide. These ovals of hair, growing down, are distinguished by their white colour. The squares which approach nearest to the bearing denote the best milkers.—See plate 6, order 1.

SECOND ORDER.—NO. II.



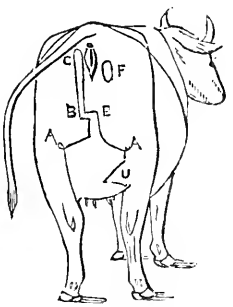
These cows give 14½ quarts of milk per day, and hold their milk till 7 months gone in calf. The mark is the same as in the preceding order, but more contracted throughout the ecusson or gravure. The square on the left of the bearing is a little lower and longer than in the first order. There is only one oval, on the left, above the hinder teats. The oval is the same size as above, marked G.

THIRD ORDER.—NO. III.



These cows give 12 quarts of milk daily, and hold it till 6 months gone in calf. The gravure has always the same form, but more low and contracted in all its parts. The points A A do not flow over so much upon the thighs as in the second order, and the gravure brings itself into a narrower compass, by a curved line upon the points J J. The angle formed by J J, joining the letter E, is more narrow than E B, and shorter than B C. This line is wider and longer than in the preceding order.

FOURTH ORDER.—NO. IV.

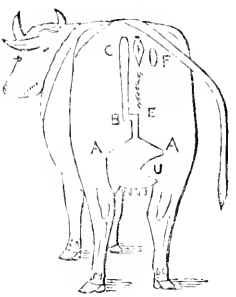


These cows give 10 quarts per day, and hold their milk till 5 months gone in calf. The mark is proportionably more narrow and low. To the right of the bearing is an ecusson of hair, bristling and growing upwards, marked F, which is about 4 inches long, and 1½ inches wide. At the point A, on the right, is a scarcity or bareness of hair, which swells itself with the thigh, marked U.

EQUERRINES.

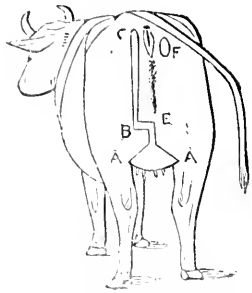
SEVENTH CLASS.

FIFTH ORDER.—NO. V.



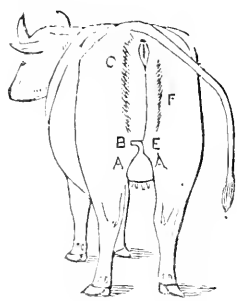
These cows give 8 quarts per day, and hold their milk till 4 months gone in calf. Same marks, but always more contracted in all the extent of the gravure. The lines of hair growing up to the right and left of the bearing are bristled. At the point A, on the right, is a scarcity or bareness of hair, which swells itself into the thighs, U.

SIXTH ORDER.—NO. VI.



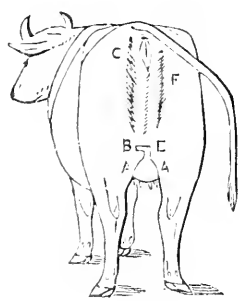
These cows give 6 quarts of milk per day, and hold their milk till 3 months gone in calf. The gravure is still more contracted at the bottom of the thighs. The square is still further down from the bearing. The lines of hair growing upwards to the right and left of the bearing are of a coarse, bristling hair.

SEVENTH ORDER.—NO. VII.



These cows give 4 quarts of milk per day, and hold their milk till 2 months gone in calf. The ecusson is still lower than in the sixth order. The line of hair growing up on the right, marked F, is also more bristling and wider.

EIGHTH ORDER.—NO. VIII.



These cows give 2 quarts of milk per day, and only hold their milk till again in calf. The form of the ecusson is the same, but very narrow, and sunk into the thighs.

MIDDLE SIZE.—SIXTH CLASS.

First order.—The cows of this order give 13 quarts a day, and hold their milk till 8 months gone in calf.

Second order give 10 quarts a day, and hold it till 7 months gone.

Third order give 8 quarts a day, and hold it till 6 months gone.

Fourth order give 6 quarts a day, and hold it till 5 months gone.

Fifth order give 4 quarts a day, and hold it till 4 months gone.

Sixth order give 3½ quarts a day, and hold till 3 months gone.

Seventh order give 2 quarts a day, and hold it till 6 weeks gone.

Eighth order still less abundant, and only hold it till again in calf.

LOWEST SIZE.—SIXTH CLASS.

First order.—These cows give 9 quarts of milk per day, and hold it till 8 months gone in calf.

Second order give 8 quarts a day, and hold it till 7 months gone.

Third order give 6 quarts a day, and hold it till 6 months gone.

Fourth order give 4 quarts a day, and hold it till 5 months gone.

Fifth order give 3½ quarts a day, and hold it till 4 months gone.

Sixth order give 2½ quarts a day, and hold it till 3 months gone.

Seventh order give 1 quart a day, and only hold it till six weeks gone.

Eighth order still less, and only hold it till again in calf.

When the cows of this class have the ecusson on the right of the bearing, marked O, of a bristling hair, it denotes a bâtarde. This is the only sign which denotes degeneration in this class, and in each of its orders, besides the length and width of the ecusson, and, above all, if the rising of the square on the left of the cow has an equally bristling hair as the ecusson on the right. These ecussons, formed by the hair growing upwards, which goes across, are generally of a coarse hair, and from 4¾ to 5¾ inches long, and 2 inches wide. When they are small the loss of milk is not so sensible or quick, but the cows will not lose it less by a gradual diminution of the produce some time after they become in calf.

LABOUR AND THE POOR.—THE RURAL DISTRICTS.

NORTHERN COUNTIES—NORTHUMBERLAND.

LETTER XXVI.

(From the Morning Chronicle.)

Northumberland—though the region thus designated is much narrowed in its dimensions since the days when it comprehended all the land on the east coast lying northward of the Humber—is still an extensive and important district, with a distinct and strongly-impressed character. It abounds with architectural remains of the middle ages, amongst the grandest to be found in any European country. At Newcastle, the visitor sees the huge Norman keep which the Conqueror reared to curb the bold Northumbrians, frowning over the crowded haven to which the ships of all nations repair, and over the flourishing streets which attest the modern civic grandeur of the town, and watching, as it were, over one of the most superb constructions of modern engineering science—the high-level bridge of Stephenson, across which the express trains of the Great Northern Railway whirl the throngs of passengers that flit between the capitals of England and Scotland. Other and even more imposing relics of former times are found in the minster church of Hexham, towering on its hill (Hagulstad, the holy place), above the fertile vale of Tyne; in Alnwick, that princely seat and stronghold of the Percies; in the vast feudal ruin of Warkworth, seated on its river-circled crags, and overlooking Coquetdale, with its blithely brawling stream, so dear to anglers; and, greatest of all, the steep of Bamborough, the Flame-bearer's gift to his queen, where the voyager yet sees—

> "King Ida's castle, huge and square,
> From its tall rock look grimly down,
> And on the swelling ocean frown"—

a pile that has seen fifteen centuries roll over its head, and is still strong and serviceable to the uses of man. The triangular shape of Northumberland, though naturally defined by the Cheviot hills and the Tweed, is yet not without a meaning that speaks of political relations existing in ancient days, when the island contained two hostile and warring nations, who delighted in indulging their mutual antipathies; it was a wedge projected by England amidst the Scots, and running up towards the heart of the enemy's territory. Camden says that "the ground itself, for the most part rough and hard of cultivation, seemeth to have hardened the inhabitants, whom the Scots, their neighbours, also made more fierce and stubborn, while sometimes they keep them exercised in warres, and otherwhiles in time of peace intermingle their manners among them." No county in England has made more real or solid progress in all the elements of social prosperity than Northumberland: commercial and mining enterprise goes hand in hand with skilled cultivation, and supplies a various and extensive field to industry; a sound and healthy, if limited, education, is generally diffused amongst its inhabitants; and the hard-headed shrewdness and intelligence of the peasantry form a remarkable contrast with the apathy and stolidity observable amongst them in some other quarters.

The coast district, by Morpeth, Wooler, and Belford, is generally level, and its aspect differs little from that of the North and East Ridings of Yorkshire, except that it is poorer and comparatively devoid of wood. A few miles to the west the country rises into uplands of moor and fell, which furnish scanty pasture for sheep and cattle; but tillage is active along the margin of the streams, and is pushed up the hill sides. The ure-ox, the bison, and the elk, once roamed undisturbed in these spacious tracts; and still the wild bull, with shaggy mane, and hide as tawny as the Nemean lion's, makes his lair in the woods of Chillingham, where the hospitality of the ancient house of Tankerville finds him a corner sheltered against the ruthless march of improvement. Though expelled from the territory of Douglas and Hamilton, this denizen of the Caledonian forests is still secure from molestation here.

Agriculture is less advanced in the southern division; and farms, except in "Hexhamshire" and the vicinity, are in general of moderate size. Amongst the chief proprietors are Colonel Beaumont and Mr. Silvertop, both noted for liberal dealing and enlightened views. The Duke of Northumberland has also large property here, though more in the north. Most people are loud in praise of his intentions and actions since his accession to the estates of his family. His tenants are stimulated to improvement, and large advances for draining or other operations are never withheld. The system on which his land is let is commended for its equity, and doubtless works well. In cases where complaint is made as to the tenure, leases are granted; and when objections are made to the rent as too high, the matter is referred to valuers. Should the farmer decline to stand by their award, the land is of course opened to competition. On the duke's own domain of Alnwick, employment has been found for labour to a greater extent than in the time of his predecessor, as I was informed; yet it appeared to me that more may be done with advantage, as it still has rather a neglected look. The Duke of Portland has also considerable property in the middle district of Northumberland,

and its management is likewise much commended. In the northern division, farms generally run to a large size, those of 1,000 acres being met with in all parts. The homesteads are here of an extent rarely seen; indeed, with their rows of cottages adjoining, their immense farm-yards with ranges of stacks, their threshing-machines worked by steam, and the brick chimney for the engine that drives them, they have much the air of corn factories. But enter, and you will be struck with the order and science that pervade every part of the system, the large scale on which the arrangements are made, and the precision with which the work is distributed and performed. Tweedside and the Lothians can alone show the like. Still it is evident even to a passer-by who examines the appearance of the land, that improvement has nowhere reached its acme. You admire the large expanse of one newly-ploughed field, the beauty of the furrows, the neat and clean look of the land; and the next minute perhaps you come upon a large piece which seems to have lain fallow for years, its balks and ridges steeped in wet, and even the clumps of rushes not extirpated. Some Northumbrian farmers have retired from their vocation in the course of the last twenty years with large fortunes—the best proof of the skill with which it had been pursued. Yet intelligent business habits are not universal amongst them. I know a farmer who holds seven hundred acres, and who confesses to never seeing a newspaper, which I should think can be no advantage to him in calculating the turn of the market. Northumberland contains a large proportion of indifferent land, on which the grain-crops do not run higher than from 12 to 16 bolls (24 to 32 bushels) an acre. Its wheat bears a much lower price in the market than that of Norfolk, Essex, and Lincoln, and is inferior in substance and nutritive qualities. This is strikingly enough evinced in the character of the bread, which is thin and poor indeed, compared to the London-made loaf or roll. The farmer is here freed from some drawbacks to which he is exposed in other districts that might be specified. Although a sporting county, the crops sustain comparatively little injury in consequence; foxhunting is not so much the rage as in some parts of Yorkshire, where I have known a farmer have forty turkeys killed by foxes at Christmas, for which he would only be indemnified to one-half their value. There are few non-residents amongst the Northumbrian gentry. No men are more awake than the Northumbrian farmers to the necessity of applying capital and energy to the cultivation of the soil.

Before I proceed further, I may as well advert to the obstacles which are thrown in the way of such an inquiry as that on which I am engaged, by the utter want of any system for the collection of agricultural statistics. This obliges one to speak much in generalities, and even those who are best acquainted with the condition of agriculture, and who have been longest versed in its practice, can often do little more. How strange that a matter on which so many things depend, and for which a ready-made machinery may be said to exist to the hand, should be utterly unprovided for—and in that which is in many respects the first agricultural country in the world! How is the farmer to regulate his operations with certainty and satisfaction—how is the tradesman to guess the character of an approaching season, and his chances of conducting business with profit or loss—how are the people to calculate the probability of the future and to proportion their expenses with reference to its exigencies—whilst all exact knowledge as to the supply and amount of the articles which constitute the staff of life is beyond their reach? What value is to be placed on the deductions of statistics, whilst the most important department of all presents nothing but a blank? Through want of this, we have been led into a thousand miscalculations, absurdities, erroneous notions, and prejudiced theories. No man in his senses, who really knew anything of the condition of the great mass of the people, could otherwise ever have believed that they ate nothing but wheaten bread to their beef and mutton; the facts being that flesh is very often, except in favoured districts, reserved for the Sunday dinner, and that in the north of England the people are as far from despising oatmeal or peasmeal crowdy (sensibly enough too in this particular), as their neighbours beyond the Tweed.

Northumberland possesses the greatest stock-market in the north-eastern quarter of England—that of Newcastle. Its establishment dates no further back than 1830. For ten years it made comparatively little progress, but it has now absorbed all lesser circles of business in this branch into its own sphere. The show of cattle on several occasions lately has been considered unequalled for number and quality. Its condition and circumstances will be best understood from the subjoined extract from a report recently addressed to the magistrates and town council of the borough, which I am enabled to present to you through the kindness of the able and intelligent official by whom it was drawn up:—

"The seventh annual report of this market shows a considerable increase in the number of both cattle and sheep, as compared with those of former years; and also a corresponding increase in their weight and quality.

"The numbers of stock presented for sale at this market from March 23, 1848, to March 20, 1849, being fifty-two weeks, have been as follows:—Fat beasts, 30,752; keeping ditto, 3,951; sheep and lambs, 255,356; swine, 10,823;—being an increase of 8,053 fat beasts, 219 keeping ditto, 21,434 sheep and lambs, and a decrease of 1,095 pigs, as compared with last year. I ought to state that the smaller kinds of the latter description of stock have sold at higher prices than were ever known.

"The following is a statement of the numbers of fat cattle and sheep and lambs offered for sale at this market during the last seven years—

Year.	Cattle.	Sheep and Lambs.
1842	5,974	117,010
1843	8,686	141,581
1844	17,086	212,601
1845	19,098	211,172
1846	25,943	222,959
1847	22,699	233,932
1848	30,752	255,356

"It will be seen from the above, that the only interruption in the progressive improvement of this market was in the disastrous year of 1847.

"I am, gentlemen,
"Your most obedient servant,
"FRANCIS SINTON.

"Cattle Market-house, Sept. 11, 1849."

The lot of the tiller of the soil in Northumberland, though far from being exempt from hardship and vicissitude, is yet one of comparative comfort on the whole. I have already given you an account of the "hind," or, as it is commonly called, the "bondage" system, as partially prevailing in Durham; it is much more widely spread in Northumberland, where it may be considered as the general condition of the labourer. But this difference is to be noted—that whereas in Durham the hind generally receives the greater portion of his wages in money, in Northumberland he is paid chiefly, and sometimes wholly, in kind. There are many degrees of variety in the condition of hinds; perhaps the best-paid men—as they are those of greatest trust and mark—are the drovers employed on the large cattle-farms and sheep-walks, and charged with the care of the numerous and valuable flocks and herds which roam on the upland pastures. The drover, or head of the herdsmen, is, in fact, part holder of the stock; he has sixty sheep for every six hundred he tends, and pasturage for two horses and his cow, together with his wheat, oats, and potatoes. The drovers are a fine class of men, who dress picturesquely with their plaid (the originators, in fact, of the costume now so much in vogue with railway travellers); let the readers of the Ettrick Shepherd's works say whether they are deficient in intelligence. Their life is one of toil and exposure to bleak skies and inclement winds; yet its rustic pleasures are not the less keenly enjoyed for being few and hastily snatched. Terrible fellows, too, to quarrel with, some of them would be, and a man must wrestle well indeed to throw them. The Roman wall runs across their pastures, and may suggest to those of them who are inclined that way a world of historical reflections and poetic musings. The Cheviots rear their heads in the distance, and may remind them of days when the wild riders of the border poured down from their fastnesses, to chase the deer in Earl Percy's woods.

Having glanced in passing at rural pleasures and sports—a theme surely not unfitted for Christmas times—I may here mention one which exists only in the north of England, and which is, on many accounts, too curious a relic of other days to be passed without notice. I allude to the sword-dance, as exhibited by the guisers or mummers, who at this season quit the hay-knife and spade, or emerge from the coal-pits, to show their rustic gallantry. It is now much more rarely witnessed than it was twenty years ago. This dance is a most beautiful and animated saltatory performance, executed by parties of six men, quaintly garbed in feathered or tufted caps, and spangled jerkins; it includes a considerable variety of postures and evolutions, in which the weapons are grouped with very ingenious combinations, in star-like cluster, vertical poise, and horizontal radiation. A pipe and tabor furnish the music; and there is a spokesman of the party, who does the oratorical prelude in uncouth periods or doggrel rhyme, to repeat which would not greatly tend to edification. It is an indubitable heir-loom from the Scandinavian ancestors of our northern population; the dance is frequently celebrated by the Norse Scalds and Saga-writers, and I doubt not that after a thousand years the veritable measure and tune is still preserved to which it was performed by the Sea-Kings of Ragnar Lodbrock and Harold Hardrada, the two most redoubted champions of the North. These games flourish here at Christmas-tide, as morris-dancers in Yorkshire still circle the May-pole in the early days of summer; and may I not be excused for this brief record of toys which a few short years may blot out from the catalogue of visible things? Other amusements, of a less picturesque character, are long-bowling, the excellence of which consists in the smallest number of stone-throws to a mile (quite a different amusement from nine-pins, on a trim bowling-green), and cock-fighting—a barbarous pastime, which has now well-nigh died out. But the sword-dance has escaped mention at the hands of almost all the antiquarians who have undertaken to describe the sports of the English people, and, therefore, I think it deserving of mention here.

There is one peculiarity in the aspect of Northumberland to which I may here advert. Villages are rare, and the eye is not offended by those aggregations of rickety hovels so common in some districts of the south. Small towns, from 1,000 to 5,000 inhabitants, are comparatively numerous—clean, pleasant-looking places, well and substantially built, generally of the whin or free-stone, plentifully found in the north of England and the south of Scotland. This feature of the social arrangements of the district arises, no doubt, from the insecurity of life and property caused in old times by the turbulent and predatory habits of the border population, and which admitted of safety only under the shelter of the feudal castle, or in the streets of the walled town. This, doubtless, has its effect in maintaining the old-fashioned system of lodging the farm-servants and labourers in or about the homestead. The extended cultivation of the soil is here of comparatively recent date; a great portion of the county consists of reclaimed moorland, which has been enclosed and brought under tillage within the last hundred years. The district under the Cheviots naturally was the last to receive cultivation, both from the poorness of the soil and from the memories of ancient ravage and depredation. Some most excellent farms have been created here within fifty years—the farm-steadings being on such a large scale as to be in fact hamlets, and the buildings of a very superior description. The cottage accommodation in many localities was formerly indifferent, from the fact of the dwellings being held rent-free, and therefore often neglected, and left without repair; and in some places it still continues to be so, but in no respect has the march of improvement been so rapid as in this. This result is to be ascribed, I am informed, to the excellent example set by the Duke of Northumberland and Sir Walter Riddell, a

magistrate and proprietor of the county, who also presides in the duke's court-leets. It is doubtful, indeed, whether in some cases improvement is not being pushed to extremes. New cottages are now almost always built with four rooms (some of the old cottages had but one); the consequence is, that the labourer cannot, for some considerable time at least, furnish them, and this leads to the temptation of subletting.

I come now to consider the condition of the hinds who in Northumberland constitute the mass of the agricultural labourers. Hinds do not work for weekly wages, but are hired by the year or the half-year. Each of the married men is provided with a cottage and small garden on the farm for himself and family, several of whom are in many cases engaged by the year as well as himself. The wages of the hind, as I have said, are paid chiefly in kind; those of his sons, either in money, or partly in money and kind. He is bound also to find the services of a woman, who, of course, is almost always one of his family. The conditions of the engagement vary somewhat in different parts of the county, and will best be illustrated by taking a series of particular instances. The first I shall take is that of a hind employed on the Greenwich Hospital estates, once belonging to the Derwentwater family, near Hexham, in the south-western district of the county; he receives 36 bushels of oats, 24 of barley, 12 of peas, 3 of wheat, 3 of rye, 36 to 40 bushels of potatoes, and 24lbs. of wool; he has besides a cottage and garden, a cow's keep for the year, carriage of coals from the pit, and £4 in cash. The next is that of one employed on a farm near Morpeth, in the central district; he receives 10 bushels of wheat, 30 of oats, 10 of barley, 10 of rye, and 10 of peas; he has besides the potatoes grown on 800 yards of ground, a cow's keep for a year, a cottage and garden, his coals led, three hens, or two bushels of barley as an equivalent, and £3 10s. in cash. The next case I take from the neighbourhood of Wooler, in the northern part of the county; this hind receives 36 bushels of oats, 24 of barley, 12 of peas, and 6 of wheat, with the potatoes grown on 1,000 yards of ground, a cow's keep, a house and garden, coals led, and £5 in cash. A pig also is kept in most cases, and is a source of considerable profit, being killed for the market in winter; at 20 stone it will bring (at the present price of pork) a sum of £5 or £5 10s. The conditions of the agreement are in writing—sometimes, indeed, a printed form is used. It is to be observed that the recent reduction in the price of grain has partially affected the money value of the hind's earnings. Of course the greater part or the whole of what he receives is consumed in his own house, when he is married and has a tolerably numerous family. There is, however, often a considerable surplus, and this will fetch less in the market now than it did three years ago. Hence the reduction of prices has in some cases affected them; and I heard a husbandman employed in the midland district of the county (an unmarried man, however, which is not frequently the case) regret the tenor of his bond, and express an opinion that the condition of the hinds and other labourers near Newcastle, where the payment is made chiefly in money (14s. and 15s. a week, with cottage and garden, potatoes and fuel carted) was now preferable. In some cases, as I have stated, the hind is paid wholly in kind; he then receives 12 bolls, or 24 bushels, of wheat, with the other articles in pretty nearly the same proportions as above; in cases where his cow is not kept, he receives 5s. a week instead, which thus appears to be considered the money value of a cow's keep. I have thus given you the average wages of the hind; of course, however, these do not include the earnings of his wife and family. The latter will often amount to a sum of £20 in the year—sometimes considerably more, sometimes less. The female bondager, who is the hind's wife or eldest daughter, is paid 10d. a day for what is called small-work, and 1s. a day in harvest. This is the stipulated price, in cases where the employment of the woman is regular during the year; but when she is only casually employed, in harvest time, the amount is from 2s. to 2s. 6d. a day. Children's earnings are very various in their nature and amount; they run from 4d. to 6d. a day, and 1s. in harvest time. In one case of which I had cognizance, the man's family consisted of six persons, including his father; the half-yearly earnings of all these persons were £19 7s. None of the three daughters was employed in domestic service.

It will be admitted, I think, that in such a state of things as I have described, the condition of the hinds is one of general comfort. The system is one well adapted to a simple rural population, and especially to the Northumbrian character. It has not, however, escaped censure or condemnation, though upon no very rational or intelligible grounds. The name of the "bondage" system, as it is commonly termed, seems to have been the chief objection brought against it. Cobbett, towards the close of his life, attacked it, and his example has since found imitators, who have denounced it as a species of serfage, which it in no respect resembles. It surely argues a confusion of ideas, amounting almost to imbecility, to speak of a voluntary engagement for a year, upon specified terms, as a sort of slavery; yet this has been done. I have explained in a former letter that the true meaning of the word "bondage," if we recur to its original sense—and no doubt it is in this sense that a people of Danish descent continue to use it—is simbly *husbandry; bonde* signifying to this day, in the Swedish, Danish, and Norse tongues, a free peasant, or yeoman. An outcry, however—on this ground chiefly or solely—was raised some years back against the system, and many of the hinds were led away by it. Mr. Jobson, of Chillingham Newton, one of the largest farmers in the northern district, yielded to the wishes of his men, and hired them at certain wages, with regular employment for the year, but before the year was out they unanimously desired to be replaced on their original footing. In fact, as has been well remarked, there can be no doubt that, owing to the thinness of the population, the great farmers who have suddenly sprung up on the borders found some such system necessary in order to carry on their agricultural operations, and the labourers receive an equivalent for submitting to tie them-

selves by the year. One of these farmers estimated to me the yearly value in money of the earnings of his hinds—not including, of course, their families—at £35 to £36 a year, which I am far from thinking an over-estimate. Unmarried farm-servants, who are lodged in the farm-house or (now more generally) in some cottage adjoining, were paid till lately £10 for the summer half-year, and £8 for the winter half-year. There has however, I am sorry to say, been a reduction in the recent hirings, and the general rate for the past year was £8 or £9 for the summer half, and £5 or £6 for the winter. The daytillmen, or husbandmen at weekly wages, regularly employed in Northumberland, are comparatively few; but there is always a class of labourers whose exact occupation is not easily definable, and who generally work on a farm during a portion of the year. The rate is 2s. 6d. a day, or by the week 12s. to 15s. Men employed in the quarries were, till lately, paid 17s. a week; their wages have been reduced within the last three months to 15s. Millers were formerly paid 16s. to 18s.; at present a general rate is 15s. In this county are some of the largest mills to be found in England. At one fine establishment of the kind, near Lesbury, belonging to Mr. Thew, 700 bolls (1,400 bushels) of gram can be ground in a week. Both water-power and steam-power are generally used in the same establishment.

Here it affords me unmixed pleasure to be able to bear testimony to the high, manly, and independent character of the northern labourer. In this respect the natives of the district with which I am dealing yield to those of no country upon earth. They face their lot, whatever it may be, with stern endurance, and bear it without murmuring. In no case, even where real hardship existed, have I heard them complain; their nature is too full of energy and resolution to be querulous. Under an aspect externally cold, deep-seated feelings, strong passions, and the enthusiasm which makes men martyrs or heroes, are hidden, not lightly to be revealed. They are also to the full as loyal and well-disposed a set of people as the island contains; and though thorough-going liberals in politics and Puritans in religion, they are by no means disposed to speak evil of dignities. Such is the true northern type—and long may it flourish.

I have already spoken of the general diffusion of education in the county. Good schools are to be found in all the towns, and most of them have mechanics' institutes and subscription libraries. I think it to little purpose to trouble you with many details on this head; one or two points, however, deserve specification. At Chevington there is an agricultural school for the training of labourers, established and supported by Earl Grey; the boys have allotments of about 122 square yards each, for which they pay 1s. 6d. per annum, and they are stated to realize 17s. in the year by their labour. In Bamborough Castle is located the munificent charitable institution founded by Lord Crewe, Bishop of Durham in the early part of last century. The trustees of the charity deserve every praise for the care and taste with which they have restored the fabric of the castle, which was a mere ruin at the commencement of their occupation, but is now, perhaps, the most curious building of the kind in the world. The educational provision, however, seems hardly so extensive as was designed by the princely liberality of the founder. Forty girls, and the same number of boys, generally the children of labourers or small tradesmen in the neighbouring parishes, are all who at present are admitted to its benefits. The quality and amount of the knowledge imparted are of course regulated by the destination of the pupils in life; the greater number in this case have little other prospect before them but that of a life of labour, though the trustees (ten clergymen of parishes in Durham and Northumberland, appointed under the will of the founder) occasionally send a lad to the universities. It is a curious fact, however, that the original object of this institution was to benefit shipwrecked sailors, and it might be a subject well worthy of inquiry how the founder's intention was so completely lost sight of, and whether some portion of the funds administered by the trustees might not be made available for the relief of the class contemplated by him, than whom more deserving objects of bounty could hardly be found. Bamborough Castle contains a choice library of 9,000 volumes of old books, admirably selected, bequeathed by Lord Crewe and Dr. Sharpe, to which any respectable householder within 20 miles round has free access. It is to be hoped, however, that the educational arrangements of the trustees may receive some extension; in their present state they hardly appear commensurate with the very large funds at their command.

With regard to the education of the labourer, it is complained by many persons that the time allowed for school is broken in upon by the employment of the children in field labour, whenever that is to be procured, as at harvest or other seasons. I am, however, rather inclined to regard it as a benefit that the agricultural labourer is enabled by the earnings of his children to add something to his own gains, however scanty; and I cannot think that the time thus subtracted from the school (which, after all, is not more, perhaps, in most instances, than a six weeks' holiday) is any real loss. Upon this subject, one who has written well on the condition of the husbandman says, that "the employment of children in agricultural labour must limit the time and opportunities for instruction, but that it should do so is necessary in a pecuniary point of view, and, indeed, in an educational one also; for labour is the agriculturist's special education, as school is his general education. That such discipline is needful from an early period, seems undeniable, when we consider the accomplishments which he must possess in after life, as well as the manner in which, at present, he is obliged to acquire them. We know the skill and exercise required to make a good swordsman, to give the masterful use of a single weapon, either for war or amusement; none acquire this without practice; some, in spite of practice, never attain it. But the agriculturist, before he can claim work throughout the year as an able-bodied labourer, must, especially in those counties where the cultivation is varied, honestly profess the use of very many implements which re-

quire a peculiar mode of handling, and, in spite of their more vulgar form and purposes, no inconsiderable skill to manage them with effect. The spade, the scythe, the hoe, the axe, the sickle, the flail, the beek, the bagging-hook, and the other implements of husbandry, all require a cunning and handicraft of their own, not exceedingly intricate or unished, but differing from each other—none to be attained without practice, and all, if possible, to be possessed by one able-bodied man. The materials, too, upon which he is called to work, and the process of labour which he must perform upon them, differ in kind and number as much as the tools themselves. With all these there is the best and the worst way of dealing—a right and a wrong method—so that their familiar management requires much practical address and discrimination. I was told by a very intelligent occupier of land, that the general skill of an able-bodied man decidedly increases so long as his strength lasts. For a man to turn his hand to all the works of the various seasons, he must be versatile and accomplished; and without this capability, his occupation is not secure and steady. As population increases, the labour of the field, in a purely agricultural district, becomes more and more a subject of competition, and consequently an exercise of adroitness, as well as of honesty and steady habits. When we add the peculiar manner in which all this ability must be attained, the necessity for an early apprenticeship becomes still clearer. The use of the different implements of husbandry in the most effective manner depends unquestionably upon general rules, as much as the use of the sword and musket. There is in the nature of things a flail exercise, and a scythe and plough exercise—as real as, though ruder than, that of less peaceful weapons; but as the use of these instruments has never been analysed, the novice is not drilled and instructed in their management; he must learn entirely by experience—by his own mistakes and successes. The knowledge which he obtains, too, is of the same nature—not imparted generally and together, but snatched up piecemeal and imperceptibly, resulting entirely from familiar intercourse with the subject, and amalgamated so completely with his practical habits as often to take no intellectual form at all. His powers of imitation are much needed; and as these last are in their fullest perfection in the early years of life, it is not entirely without reason, even as a matter of training, that he begins his labours as soon as the development of his bodily strength will permit him to do so." In corroboration of these views I can state that many farmers declared, that a boy who begins work later than six or seven never turns out worth anything as a labourer. There are first and second classes of labourers in agriculture, as well as in other occupations. Those who can turn their hands to all kinds of work as the seasons draw round, naturally do best, and are always most secure of employment.

ON THE ERECTION OF STABLES.

The reason why so many buildings for live stock are so ill adapted to the use of the occupier is doubtless because few, very few architects or builders understand the proper principles of animal physiology. A farmer knows from experience what is convenient—an amateur knows what is beautiful—a scientific man, what is correct—an architect, what produces *effect*. It seldom happens that any designer of buildings suitable to contain horses and cattle know enough of the management practically—of their treatment scientifically, combined with an adequate knowledge of bricks, mortar, and timber, of areas and of forces.

Hence we have beautiful and costly buildings, nearly useless, extremely inconvenient, and very unhealthy; and we have the ugliest and most tumble-down buildings, excessively offensive to the eye, which are really, in an economical and sanitary sense, all that the farmer could wish.

The *draught horse stable* is very different to that of the hunter or the racer. One must be kept hot, the other cool. Custom and fashion require a fine shining coat in the former class of animals, but deny it in the latter—at least, they aim at it in a very inferior degree.

But the great difficulty is a discrimination between hot air and impure air. The two are almost invariably classed together; and it must be admitted that, other things being equal, cool air is much purer than hot: in other words, it contains more of the elements by which the vital processes are sustained. Hot air is thinner, more rarefied than cold; hence, yard for yard, it contains more oxygen, and consequently sustains the respiratory process in a more complete and satisfactory manner. Now, nearly all the systems of ventilation of stables combine an upper outlet for the impure air; and certainly the hot air will, as a rule, rush upwards, and the cold air from outside return to supply its place. With this the ammoniacal gas, so very volatile, and possibly the sulphuretted hydrogen, if any, will so make its escape. But the carbonic acid gas—that of which there is generally the most generated—is a heavy gas, and will linger at the bottom of a stable, so that a dog would die in a room charged with it, before a man who stood four

feet higher. And as this is expired by the horses' nostrils, which are usually lower than the line of his back—at least, while at rest—there should be some mode adopted to free him from the influence of these various effluvia.

Now, to ventilate a stable generally, there must be two things. First, an aperture for the escape of the tainted air, colder than the stable, which will of itself pull out the impure air in the shape of a current; but, to render this complete, an opening near the ground should also be made, to drive off the carbonic acid or heavy gas, and to supply the vacancy its removal will create.

We are glad to observe that the Duke of Northumberland, who has lately ordered a thousand cottages to be built on his estate for his labourers and dependants, with the best attention to health and convenience, has also entrusted the building of the stables for his tenants to a gentleman who has made the study of the wants of the horse his business; and hence he has adopted, and his Grace has approved, a kind of farm-horse stable free from many of the disadvantages which too often belong to them, and with some new modes of effecting the objects of quiet and ventilation.

The first principle with Mr. Green, the architect, who has in a very praiseworthy manner given his plans and reasonings to the Newcastle Farmers' Club, and which they have published, is that no stable will be made for more than a pair of horses. He contends that a large stable has nothing to recommend it but a saving in the first cost; and that a healthy rather than a cheap stable ought to be the object of the builder. He contends that the changes in the temperature of a large stable are so great that the horses must get colds continually, from changes in the number of animals; that the horse suffers disturbance from the others when he requires rest; that any disease or habit is far more likely to spread; and contends that for ten horses the expense will not be increased more than £35 by making the stables fit for two horses only, with a hayloft, and making them simply all in one.

The great advantage he proposes is, to equalize the heat in a far greater degree by his mode of small stables than by using large ones; and there is much that is rational in his views, though no one would wish to see the draught-horse immured in a hot stable at one period, and next employed in standing still carting turnips, getting-in stacks, or leading manure from the yard, for during the filling or loading of the carts this must be the case. Provision, however, could always be made for supplying sufficient cool air to prevent the stables ever heating; but Mr. Green says—

"My opinion is, not only as a matter of economy, but by lessening the cubical contents of the stable, by putting a loft above, that due amount of warmth, free from foulness, with the ventilation I have proposed to adopt, is secured by the loft; and the air will be sufficiently rarefied with having only two horses in one stable; that foul vapours will not be allowed to generate, and if they do, I prevent them penetrating the loft to injure the hay; and in a range of stables open to the roof, with hay-houses on the floor, none of these advantages are so cheaply or so easily effected. When a stable is cold the animal has a much greater amount of the heat of his body to expend in warming it; and taking, on an average, from 1,000 to 1,100 cubic feet to be the proper quantity provided for each horse (that his blood may not be unnaturally cooled), I find that a stable of the size indicated by the model, viz., 13 feet deep, 12 feet 6 inches wide, and 9 feet 7 inches high up to the boarding of the loft, contains 2 136 feet, which leaves 1,078 cubic feet for each horse; and a stable of the same dimensions, without a loft above, has in the roof 862 feet more for the horses to warm, being 431 feet in excess for each animal."

The ventilation of these stables is a very important matter, and, we think, quite new. First, provision is made for carrying off the impure air and vapours in a close tube through the loft, and it passes off at the roof; but the top is turned downwards to prevent down drafts. Openings are then made at both sides of the stable, and a pipe passes through in front of the horse: it is of cast-iron, and perforated on three-fourths of its circumference, so as to diffuse the air and prevent currents. Each tube has a bell-mouthed entrance, with perforated gratings, and supplied with small doors. Shut up the stable as you may, therefore, the escape of noxious air takes place, and the supply of pure air goes on—but, it is admitted, in a diffused form—exactly in the place where the horse requires it—near his nostrils—displacing the carbonic acid, and supplying the pure and vital air. Nay, the very inspirations of the horse will draw the air from the external atmosphere fresh and cool, while the rest of the stable is warm and comfortable.—*Gardeners' and Farmers' Journal.*

EVILS OF INDISCRIMINATE WATERING PLANTS IN POTS.—To insert cuttings of plants, particularly those of a soft, woody, or succulent nature, into moist materials, before the wounds made in preparing them are healed over, is often attended with fatal consequences, from the moisture finding its way into the pores of the plant, thereby causing putrefaction and decay. The woody parts of plants being more consolidated and less porous than their roots, are altogether less calculated to imbibe an undue portion of moisture, yet we find that even these do so to a most injurious extent; therefore, we may reasonably conclude that roots mutilated and placed in the same circumstances would have a greater chance, from their peculiar organization, to suffer from such a cause; nor can there remain a doubt that they do so. This points out as most injudicious the practice of turning plants out of their pots, reducing their balls as the case may be, thereby lacera-

ting every fibre, and placing every rootlet in a worse position than a cutting, and then finishing the operation by giving a good drenching of water, which, as we have already seen, must make dire havoc among the previously reduced channels by which the plant receives its food. Such is, in a great measure, the cause of delicate plants suffering so much from shifting, or the check they receive unless the operation be carefully performed, and consequent loss of time in recovering from its effects. Still this is an every-day practice, that has descended to us hallowed by the customs of ages, and sanctioned by the highest authorities. Who ever heard of directions for shifting or potting plants that did not end thus?—Give the whole a good watering to settle the mould in the pots, and the operation is completed. After shifting or transplanting plants in hot dry weather, when an arid atmosphere causes, by excessive evaporation, an unusual drain upon the roots, the necessity of a supply will soon become apparent; and administering it under such circumstances is less injurious than under any other, from the activity maintained in every part of the plant rendering stagnation an unlikely occurrence. But even then, when practicable, it is better to confine them in a close moist atmosphere, which, with water over head and shade, will enable them to exist through the medium of the leaves until growing has commenced, and the roots are in a condition to receive without injury the necessary supply. It is, however, when there is a deficiency of heat, vegetation languid, and a corresponding danger from excess of moisture, that such precaution is most required, and the contrary practice most hurtful. Among seedlings of tender sorts the mortality from such maltreatment is truly great; and when the impossibility of transplanting such without, in some shape, hurting their few and almost unformed spongioles, scarcely more consolidated than the fluid in which they are thoughtlessly immersed, is considered, their certain destruction is not to be wondered at. The advantages these derive from the treatment described, led me first to examine more closely what I deem a matter of much importance. Before quitting the subject for the present, I may here add, that the injury inflicted by such treatment is not confined to plants alone; the soil, also, is oftentimes irreparably injured. It has been placed between the sides of the pot and the root-bound ball containing the plant, where, being in a comparatively loose state, it receives the whole of the water that is considered sufficient to moisten the whole mass; as, where there is so little resistance, it is as effectually repelled by the hard, and much more by a dry, ball as by the sides of the pot. This reduces what has been added to the condition of a puddle, and in this state it stands a good chance of being baked as hard as a brick. At all events, it has been totally unfitted to afford that nourishment to the plant it otherwise would have done. Such consequences may be avoided by applying moisture gradually; but if some time is allowed to elapse there is not so much to fear, even from the usual soaking, as the old and new material must, in the interim, have become equally dry; a state, let it be remembered, indispensable to the thorough incorporation of such materials.—H. Bock, *in Hovey's Mag. of Horticulture.*

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Monthly Council was held at the Society's house in Hanover-square, on Wednesday last, the 3rd of December: present, the Earl of Ducie, President, in the Chair, Duke of Richmond, Mr. Raymond Barker, Mr. Barnett, Mr. Brandreth, Mr. Brandreth Gibbs, Mr. Grantham, Mr. Fisher Hobbs, Mr. Lawes, Mr. Milward, Prof. Sewell, Mr. Shaw (London), Mr. Shelley, and Prof. Way.

Finances.—Mr. Raymond Barker, Chairman of the Finance Committee, presented the report on the accounts of the Society, to the end of the previous month; from which it appeared that the current cash-balance in the hands of the bankers at that date was £781.

Fines.—The Duke of Richmond, Chairman of the Non-exhibition Fines' Committee, read the following report to the Council:

"The Committee have had laid before them a list of the parties who had become liable to fines for the non-exhibition of animals entered for the Windsor Meeting, agreeably with the 22nd regulation of the Show, printed both in the prize-sheet and on the several certificates on which the respective entries had been made. Of these parties, it appeared, 18 had duly paid the fines, and 10 had sent letters of excuse, while the remaining 19 had sent no reply whatever to the circular addressed to them by order of the Council.—The Committee are of opinion that the payment of these fines should be enforced, with one exception only—namely, in favour of Mr. Sharp Spence, who states that his animal died on the railroad, and that his servants informed the officers in charge of the show-yard at Windsor of the circumstance. The Committee recommend that the regulation under which these fines are levied should be amended, with a view of making it more stringent; and the Committee accordingly beg to submit to the consideration of the Council the following new rule for future adoption: In order to check the non-exhibition of animals which have been entered for the show, thus causing the Society to make unnecessary preparations and incur unnecessary expenses; and also to prevent the show-yard from being disarranged; a fine of 10s. will be levied on each entry of stock which shall not be exhibited, unless a certificate, under the hand of the exhibitor or his authorised agent, be lodged with the Secretary of the Society, on or before the day of exhibition, proving to the satisfaction of the Council that such non-exhibition is caused either by the death of the animal or animals, by contagious or infectious disease, or by unavoidable injury, sufficient to prevent such stock from being exhibited."

This Report was unanimously adopted by the Council, and directions were given for carrying out its recommendations.

Guano.—The Duke of Richmond took that oppor-

tunity of reporting the favourable progress of the communications into which, at the request of the Council, he had entered with Viscount Palmerston, H.M. Principal Secretary of State for the Foreign Department, for the purpose of effecting a reduction in the price of Guano imported into this country. On the motion of Mr. Shelley, seconded by Mr. Fisher Hobbs, the cordial thanks of the Council were expressed to his Grace for the anxious attention he had bestowed on this subject, and for the important facts he had communicated to the Council, in reference to the deep interest felt by H.M. Government on this national question, and the entire willingness of the noble Lord at the head of the Foreign Department to promote the wishes of the Society, and advocate the cause of the English farmer to the utmost of his power: the noble Duke being requested by the Council to continue these communications, and act on their behalf and that of the Society in such manner as he might from time to time find most desirable.

Foreign Elections.—On the motion of Mr. Fisher Hobbs, seconded by Mr. Raymond Barker, the following resolution was passed, and the by-law of elections ordered to be amended accordingly, namely, "That, in future, every candidate proposed for election into the Society, whose residence is out of the United Kingdom, shall only be elected under the condition that he makes in one payment the composition for life in lieu of annual subscriptions."

Standing Committees.—The following standing Committees were appointed for the year 1852:—

Finance Committee.—Colonel Austen, Mr. Raymond Barker, Mr. H. Blanshard, Mr. Brandreth, Colonel Challoner, Mr. Jonas, Mr. Wilson (Stowlangtoft).

House Committee.— Past President, Chairman of Finance Committee, Mr. Raymond Barker, Mr. Brandreth, Colonel Challoner, Mr. Brandreth Gibbs, Mr. Fisher Hobbs, Mr. Kinder, Mr. Shelley.

Journal Committee.— Duke of Richmond, Lord Braybrooke, Lord Portman, Hon. R. H. Clive, M.P., Sir C. Lemon, Bart., M.P., Sir John V. B. Johnstone, Bart., M.P., Mr. Burke, Mr. Childers, M.P., Mr. E. Denison, M.P., Mr. Hyett, Mr. Miles, M.P., Mr. Milward, Mr. Pusey, M.P., Mr. Shaw (London), Mr. Shelley, Mr. Thompson.

Chemical Committee.—Lord Portman, Sir John V. B. Johnstone, Bart., M.P., Mr. Dyke Acland, Dr. Daubeny, Mr. Hoskyns, Mr. Hudson (Castleacre), Rev. A. Huxtable, Mr. Hyett, Mr. Jonas, Mr. Lawes, Mr. Miles, M.P., Mr. J. M. Paine, Mr. Pusey, M.P., Mr. Shaw (London), Mr. Sheridan, M.P., Mr. Thompson.

Veterinary Committee.—Duke of Richmond, Sir John V. B. Johnstone, Bart., M.P., Mr. Raymond Barker, Mr. S. Bennett, Mr. Brandreth, Colonel Challoner, Mr. E. Denison, M.P., Mr. Fisher Hobbs, Mr. Pym, Prof. Sewell, Mr. Shelley, Prof. Simonds, Mr. Shaw (London), Prof. Spooner.

General Lewes Committee.—Duke of Richmond (Chairman), Mr. Shelley (Vice-Chairman), Earl of Chichester, Lord Portman, Sir Edward C. Dering, Bart., Sir M. W. Ridley, Bart., Sir John V. B. Johnstone, Bart., M.P., Sir H. Shiffner, Bart., Colonel Austen, Mr. Raymond Barker, Mr. Brandreth, Colonel Challoner, Mr. G. Darby, Mr. Ellman, Mr. Brandreth Gibbs, Mr. Grantham, Mr. Hamond, Mr. Fisher Hobbs, Mr. Law Hodges, M.P., Mr. Jonas, Mr. Milward, Mr. Pusey, M.P., Mr. Shaw (London), Mr. W. Simpson.

Implement Committee.—Lord Portman, Sir M. W. Ridley, Bart., Mr. Brandreth, Colonel Challoner, Messrs. Easton and Amos, Mr. Garrett, Mr. B. Gibbs, Mr. Hamond, Mr. Fisher Hobbs, Mr. Hornsby, Mr. Miles, M.P., Mr. Shaw (London), Mr. Shelley, Mr. Thompson.

Lewes Meeting.—The Council decided that the country meeting of the Society at Lewes, in 1852, should be held in the week commencing Monday the 12th of July.

Miscellaneous Communications.—Prof. Nesbit's offer to exhibit before the Council, at their weekly meeting, on Wednesday, the 10th of December, a new and simple mode for detecting the adulteration of guano; and Prof. Way's offer to explain at the same time a mode of effecting the same desirable object, communicated to him by a young Belgian chemist; were accepted with thanks by the Council.—Mr. Parkes, C.E., transmitted for each member of the Council a copy of a work he had just published, containing an exposition of what he considered to be fallacies in land-drainage, especially as propounded by Lord Wharncliffe, in the last Journal of the Society.—Baron Mertens addressed to the President a communication containing suggestions for ascertaining the conditions of deep ploughing, and an offer to become in part a subscriber to a prize for promoting competition in the practical trial of the same.—Chevalier Claussen invited attention to his operations at Stepney for the manufacture of Flax-cotton fabrics.—Mr. Lawrence, of Cirencester, addressed to the Council various suggestions connected with the subject of Implement Prizes.—The Council ordered their usual acknowledgments for these communications; and adjourned to their weekly meeting, at 12 o'clock on Wednesday, the 10th inst., at which all members of the Society have the privilege of being present.

A Weekly Council was held at the Society's House, in Hanover-square, on Wednesday, the 10th December; present, the Earl of Ducie, president, in the chair; Duke of Richmond, Lord Berners, Sir M. W. Ridley, Bart., Mr. Ambrose, Mr. Raymond Barker, Mr. John Bethell, Mr. A. Carden, Captain Stanley Carr, Col. Challoner, Mr. J. W. Clarke, Mr. E. Davy, Mr. Duncan, Mr. Dyer, Mr. Gadesden, Mr. Garrett, Mr. R. F. Gower, Mr. F. Hobbs, Mr. Hudson (Castleacre), Mr. Kinder, Mr. Lawford, Mr. Odams, Mr. Mainwaring Paine, Mr. Paul, Mr. Rowlandson, Mr. Shaw (London), Mr. Shelley, Mr. Sillifant, Professor Simonds, Mr. Smith (Exmoor), Mr. C. Towneley, Mr. Tunno, Mr. Turner (Barton), Prof. Way, and Mr. Wight.

Mr. Nesbit favoured the Council with an experimental illustration of his new mode, by which farmers and others, little conversant with chemical manipulation, may, in a simple manner, ascertain whether the guano they are about to purchase is adulterated.—Captain Stanley Carr, on his return to England, gave an interesting statement of facts connected with his observations of the occurrence and amount of guano in different geographical localities.—Mr. Turner undertook inquiries in reference to Mr. Amos Bryant's communications on

cultivation of land.—Professor Simonds reported on the cattle probang submitted to the notice of the Council at a former meeting, and referred to his examination. The result was not favourable to the claims advanced.—Mr. Marcott transmitted a further communication on the Clover insect.—Mr. Parish and Mr. Davy addressed letters to the Council, on the subject of Flax-cultivation and management.—Captain Chapman, R.A., made enquiries on the flooring of barns.—Mr. Chivas transmitted specimens of Turnips.

The Council ordered their usual acknowledgments for the favour of these communications.

A SPECIAL COUNCIL was held on Thursday, the 11th of December, for deciding on the prizes to be offered for live-stock at the Lewes meeting. Present: The Earl of Ducie, President, in the chair, Lord Camoys, Lord Portman, Sir M. W. Ridley, Bart., Mr. Raymond Barker, Mr. Barnett, Mr. S. Bennett, Mr. Brandreth, Col. Challoner, Mr. Fisher Hobbs, Mr. Law Hodges, M.P., Mr. Hudson (Castleacre), Col. Hulse, Mr. Jonas, Mr. Milward, Mr. Popham (Littlecote), Mr. Shaw (London), Mr. Shelley, Mr. Sillifant, Prof. Simonds, Mr. Smith (Exmoor), Mr. Turner (Barton), and Mr. Jonas Webb.

The prize sheet was arranged, and the final adjustment of general regulations deferred to the 4th of February.

A SPECIAL COUNCIL was held on Friday, the 12th of December, for receiving the report of the General Lewes Committee, and agreeing to the report to be made by the Council to the ensuing general meeting. Present: The Earl of Ducie, President, in the chair; Lord Ashburton, Mr. Raymond Barker, Colonel Challoner, Mr. Druce, Mr. Fisher Hobbs, Mr. Shelley, Professor Simonds, and Mr. Thompson. The report of the Lewes Committee having been read and adopted, the Council agreed to their report to be made to the general meeting on the following day.

The annual meeting of this Society took place on Saturday, Dec. 13, at the Offices in Hanover-square. The chair was taken, at 11 o'clock, by Earl Ducie, the President: present, Earl of DUCIE, President, in the Chair; Duke of Richmond, K.G., Lord Berners, Sir R. Price, Bart., M.P., Sir Digby Neave, Bart., T. Raymond Barker, Esq., Col. Challoner, H. Blanshard, Esq., Rev. J. Linton, Rev. J. Smythies, Wm. Shaw, Esq., Professor Simonds, Professor Way, Don Domingo de Savignon, Dr. Walker, Dr. Calvert, Mr. Grissell, M.P., Mr. Wingate, Mr. Jonas Webb, Mr. R. W. Baker, Mr. J. Ellman, Mr. Staffurth, &c., &c.

The Secretary, Mr. HUDSON, having been called upon by the Chairman, read the following report of the Council:

REPORT.

The Council have to report that, since the last General Meeting, 132 Members have been elected; 69 have died; and 149 have been removed from the list: so that the Society consists accordingly of—

91 Life Governors;
158 Annual Governors;
690 Life Members;
4,076 Annual Members;
19 Honorary Members;

making a total of 5,034 Members on the list of the Society at the present time. The Council have filled up the vacancy in their body occasioned by the loss of the Hon. Capt. Pelham, by the election of Mr. Law Hodges, M.P. for West Kent.

The Finances of the Society are in a highly favourable state: the floating cash-balance in the hands of the Bankers being equal to the discharge of current claims; while the Council have been enabled to purchase Stock in Government Securities to the amount of £11,190, being the investment of Life Compositions of Governors and Members, made in accordance with the principle originally laid down as essential to the security of the Society.

The Windsor Meeting has been held, under most gratifying circumstances, and with perfect success. The Members were honoured on the occasion by the gracious presence of Her Majesty the Queen, the Royal Patroness of the Society; and His Royal Highness Prince Albert, as one of its Governors, evinced a lively participation in the proceedings of the Meeting, and with kind condescension sat down to dinner in the Pavilion, with 2,000 guests of the Society, whom he most heartily bid welcome to the Home Park. The Mayor and Corporation and the Local Committee, with the most zealous co-operation, anticipated and executed the wishes of the Council on every point connected with the convenience and accommodation of the Society, and the perfect preservation of the peace of the borough. The Railway arrangements were in every respect as complete as the increased pressure of traffic and the multiplicity of details would allow; and the Stock of the Exhibitors was liberally conveyed free of charge in both directions by the principal Railway Companies throughout the kingdom. The number of the stock, the variety of the breeds, and the high character so great a proportion of the animals exhibited, rendered the Show at Windsor one of the most remarkable, perhaps, that has ever taken place in this or any other country; and notwithstanding the increased expenses attending so large an exhibition, the balance-sheet of the meeting will be found to present a larger surplus in favour of the Society than on any former occasion.

The Council have arranged that the Lewes Meeting shall be held in the week commencing Monday, the 12th of July next. They have also decided on the Prizes to be offered at that meeting, for Agricultural Implements and Machinery, and for Live Stock intended for breeding purposes. The former include important additions, intended to draw the attention of Agricultural Engineers and Machinists more strongly to the different degrees of motive power required by farmers under different circumstances, and to its convenient adaptation to agricultural purposes: and it is hoped that an opportunity

will be afforded for obtaining a satisfactory trial of the efficiency of those reaping machines which have attracted so much attention subsequently to the period when the Prize Sheet for Implements was arranged by the Council for the year 1852. The latter comprise distinct classes of prizes for the Sussex breed of Cattle, the Romney Marsh or Kentish Sheep, and Domestic Poultry; having reference respectively to the counties of Sussex, Kent, and Surrey, constituting the district of the Country Meeting to be held next year at Lewes. They have made the rule more stringent by which fines are levied on exhibitors for not sending to the show the stock they have entered, and for which the Society provide accommodation in the show-yard. They have resolved that no prize of the Society shall be given to bulls exceeding five years old; they have limited the competition amongst the class of agricultural stallions hitherto known as that of any age, to horses that are above two years old; and they have decided to require in the case of incalf-heifers not in milk, the same certificate as in the case of incalf-cows not in milk, before paying the amount of the prize, namely, a certificate that such incalf-heifer had in due course produced a live calf. The Council have under their anxious consideration two most important questions connected with their Country Meeting: namely, the best mode of appointing the Judges, and the conditions under which their attention should be directed to a veterinary inspection of the animals. The Council consider that the stock to which the prizes of the Society are awarded ought not only in the opinion of the judges to be best specimens of their particular class in the yard, but that in condition and function they ought also to be fully qualified to propagate their species without communicating to their offspring any tendency to hereditary disease or imperfection; and, in order more clearly to call attention to the circumstances under which such tendency might be apprehended, the Council have offered a prize of £20 for the best Essay on the subject. The Council have received from Colonel Le Couteur the scale of points for Jersey cattle, which has been found so satisfactory in enabling the Judges of the Royal Agricultural Society in that island to arrive at uniform decisions. At his request these points were placed by the Council in the hands of the Judges of Channel Islands' cattle at Windsor; and the award of the first prize in that class, although made to an animal bred in the county of Sussex, as well as the other awards, have, it is believed, given satisfaction to the Channel Islands' breeders. This scale of points, and the accompanying illustrations, having been placed at the disposal of the Society for publication, in the hope that an equally successful attempt may be made for other breeds of cattle in England, the Journal Committee have directed their insertion in the ensuing number of the Journal. The Council have given directions for the preparation of a plan of the show-yard at Lewes, and have decided that a pavilion for the great dinner shall be constructed to accommodate 1,000 persons. At their request, Professor Simonds has kindly consented to deliver a lecture in the week of the Lewes Meeting, on some practical and important questions connected with the management and diseases of animals on a farm. The position of Lewes in reference to the Southdown district, its immediate vicinity to Brighton, its connexion by a navigable river with the sea, and its direct railway communication with London and the West of England, will no doubt render it a place of convenient access both to the breeders of Sussex, the members and exhibitors of the Society, and the public generally, who intend to be present at the meeting; while the great facilities offered by the authorities of the borough, and the immediate residence of so many active members of the Society, will secure the most advantageous arrangements for the occasion.

The Duke of Richmond has reported to the Council the progress of the communications he was requested by them to enter into with Viscount Palmerston, Her Majesty's Principal Secretary of State for the Foreign Department, on the subject of a cheap and abundant supply of guano to this country. His Lordship has signified his entire willingness to lend every aid in furtherance of this important object, by requesting the Admiralty to instruct the commander of every ship in Her Majesty's Navy to search for deposits of Guano in the rainless regions within the tropics, and every surgeon of such ships to be prepared to examine on the spot the amount and quality of each deposit of guano that may be discovered: the search for mineral phosphate of lime in any part of the world being also included in this instruction. Lord Palmerston having also stated his desire that the Council should draw up a code of the instructions and queries they would wish to have distributed by the Admiralty, they have requested the Chemical Committee of the Society to prepare these instructions and queries accordingly. The announcement of this most gratifying participation of Her Majesty's Government in a question affecting in so high a degree the cause of practical agriculture, will be received with satisfaction by the Society; and these measures of the Government, with the Prize of £50 already offered by the Society for a statement of the geographical distribution and the discovery of new sources of guano, will, it is hoped, lead to interesting details and important results. In the mean time, as the large proportion of ammonia resulting from guano constitutes, in a great measure, its essential value, it will be an important object to discover a mode by which a cheap and abundant supply of that valuable element may be obtained. The simple and effectual modes now available for detecting adulteration in the guano of commerce, ought to prevent the great loss and disappointment to which farmers at the present time are very liable; and in furtherance of this object, Professor Way has reduced his charge for an analysis of this manure to a rate which brings it within the means of every farmer who will take the trouble to guard himself by this analysis from fraud.

The Journals of the Society contain from time to time the results of Professor Way's Chemical Investigations, instituted under the instructions of the Chemical Committee of the Society; and the Lectures which

he has delivered to the Members since the last general meeting on the agricultural employment of lime and Gypsum have been valuable in themselves, and have led to interesting practical discussions.

The Council have taken means to bring before the members various suggestions made during the past year for extending in this country the growth of Flax as an agricultural crop. The conditions of soil and culture, the management of fibre, and the question of there being or not a sure market for its sale, are practical and prudential considerations, which will no doubt of themselves engage the attention of farmers, without any special caution being given to them by the Council; who, although well aware that there are, under ordinary circumstances, no difficulties attending the cultivation of this crop, yet feel at the same time that at present adequate means are not generally available for taking the crop off the grower's hands.

The Council, in conclusion, have the continued satisfaction of calling the attention of the Members to the gradual and vigorous development of the Society in its practical and useful objects, and to the addition of new members to its list from among the friends of agricultural improvement in every part of the United Kingdom. By order of the Council.

JAMES HUDSON, Sec.

The Rev. JAMES LINTON said it was with great pleasure that he rose to move the adoption of the report which had been drawn up by the Council, and read to the meeting. There was one subject introduced in it which he was exceedingly glad to find, and he thought the Council had conferred the greatest benefit upon the agricultural interest by the knowledge they had diffused with regard to it throughout the country. The subject to which he alluded was that of guano (Hear, hear). On that subject much, he believed, had been said in that room which had never come before the agricultural public in general. He was not wrong in stating that the supply of guano was inexhaustible (Hear, hear). It was so enormous, at least, that it would take centuries to transport it to this kingdom; and if, in addition to the benefits they had already conferred on agriculturists, the Council could prevail on Lord Palmerston to use earnest endeavours to persuade the Peruvian government to allow guano to be imported into this kingdom at a less expensive rate, they would confer a lasting benefit on agriculturists generally, and particularly upon those who, like himself, cultivated cold clays (Hear, hear). A reduction in price would not, he believed, at all detract from the advantages enjoyed by the Peruvian government, as increased exports at a lower price would pay them quite as well as the present system. The importations of guano into this country are at present greatly restricted by the high price at which it was sold (Hear, hear). By exerting themselves in the direction which he had indicated, the Council would entitle themselves to the warmest thanks of the whole agricultural body. He most cordially moved the adoption of the able report which had been read by the Secretary.

Mr. WINGATE, in seconding the motion, said he cordially concurred in what had been said on the subject of guano, and believed that the Council entertained the strongest desire to improve and benefit agriculture by any means in their power.

The motion was then adopted unanimously.

Mr. RAYMOND BARKER, the Chairman of the Finance Committee, read the following balance-sheet:—

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

HALF-YEARLY ACCOUNT, ENDING JUNE 30, 1851.

RECEIPTS.

	£	s.	d.
Balance in the hands of the Bankers, 1st Jan., 1851	738	2	8
Balance in the hands of the Secretary, 1st Jan., 1851	11	9	1
Dividends on Stock	160	6	1
Life-Compositions of Governors	90	0	0
Life-Compositions of Members	360	0	0
Annual Subscriptions of Governors	625	0	0
Annual Subscriptions of Members	3002	7	0
Receipts on account of Journal	266	19	6
Windsor Subscription to Country Meeting of 1851	600	0	0
	£5854	4	4

PAYMENTS.

Permanent Charges	£170	12	6
Taxes and Rates	18	2	2
Establishment	481	11	0
Postage and Carriage	28	0	11
Advertisements	3	19	0
Payments on account of Journal	1759	18	3
Chemical Grant (two quarters)	100	0	0
Chemical Investigations	200	0	0
Payments on account of Country Meetings	493	0	2
Repayments to Bankers	11	0	0
Sundry items of Petty Cash	3	9	9
Balance in the hands of the Bankers, 30th June, 1851	2584	9	5
Balance in the hands of the Secretary, 30th June, 1851	0	1	2
	£5854	4	4

(Signed) THOMAS RAYMOND BARKER, *Chairman*
C. B. CHALLONER,
THOMAS AUSTEN,
HENRY BLANSHARD,
} *Finance Committee.*

Examined, audited, and found correct, this 12th day of December, 1851.

(Signed) THOMAS KNIGHT,
GEO. I. RAYMOND BARKER,
} *Auditors on the part of the Society.*

Mr. BARKER, after reading the accounts, said it was not for the financial committee to compliment themselves, but the accounts were there for inspection, and he would be happy to furnish any information which might be desired with regard to the items.

Mr. ASTBURY felt great pleasure in proposing a vote of thanks to the auditors for the manner in which they had fulfilled their arduous duties.

Mr. WOODWARD, in seconding the motion, said he fully concurred in its terms. Living as he did at a great distance, he was not able to attend the meetinga so frequently as he could wish; but the members received such excellent reports from the Council on all matters connected with the society, that he felt that they were greatly indebted to the managing body.

The motion was then agreed to.

Mr. R. BARKER, in returning thanks, said the members now found the happy result of some steps which had been recently taken. It was true that money was of no use unless it were spent; but the greatest care ought to be taken that it should be properly laid out. That was the principle which had guided the committee since he had been honoured with the confidence of the Council in connection with the finances of the society.

On the motion of Mr. Astbury, seconded by Mr. Druce, Mr. Dyer was chosen to fill up the vacancy amongst the auditors for the ensuing year.

The CHAIRMAN then handed to the members present printed copies of the programme of the Lewes meeting next year, observing that there might still be some verbal alterations, but that it was substantially correct. He then said that, as they had come to the conclusion of the topics which had been prepared for consideration, he should be happy to hear any remarks which any gentleman might desire to make.

As no gentleman rose in consequence of this invitation,

The Duke of RICHMOND said the business of the meeting being concluded, he begged to move a vote of thanks to Lord Ducie for his conduct in the chair, and for his general attention to the improvement of agriculture since he had been a member of the Council (Hear, hear).

The motion was seconded by the Rev. J. Linton, and immediately carried.

The CHAIRMAN said he could not but thankfully express how much he felt the kindness of the meeting in thus noticing his services to the Society. It was very gratifying to him to be noticed in that way at all; for he felt, not indeed that he had been remiss, but that he had been prevented from fully performing the duties which were devolved upon him when he was elected president. It was a deep source of regret to him that he had been obliged to appear at the Windsor meeting as vice-president by substitute. All he could do, however, in that matter, was to make the same excuse as the horse-dealer made for a lame horse, and declare that it was his misfortune and not his fault (laughter). He need scarcely add, that if it should please God to give him health, he would not lose any opportunity of fulfilling the duties which had devolved upon him.

The meeting then separated.

The meetings of the Council stand adjourned over the Christmas recess to Wednesday the 4th of February.

The following new Members were elected:

Bulkeley-Owen, B. H., Tedsmore Hall, Salop.
Bulley, Rev. Frederick, Fellow of Magd. College, Oxford.
Coryton, Augustus, Pentillie Castle, Cornwall.
Del Valle, The Conde, Vergana-in-Guipoiscoa, Spain.
Evans, David, Llaethlin, Aberayron, Cardiganshire.
Fischer, Ewald, Wietendorf, Mecklenburg-Schwerin.
Goodson, William, Hill Farm, Carshalton, Surrey.
Greener, Thomas, Etherley, Darlington, Durham.
Groves, Thomas, Manor House, Nun-Monkton, York.
Hall, Dr. Marshall, Grosvenor-street, London.
Harris, His Exc. Lord, Governor of the Island of Trinidad.
Hartley, John, The Oaks, Wolverhampton.
Hawkesworth, Thomas, Chesterfield-place, Weymouth.
Jackson, John S., Bank of Mona, Douglas, Isle of Man.
James, William, Maypowder, Blandford, Dorset.
Key, Kingsmill Grove, 103, Newgate-street, London.
MacClintock, H. Stanley, Randal's Town, County Antrim.
Matthews, Francis Cook, Driffield, Yorkshire.
May, John, Bath-road, Reading, Berkshire.
Mitchell, Wm. Rowland, Royal Agr. College, Cirencester.
Peacocke, Montague, Pylewell, Lymington, Hants.
Pocock, Thos. William, Glenridge, Virginia-water, Surrey.
Pollen, R. H., Rodbourne, Malmesbury, Wilts.
Powell, William Styles, Castle-street, Hereford.
Pye, William, Oaklands, St. Alban's, Herts.
Scott, Sir Wm., Bart., Ancrum House, Jedburgh, Roxbshire.
Stonehewer, Wm. Scott, jun., 10, Brunswick-terr., Brighton.
Townshend, Charles, Pulford, Chester.
Weir, Edward, 351, Oxford-street, London.
Whiting, Charles, Beaufort House, Strand, London.
Wright, George, Chapel Farm, Dorking, Surrey.

The names of six other candidates for election at the next Monthly Council were read.

RECENT IMPROVEMENTS IN IRRIGATION.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The introduction of the steam-engine into agriculture, as I some time since ventured to suggest to the farmers of England, will most probably be now rapidly extended. Its gigantic power will not be, I feel, confined to the working of the machinery of the farm-yard: far greater and more profitable objects than any of these will suggest themselves. We have seen within the few past months machinery employed in the cutting of corn, and more than one attempt is now making to bring to working perfection a steam-plough. The use of the steam-engine in the irrigation of the land, a plan whose easily attained and *profitable* advantages I long since endeavoured to advocate, has since been carried out by Mr. Huxtable, at Sutton Waldron, in Dorsetshire, and others; and in Scotland, near Edinburgh and Glasgow, either by associations, or by private enterprise.

At p. 11, of *Johnson and Shaw's Farmer's Almanac* for 1852, the reader will find an estimate by

Messrs. Ransome and May, of the cost of lifting water to various heights. The valuable paper of these eminent engineers will well repay the very serious attention of both the landowner and the tenant farmer. One of the startling conclusions to which they arrive is this—that supposing, as for the purposes of irrigation, that the farmer wishes to raise water from a stream, to the height of ten feet, that then by the ordinary steam-engine 714 tons of water may be pumped up to this height with the consumption of only one hundred weight of coals; and this, be it carefully remarked, is almost exactly equal to an inch in depth over seven acres of land, or to an average of a fortnight's rain in the midland and southern districts of England. If the height to which the water is to be raised is less than ten feet, the expenditure of fuel will be less—if it is only five feet, then 1 cwt. of coals will raise 1,428 tons of water to that height. If, on the other hand, the height is greater, more coals will be required—for instance, the same coals which raise 160,000 gallons of water to a height of 10 feet will raise 100,000 gallons to a height of 16 feet.

Thus economical and powerful in raising water, need we feel surprised that the irrigating steam-engine is finding its way into the farmers' fields? or that the skilful Scotch farmers are using it in several places?

Hearing of the progress which the Scotch farmers were making in steam irrigation, a deputation from the General Board of Health has recently visited some of the localities where the steam-engine has been thus employed. A valuable report, by the Honourable D. F. Fortescue, has since been made of the result of their observations, from which I take the following extracts:—

"The first farm we visited was that of Craigentinney, situated about one mile and a-half south-east of Edinburgh, of which 260 Scotch (one fourth more than the English acre) acres receive a considerable proportion of such sewerage as, under an imperfect system of house drainage, is at present derived from half the city. The meadows of which it chiefly consists have been put under irrigation at various times, the most recent additions being nearly 50 acres laid out in the course of last year and the year previous, which lying above the level of the rest are irrigated by *means of a steam engine*. The meadows first laid out are watered by contour channels following the inequalities of the ground, after the fashion commonly adopted in Devonshire; but in the more recent parts the ground is disposed in "panes" of half an acre, served by their respective feeders, a plan which, though somewhat more expensive at the outset, is found preferable in practice. The whole 260 acres take about 14 days to irrigate; the men charged with the duty of shifting the water from one pane to another give to each plot about two hours' irrigation at a time; and the engine serves its 50 acres in 10 days, working day and night, and employing one man at the engine and another to shift the water. The produce of the meadows is sold by auction on the ground, "rouped" as it is termed, to the cow-feeders of Edinburgh, the purchaser cutting and carrying off all he can during the course of the letting, which extends from about the middle of April to October, when the meadows are shut up, but the irrigation is continued through the winter. The lettings average somewhat over £20 the acre; the highest last year having brought £31, and the lowest £9; these last were of very limited extent, on land recently denuded in laying out the ground, and consequently much below its natural level of productiveness. There are four cuttings in the year, and the collective weight of grass cut in parts was stated at the extraordinary amount of 80 tons the imperial acre. The only cost of maintaining these meadows, except those to which the water is pumped by the engine, consists in the employment of two hands to turn on and off the water, and in the expense of clearing out the channels, which was contracted for last year at £29, and the value of the refuse obtained was considered fully equal to that sum, being applied in manuring parts of the land for a crop of turnips, which, with only this dressing in addition to irrigation with the sewage water, presented the most luxuriant appearance. The crop, from present indications, was estimated at from 30 to 40 tons the acre, and was expected to realize 15s. the ton sold on the land. From calculations made on the spot we estimated the produce of the meadows during the eight months of cutting at the keep of 10 cows per acre, exclusive of the distillery refuse they consume in addition, at a cost of 1s. to 1s. 6d. per head per week. The sea-meadows present a particularly striking example of the effects of the irrigation; these, comprising between 20 and 30 acres skirting the shore between Leith and Musselburgh, were laid down in 1826 at a cost of about £700; the land consisted formerly of a bare sandy tract, yielding almost absolutely nothing; it is now covered with luxuriant vegetation extending close down to high-water mark, and lets at an average of £20 per acre at least. From the above statement it will be seen how enormously profitable has been the application in this case of town refuse in the liquid form; and I have no hesitation in stating, that, great as its advantages have been, they might be extended four or five fold by greater dilution of the fluid. Four or five times the extent of land might, I believe, be brought into equally productive cultivation under an improved system of drainage in the city, and a more abundant use of water.

Besides these Craigentinney meadows there are others on this and on the west side of Edinburgh, which we did not visit, similarly laid out, and I believe realizing still larger profits, from their closer proximity to the town, and their lying within the toll-gates.

"The next farm visited was in the immediate vicinity of Glasgow, where the supply of liquid manure is derived from another source, and distributed in a different manner. The supply is from a dairy of 700 cows, attached to a large distillery; the entire drainage from the former flows in a full continuous stream into a tank containing 30,000 or 40,000 gallons, whence it is pumped up immediately by a 12-horse power engine, and forced through 4-inch iron pipes, laid about 18 inches under ground, into large vats or cisterns placed on the highest points of the land to be irrigated. From these it descends by gravitation through another system of pipes laid along the ridges of the hills, finding an outlet through stand-cocks placed at intervals, from which it is distributed through moveable iron pipes fitting into each other, and laid along the surface in whatever direction the supply is required. The land thus irrigated consists of three farms lying at some distance apart, the farthest point to which the liquid is conveyed being about two miles, and the highest elevation 80 feet above the site of the tank and engine. The principal use to which the irrigation has been applied has been to preserve the fertility of the pastures, the general appearance of which was at first rather disappointing, but this was explained by the fact that they are fully stocked, and that the cows rush with avidity to those parts that have been last irrigated, and eat them down quite bare. As is the case in other instances, however, by far the most profitable application has been found to be to Italian rye-grass, of which 15 (Scotch) acres were under cultivation, some with seed supplied by Mr. Dickinson, whose successful cultivation of it by similar means, near London, has long been known. The first cutting of this had yielded about 10 tons the acre, the second nine, and the third, which was ready for cutting, was estimated at eight or nine more. Some crops of turnips and cabbages were pointed out to us in a state of vigorous growth, and with more than common promise of abundance; these were raised by a dressing of ashes and refuse (of little fertilizing value, having been purchased at 2s. 6d. a ton), conjoined with four doses of liquid, one after the preceding crop of oats had been carried, one prior to sowing, and two more at different stages of growth. The enterprising gentleman who has carried out these works at his own expense, and in spite of the discouragement arising from partial failure in his earlier attempts, though speaking cautiously, as was natural in a tenant on a nineteen years lease, of the pecuniary results of this undertaking, imparted some facts which leave little doubt that it must have been largely remunerative. Besides maintaining, if not increasing, the fertility of the pastures, to which the solid manure from the byres was formerly devoted, at a heavy expense of cartage (the whole of which is now saved), he is enabled to sell all this manure, of which we estimated the quantity at about 3,000 tons a year, at 6s. a load. For a good deal of the Italian rye-grass not required for his own consumption he obtained upwards of 13s. a ton, the profits on which, taking into account the yield before stated, may easily be imagined.

"These results fall infinitely short of what might be done by carrying out the same system on an improved scale; the urine, instead of being diluted, as has been found most expedient in practice, with three or four times its bulk of water, is delivered on the land in nearly its full strength, or with not more than one-third of water, thereby occasioning an enormous waste, greatly increased by the impervious nature of the soil of the pastures, from the surface of which it flows off in large quantities, to the loss of its fertilizing effects, and to the pollution of the waters of the neighbourhood. The breaking up and cultivating more of this land in Italian rye-grass and root crops would add immensely to the productiveness of the farm. I must mention that the mode differs in applying the liquid to the pasture and to the cultivated land; on the former it is distributed from a hose of gutta percha or vulcanized caoutchouc: on the latter a succession of short lengths of iron pipe, 3 feet long, 1½ inches diameter, laid down between the drills, are added on, almost as quickly as a man can walk; and the liquid is thus shed about the roots of the plants, without touching the leaves, so as to be capable of innocuous application, if desired, at the latest periods of growth. It is interesting to know that these works were undertaken under the combined influence of the late Mr. Smith of Deanston's representations of the immense waste of valuable material that formerly took place, and of the remonstrances of parties in the vicinity, to whom the flow of refuse into the adjoining canal was an intolerable nuisance.

"The next place visited was the farm of Myer Mill, near Maybole, in Ayrshire, the property of Mr. Kennedy, who adopted and improved on the method of distribution just described. On this farm, about 400 imperial acres of which are laid down with pipes, some of the solid as well as the liquid manure has been applied by these means, guano and superphosphate of lime having been thus transmitted in solution, whereby their value is consider-

ably enhanced. This is especially the case with guano, the use of which is thus rendered in great measure independent of the uncertainties of climate, and it is made capable of being applied with equal advantage in dry as in wet weather. In some respects this farm labours under peculiar disadvantages, as water for the purpose of diluting the liquid has to be raised from a depth of 70 feet, and from a distance of more than 400 yards from the tanks where it is mixed with the drainage from the byres. These tanks are four in number, of the following dimensions respectively: 48 × 14 × 12; 48 × 14 × 15; 72 × 14 × 12; 72 × 17 × 12. They have each a separate communication with the well from which their contents are pumped up, which are used in different degrees of 'ripeness,' a certain amount of fermentation induced by the addition of rape-dust being considered desirable. The liquid is diluted, according to circumstances, with three or four times its bulk of water, and delivered at the rate of about 4,000 gallons an hour, that being the usual proportion to an acre. The quantity to be applied is determined by a float-gauge in the tank, which warns the engineer, whose business it is to watch it, when to cut off the supply, and this is a signal to the man distributing it in the field to add another length of hose, and to commence manuring a fresh portion of land. The pumps are worked by a 12-horse power steam-engine, which performs all the usual work on the farm, threshing, cutting chaff and turnips, crushing oil-cake, grinding, &c., and about six-horse power is the proportion required for the service of the pumps. The pipes are of iron; mains, submains, and service pipes, five, three, and two inches in diameter respectively, laid eighteen inches or two feet below the surface. At certain points are hydrants to which gutta percha hose is attached in lengths of twenty yards, at the end of which is a sharp nozzle with an orifice ranging from one to one and a-half inches, according to the pressure laid on, from which the liquid makes its exit with a jet of from twelve to fifteen yards. All the labour required is that of a man and a boy, to adjust the hose and direct the distribution of the manure, and eight or ten acres may thus be watered in a day. There are now 70 acres of Italian rye-grass and 130 of root crops on the farm. The quantity they would deliver by a jet from a pump worked by a horse steam-engine would be 40,000 gallons, or 178 tons, per diem, and the expense per ton about 2d.; but a double set of men would reduce the cost. The extreme length of pipe is three-quarters of a mile, and with the hose the total extent of delivery is about 1,000,000 yards, or 400 acres. To deliver the same quantity per diem by water-carts to the same extreme distance would be impracticable. One field of rye-grass, sown in April, has been cut once, fed off twice with sheep, and was ready (August 20) to be fed off again. In another, after yielding four cuttings within the year, each estimated at 9 or 10 tons per acre, the value of the aftermath for the keep of sheep was stated at 25s. an acre. Of the turnips, one lot of swedes dressed with 10 tons of solid farm manure, and about 2,000 gallons of the liquid, having 6 bushels of dissolved bones along with it, was ready for hoeing 10 or 12 days earlier than another lot dressed with double the amount of solid manure without the liquid application, and were fully equal to those in a neighbour's field which had received 30 loads of farmyard dung, together with 3 cwt guano, and 16 bushels bones per acre; the yield was estimated at 40 tons the Scotch acre, and their great luxuriance seemed to me to justify the expectation. From one field of white globe turnips sown later, and *manured solely with liquid*, from 40 to 50 tons to the Scotch acre was expected. A field of carrots treated in the same manner as the swedes, to which a second application of liquid was given just before thinning, promise from 20 to 25 tons the acre. Similarly favourable results have been obtained with cabbages; and that the limit of fertility by these means has not yet been reached was clearly shown in one part of the Italian rye-grass which had accidentally received more than its allowance of liquid, and which showed a marked increase of luxuriance over that around it. The exact increase of produce has not been accurately determined, but the number of cattle on the farm has increased very largely, and by means of the Italian rye-grass at least *four* times as many beasts as before can be kept now on the same extent of land, *the fertility of the land being at the same time increased*. This plant, of all others, appears to receive its nourishment in this form with most gratitude, and to make the most ample returns for it; and great as are the results hitherto obtained, I believe that the maximum of productiveness is not yet reached, and that the present experiment must be carried yet further before we know the full capabilities of the manure. Of one important fact connected with this crop, I am assured, that notwithstanding the rank luxuriance of its growth, animals fed upon it not only are not scoured, but thrive more than on any other kind of grass in cultivation. The cost of purchasing and laying down the pipes at Myer Mill has been at the rate of £2 10s. an acre, exclusive of 300 yards of gutta percha hose, with the distributing apparatus. This does not, however, include the cost of the engine, pumps, and tanks, which last, built of stone and arched over, were constructed at a cost of £300, or thereabouts, stone for the purpose being procured from a quarry close at hand; the cost of the engine,

&c., was put at £12 per horse power. I must not omit to mention that though the direct application of the liquid manure to grain crops is not practised, its tendency being to induce rankness of growth and liability to lodge, such crops grown on land previously manured in this manner for grass or roots gave evidence of the full amount of fertility attained by the usual means remaining in the soil, without the drawbacks I have mentioned. Whether such may be obviated by the practice of thin sowing and a more diluted manuring might be a desirable subject of experiment."

I have given these copious extracts from a deep conviction that these are of the class of gigantic efforts, well within the reach of many an English farmer. They are of a class too which seem to me most desirable in another point of view—they are exactly such as no foreign competition is likely to interfere with. The steam-engines are not to be had in other lands; or if the steam-engines are obtainable, the fuel is there far more expensive—the required capital is absent. The low rate of labour in other lands, it is true, often gives our foreign competitors a considerable advantage (it seems from the "Narrative of the Surveying Voyage of H.M.S. Fly, on the Eastern Archipelago," that labourers in Java are paid about three farthings a day!); but whatever may be the superiority in this way on the part of foreign cultivators, this advantage will be found on the other side, as soon as ever the vast powers of the English steam-engine are developed, in work which in other lands must be supplied, if at all, by animal labour.

AGRICULTURE AND THE RURAL POPULATION ABROAD.

FRANCE.—No. XX.

THE MEDITERRANEAN LAGOONS AND THE OLIVE DISTRICTS OF THE SOUTH.

[FROM THE SPECIAL CORRESPONDENT OF THE MORNING CHRONICLE.]

The approach to the Mediterranean by the Canal du Midi is striking and characteristic. Proceeding southwards from Beziers, the stony slopes which the olive loves gradually disappear, fading away into flat plains, the latter becoming more and more humid in their character as we near the sea, the waters of which the low level of the coast, and the spongy nature of the soil, permit to soak and ooze to considerable distances inland. We leave, therefore, expenses of hard-baked clods, and slaty, shingly, and rocky uplands, for vast tracts of quite as dreary marsh and salt meadow. The olive gives place to the willow, and the vine to the bulrush; jungles of which, growing to a most formidable size, cover many square miles of waste. A few poor-looking fields of Indian corn make their appearance from time to time upon slightly elevated plateaus of soil, divided by broad beds of sand, alternating again with rush and fen. Then irregular canals and ditches begin to spread along the expanse, rank with slimy weeds, and their edges white with salt deposited in thin incrustations upon the shingle, sand, or herbage. For miles and miles not a human habitation or a human form is visible. You see raised causeways, bordered by willows and poplars, stretching in long straight lines athwart the marshes, and in the distance towards the ocean the flat sweep of the horizon is now and then broken by the slovenly-looking rigging of a polacre brig, or the long slanting lateen yard of a felucca, snugly ensconced in one of the sea-side stretching lagoons. Presently tracts of sand, and tufted bent, and long narrow-bladed grasses, begin to divide the glistening expanses of salt shallow pools, athwart which grey ghastly cranes go wading, and wheeling flocks of plovers and sandpipers circle. Occasionally, I am told, the flamingo and the pelican manage to cross the sea from the African coast, and haunt those dreary wastes. Great shoals of small fish abound in the lukewarm salt lakes, and now and then a fisherman may be seen in a cockleshell of a flat-bottomed coble, visiting a long array of stake-nets, or a lounging douanier paces his dreary rounds upon the beach. Still further southward you mark great semi-triangular structures, some of them brown, others of a glistening white, rising, quite in Pyramid fashion, from the waste. A few scattered houses, mere square boxes of masonry, are sprinkled in their vicinity, intermingled with long open sheds. The pyramids in question are built of less durable matter than those of Cheops. They are piles of salt, the brown heaps thatched over with rushes or dried fern. Yet a little further in advance, and we see the ponds of brine from which the condiment is made—very respectable lakes, divided, by raised causeways and long lines of jetties, into square compartments, the entry and egress of the water managed by a complicated system of sluices. Under the open sheds are numbers of mills for grinding the salt to the requisite degree of fineness, turned by horses, asses, and mules; and here and there in the close neighbourhood of these works you find raised patches of land, producing languishing crops of vegetables and starvling grass. Still gliding slowly seawards, you catch occasional glimpses, athwart the still shining waters of the lagoons, of the flash of surf, rising above the outermost belt of brown

sand, and the low moan of the Mediterranean surges is borne along by the breeze which sighs dismally over the fenny flats, until just ahead of you you observe the canal losing itself in a great still lagoon—with half-a-dozen paltry steam-tugs, and as many barges, feluccas, and fishing-boats, lying alongside a rickety wooden jetty. Look back, and across the vast expanse of sand, shingle, pond and marsh which you have traversed, you can still catch the distant rising grounds, dusky with their olive groves, and the irregular sierra of the Cevennes Mountains, forming the extreme landward horizon. It is but the voyage of an hour and a-half to traverse the shallow lagoon or Etang de Thau, and you land on the quays of Riquet's city of Cette, a locality not without its industrial and agricultural interest.

Cette lies upon a sandy tongue of land traversed by the channel which connects the Etang de Thau with the Mediterranean, one portion of the town looking upon the sheltered expanse of the salt lake, the other facing the open sea. Immediately behind the town rises a remarkably precipitous and rocky hill, terminating, in fact, the strip of land which shelters the lagoon. The lower portions of this roughly-piled eminence are belted by woods of olives, and upon the slopes which dip away all round its landward face to the salt lake a fair proportion of corn and vegetables are cultivated. Above the hill, to the very summit, is a mingled mass of rocks, vineyards, and swarming summer houses or *baraques*, the Sunday resort of almost the entire population of Cette. In several respects the hill is remarkable. Not even the rock vineyards of the Ariege afford so striking a specimen of determined and persevering industry. Originally the mountain was a mere mass of crag and piles of slaty flaky stone, with here and there a dusky plant of the cactus order growing out of its flinty crevices. By dint of sheer hard manual work, masses of the rock have been torn up, while the stones have been gathered and piled into dykes, terraces, and moles, so as to expose every square foot of earth, the said earth being a species of parched reddish gravel, to the sun. The face of the hill is thus picked out into a bewildering mass of tiny vineyards, many of them actually not bigger than an ordinary bed-closet, but one and all enclosed by the most formidable bulworks of loosely-piled stones. Winding backwards and forwards through the expanse, run labyrinths of roads, the pathways mere piles of broken slates and shingle, fenced in by perfect ramparts of splintered rock, piereed here and there by clumsy unpainted doors leading to the vineyards. The hill is a puzzling locality for the stranger unacquainted with its mazy paths, as they every now and then vanish, and the adventurer has to make his way along the tops of the walls, scrambling from pile to pile of loosely heaped pebbles as he may. He thus, however, catches in a satisfactory manner the curious features of the vineyards. Sometimes they are mere slips, corridors between bounding walls or supporting terraces, the vines springing from veins of gravel in the cliff, or rooted in crevices in the stone and turning and twisting their fibres round shapeless blocks of rock. Here and there, where a little more than the average quantity of soil has been got together, small and by no means fruitful olives grow, intermingled with scattered specimens of that most utterly ungraceful and shapeless plant which nature ever produced—the fig tree. The day on which I explored the hill it presented a scene of the most arid desolation. The vines, leafless and withered, looked like mere bunches of dried up twigs scattered over the hot cliff. Every puff of wind blew the dust of the crumbling rock from garden to garden. Brown parched briars straggled hither and thither among the vines and the ugly soft skeletons of the fig trees, but not a wild flower or a blade of grass found nourishment among the gravel and rock blocks. Green, grey, and yellow lizards all but monopolized the visible sum of animal life, except when now and then a great dragon-fly shot past with a startling buzz, or when out from among the dry grey stones sprung, with a sudden flutter, a grasshopper big enough to have astounded Sir Thomas Gresham.

It is on Sunday, however, that the mountain is in its glory; then it is one mass of life, industry, and enjoyment. Not a vine-garden but has its baraque, or summer-house; and a summer-house in this part of the world is perfectly and pleasantly habitable all the year round. The better sort of these erections dot the lower slopes of the hill, and are occasionally surrounded by a few formally cut cypresses and boxwood bushes. But the vast mass of the erections in question are mere shells of mason-work glaring with whitewash, and nestling as much as possible under the shade of the rock. With the dawn of the Sunday morning, the working population of Cette pour fourth, swarming up the toilsome, narrow ways—men, women, and children—bearing baskets full of the day's provisions, or leading donkeys equipped with well-filled panniers. It is a sort of point of honour with every tradesman or workman making a decent livelihood to have a patch of vineyard and a Sunday country house on the mountain. The greater portion of the requisite cultivation is bestowed upon the vines in these hebdomadal visits, and very toilsome work the nature of the ground forces such cultivation to be. The wine produced is merely for home consumption, and the olives and figs are tended with little view to commercial speculation. The ground, as may be expected, is cheap enough, there being ample room upon the hill for all and sundry. An average sized patch of vineyard can be obtained for three or four pounds, and the materials for the roughly run-up houses are to be got gratis from the ground. The better class of proprietors employ regular cultivators in the vineyards, and have the shrubs very carefully attended to. The work is hard, consisting in great part of stirring and loosening the earth down in the rock crevices, among which the fibres of the roots twist and penetrate. The wages given are accordingly high, amounting to fifty sous, or two francs and a-half per day. Employment of this kind is, however, necessarily irregular and uncertain, the amount paid being, in fact, rather a "fancy" than a regular commercial price. On the level and loamy borders of the hill the average sum paid to the labourers per day ranges from thirty-five to forty sous; still, however, decidedly above the ordinary rate of the

country. The phenomenon is of course exceptional, arising from the constant demand for labour in Cette and the high prices of agricultural commodities afforded by a thriving and busy seaport. Upon the opposite side of the Etang de Thau a labourer is glad to get 20 sous per day and his food. The high mountain vineyards are, as the reader will perceive, cultivated almost purely out of whim. So utterly ungrateful is the soil that a regular yearly supply of manure is necessary for each vine, the compost being carried up the hill in panniers by donkeys. The arable ground below is, with the exception of an estate here and there, much divided, and cultivated for the most part by hand husbandry. A party of neighbours unite to break up and prepare a field for seed. I saw five or six men, with short hoes, employed upon a patch of soil not a quarter of an acre in extent. The old custom of the district was for a proprietor of really profitable vineyards to have the plants tilled and dressed by *prix faiteurs*, after the Medoc fashion. The usage is now, however, dying out, owing, as I was informed, to the general negligence with which the *prix faiteurs* were apt to treat the vineyards which they had contracted to till; and the necessary work is now done by means of day labour. The produce of the low-lying land is occasionally changed from vines to a succession of corn and green crops. When the former plants cease to yield, wheat is considered a fair return; they are rooted up, the ground thoroughly broken by the hoe, and corn sown in their stead. Five or six years under grain is held to bring the land into first-rate condition again for vines. Under the hill, upon the margin of the lagoon, cottages are thickly scattered, occupied by fishermen, a picturesque-looking race, with Phrygian bonnets—the original, by the way, of the cap of liberty—long jackets or doublets, breeches, and striped woollen hose covering the legs. These men are fishers and net makers, seldom or never possessing land, but occasionally working at the manufacture of ropes, spun from a species of long tough grass imported from Spain, and much used, on account of its cheapness, for barges navigating the lagoons. The skiffs employed by the fishermen in question are exceedingly slight, flat-bottomed boats, fast rowing craft, and very graceful upon the water. The "Catalan" boats used for fishing purposes outside the harbour, with their high curved cut-waters, sharp bows, and melting runs, are beautiful models of naval architecture.

There is one species of industry actively pursued by the energetic people of Cette, which redounds more to the credit of their ingenuity than their commercial morality. This is a no less impudent piece of quackery than the concoction, in very large quantities, of imitations of all European wines of celebrity, the stuff being of course purchased in the markets upon which it is principally poured, as the genuine article. The raw materials used by the wine manufacturers of Cette are mainly the growth of the numerous but undistinguished vineyards of the departments of Herault, Gard, and Bouches du Rhone. A quantity of rough, coarse wine, from the higher reaches of the river, towards the Hermitage district, finds its way annually along the Canals de Beaucaire and des Etangs to Cette. Cider is also used as a basis. The imitations of particular flavours are mainly imparted by subtle chemical ingredients, and so deftly is the task performed that the palate of a practised connoisseur is requisite to distinguish the port of the Douro, the sherry of Cadiz, the claret of the Garonne, and the hockheimer of the Rhine and the Maine, from the port, sherry, claret, and hockheimer of Cette. The extent to which this forgery of vintages is carried may be inferred from the fact that the amount of fabricated wines annually shipped from Cette—never, however, I believe, under the French flag—for ports in the north of Europe, equals the quantity of claret exported from Bordeaux for the same destinations. In 1843 there were cleared out from Cette, loaded with manufactured wines, 22 ships for Russia, 8 for Sweden, 10 for Norway, 34 for Denmark, 28 for the Hanseatic Towns, 12 for other ports in Northern Germany, 11 for Holland, and 1 for Belgium—in all 126 vessels, of the burden of 27,240 tons. The tonnage despatched to the same ports from Bordeaux the same year, loaded with genuine wine, amounted only to 28,102. In 1841 Cette sent forth to European markets 118 ships, of 21,081 tons, and in 1842 upwards of 115 ships, of 23,013 tons. Nor are the unfortunate heads and stomachs of the northern part of our own quarter of the world the only sufferers from the ingenuity of the slow poisoners of Cette. In 1845 there left the port 4 ships for the Brazils, 12 for Rio de la Plata, 6 for the Mauritius, and 2 for the United States. The cargoes of these vessels were entirely wine. It is comforting, however, to mark that none of the compounded trash in question finds its way either into Britain or, with one exception, into any of our colonies. Not far from Cette, to the east, lie the paltry town and once celebrated vineyards of Frontignac, stretching seaward amid sand, marsh, and shingle beds, and fringed with low scrubby fences of dried grass and brush-wood; altogether a dreary spectacle. The sweet wines produced hereabouts now find their principal buyers among the fabricators of Cette, who speedily transform them into golden sherries and south-side Madeiras.

Arrived, as I now am, almost in the centre of the olive-growing provinces of France, I may here introduce what account I have managed to scrape together of the cultivation of the tree and of its effects upon the condition of the rural population. The task has not been an easy one. There is an almost total want of written information upon the subject of the olive tree and its productions, so that my inquiries had, from first to last, to be pushed in the fields among the peasantry. The contradictory information I received on all hands was at first bewildering, but I think that some perseverance in the inquiry has enabled me to offer a sketch which will, in its main features, be found to be correct.

The olive then, whatever may be its utility, is not, in English eyes at least, a handsome tree. It wants all vegetable symmetry, all grace, all picturesqueness. Poplars have hardly a more uniform family likeness than olives; the only feature distinguishing any one of the latter tribe from the others being the higher or lower point at which the trunk

divides into branches. A not bad idea, in fact, of an olive grove could be obtained by cutting short the handles of a regiment of mops, and sticking the mutilated implements erect in a very dusty yard. For all that, however, your true Provençal or Languedocien talks of the beauties of the olive with an odd misplaced enthusiasm, and discovers all manner of recondite graces in peculiar varieties and peculiar styles of branching of the tree. There are olive fanciers, in fact, as there are tulip fanciers and rabbit fanciers, and these amateurs hit upon all manner of modes of twisting and distorting the tree. The most common method of treating an olive, so as to develop its beauties in the eyes of the amateurs in question, is to proceed by "couronnement;" in other words, so to bend and direct the branches of the young tree, as to spread out the foliage in a flat circular table-like mass, around and above the trunk. The aspect of a field of olives so treated is curious. They look like so many gigantic toad-stools; or, if they are planted close to each other, like a regular compact layer of vegetable matter, supported at certain intervals by bare wooden pillars. Olives planted in alleys are almost invariably treated in this fashion; but I ought to add, that the method is condemned by many of the best cultivators, who maintain, and certainly with reason, that it injures the vigour and fruit-bearing capabilities of the tree.

Olives flourish best upon dry, stony eminences, and the sides and tops of hills. You occasionally see them in the flat arable land, but never in the flourishing state in which they appear on their favourite gravelly or rocky slopes. In respect to soil, indeed, the vine and the olive show a very similar taste, and in the south of France generally go together. The mistral is very prejudicial to the oil-giving tree, and southern and eastern exposures are always, if possible, chosen for rearing it. In rich, damp soils, the tree gives plenty of leaves—but little (and that little inferior) fruit. In clay grounds, however favourably situated, the tree will hardly grow at all, the earth becoming clodded and baked round its roots in the summer droughts, and rotting the delicate fibres in winter by soaking them with the cold rain water which it retains. Even if in ordinary years olives planted in low moist ground give respectable crops, their produce is much more liable to be affected by unfavourable seasons than that of the trees rooted in congenial soil. The latter are able to endure a degree of cold which would wither and kill the former. As may be supposed, a peculiarly severe winter is the dread of the olive grower. The sinking of the thermometer eight or ten degrees beneath the freezing point seals the doom for seasons, or it may be entirely, of hundreds of thousands of olive trees. Winters in which such catastrophes have taken place are remembered as times of national loss and sorrow in Provence and Languedoc. Such were the severe seasons of 1709, 1765, 1769, 1820, and 1830. The first of these years was particularly fatal, and the popular impression still existing in the country is that the tree has never recovered the shock which, as a species, it then received. It was in the month of January that the severe frost in question occurred, blasting the trees to their very roots. In the course of the following summer shoots sprung up around the dead trunks, and from these the great body of the still existing trees have been derived. I am indeed assured that the mass of wood furnished by the present existing olives is not above a fifth or sixth of that which was afforded by the average of dead trees killed by the frost of 1709. The winter of 1820 was another of the very fatal epochs, a single night of intense cold killing multitudes of the trees outright, and injuring the greater portion of those surviving to such an extent that they had to be cut and pruned almost down to the ground. The disaster produced a profound public sensation in the south of France, and so unreasoning was the panic that it was afterwards discovered that many trees had been rooted up and flung aside, which, though damaged, were by no means rendered *hors de combat*. The last fatal winter was that of 1830. These severe seasons sufficiently account for the number of young trees, almost saplings, which are sprinkled over the fields, particularly in the level portions, where the frost was most severely felt.

A young olive tree, in the best condition for planting, costs from three francs to ten francs, according to its quality and the variety of the family to which it belongs. The price of thriving sapplings of the four species which flourish most in Provence—the *verdale*, the *oliviere*, the *grousseau*, and the *picholine*—may range from five francs to six francs. The smoother and cleaner the bark, the more valuable are the shoots, or "subjects." They are planted sometimes in regular lines—sometimes here and there, at random—sometimes along the boundaries of fields and roads, according to the general species of cultivation adopted on the ground. The larger and deeper the holes dug for their reception the better. Cavities comprising four or five square feet of space are generally employed, but the most successful cultivators dig them still larger. The holes are only in part filled up with the friable rock, flints, and gravel in which they have been usually sunk. A thin layer of fine warm earth is deposited around the roots, or occasionally a small quantity of forcing manure. Great attention is requisite properly to develop the vigour and valuable qualities of the young olive. The stem is apt to be beset with insects and parasitical plants, requiring patient attention to discover and remove. In the heats of summer the loosened earth above its roots demands frequent waterings and tillage with hoe and pick. The second season after planting it commonly yields fruit, but it does not begin to undergo the annual ordeal of pruning and trimming before the third year. The dead and dry twigs only are cut away each spring, before the leaves begin to shoot. In subsequent seasons great attention is paid to forming the shape of the tree. Branches which bear little or no fruit, and which are called *gourmands*, are lopped mercilessly off; the centre portions of the boughs are thinned so as to admit a free circulation of air through the olive, the general object of the cultivator being to produce a tree with boughs of nearly equal length, spreading regularly and horizontally out from the trunk, like the ribs of an umbrella—the upper part of the foliage kept as flat as possible.

The subsequent routine of pruning, to which the mature tree is subjected, differs in different districts. In some places the system is to apply the knife in winter after the fruit has been gathered. In other districts the operation takes place before the budding of the tree in spring. Sometimes the process is repeated in nearly the same manner every year. And this is, I believe, the most approved fashion. In other cases cuttings, upon a large and small scale, annually alternate. All this pruning work is managed in a very systematic manner, there being technical names for and technical modes of accomplishing every degree of curtailment. Thus the slightest species of *taille*, consisting simply of the snipping off of dead twigs and leaves, is called the *emondage*. When larger branches are cut the tree is said to be *claqué*. To *ébrancher* an olive is to loop asunder the medium branches at their junction with the stem. To *éfourcher* the tree signifies to cut through the larger and more important boughs at their roots; and a tree is said to be *recepé* when the axe is applied to its trunk. The care with which these operations are gone about may be inferred from the fact that skilful cultivators cut the thickest branches with sharp knives or chisels instead of with saws, the friction of which is said to burn the wood, and irremediably to injure the bough. If, however, the position of the branches necessitates the use of a saw, the stump is afterwards cut with a knife, so as to get rid of the seared portion of timber. Grafting is much practised in olive plantations. As in the case of other fruit trees, there are many varieties of the operation. It is frequently resorted to in order to improve the produce of the wild olive tree—a dwarfed and stunted variety—and is usually undertaken in the month of March.

The olive requires from time to time attention beneath as well as above ground. A few cultivators who possess facilities for the purpose, not common in the south, water their trees in times of long-continued drought, but these cases are necessarily exceptions to the general rule. In all instances, however, in which ordinary care is bestowed upon the tree, the earth surrounding it is yearly hoed, or broken with the plough. When vines or corn (barley chiefly) are cultivated beneath the shade of the olive, the same preparation of the earth suffices for tree and shrub, or plant. Every second year, immediately after the gathering of the fruit, the roots are laid bare, and covered with a fat layer of stable manure. The usual plan is to arrange matters so that one half the trees upon a property come in yearly for their turn of artificial nutriment. The process is one of the most expensive portions of the culture of the olive. It forms a hard day's work suitably to manure three trees of average size. The value of the compost applied to such olives may be about half a franc a piece; and, at a rough estimate, the total ordinary expenses requisite for the due culture of each tree may range from 1½ to 2½ francs per annum.

With respect to the average annual produce of the tree, I found it no easy matter to get any very reliable information. The point may seem a simple one—but the difference of opinion which subsists with respect to it, even among the practical cultivators of the tree, is astonishing. I was furnished with estimates varying from a couple of francs to over fifty. The truth is, that the yield in different districts, and in different years, is subject to astounding irregularities. A grove upon the plain will be producing annually oil to the value of only two or three francs per tree, while within a gun-shot a clump of olives springing from the hot gravelly soil of a southward sloping hill will be yielding an annual revenue of over twenty francs a-piece. Here and there, too, are to be found trees of very large growth, producing singly as much oil as will be furnished by a whole field of *oliviers* in the neighbourhood; and now and then I heard legends of wonderful trees, the pride of a whole district, the yearly profits of which were described as perfectly fabulous. An intelligent person, the principal functionary in an oil mill, to whom I applied for information, informed me that he would not reckon an olive tree *vraiment un bon arbre* unless it produced somewhere about 60 litres of oil, at 14 sous per litre—thus yielding a gross revenue of 42 francs. In the neighbourhood of Montpellier, the products of the olives were estimated as ranging from 4 to 30 or 35 francs. Near Nismes, the general valuation was lower, including all manner of sums from 3 and 4 to 10, 20, and 25 francs. The fact is, however, that although individual trees, or individual clumps of trees, are frequently large and fruitful, the smaller and the more sterile class very much predominate—a no inconsiderable proportion of the whole number being very little removed from the category of bushes. He would be, then, on the whole, I think, a bold man who would estimate the annual net average income produced by the olive trees of Provence and Languedoc at more than a sum ranging from four to six francs per tree. The single small tract, with reference to the olive, which I have been able to pick up, and which was published apropos of one of the fatal frosts to which I have alluded, complains pointedly of the wretched quality and species of a great proportion of the trees in bearing, and advocates the necessity of a general rooting out and replanting with fresh and vigorous imported shoots throughout Provence and Languedoc.

"A foolish parsimony," says the author, "the necessity of a rigorous economy on the part of a father of a family, and, above all, the difficulty experienced in procuring young, healthy, and vigorous shoots, too often compel proprietors to plant half, or even two-thirds of their land with trees of an inferior species, often wild olives grafted, or old, stunted, and rickety deformities. Nothing is more common than to see good olive-bearing ground cumbered with these sapless and withered sticks, which for generations take up the space which ought to be occupied by thriving and fruit-producing trees."

The same authority, who seems to be a practical provincial cultivator, exclaims against the parsimony of manual labour, ordinarily bestowed upon the roots of the olive, particularly in the case of the young trees. The earth with which they are surrounded is often, he says, ill-selected, the waterings are neglected, manure is not supplied in sufficient quantities, and the soil is seldom or never suffi-

ciently deeply and [illegible] often stirred and loosened.

The olive tree is cultivated sometimes upon the metayer system, in common with the vines or corn among which it grows; but it is, perhaps, more often tilled and pruned by day-labourers, hired at the seasons when the operations are necessary. Metaries, properly speaking, are, indeed, rather the exception than the rule in the olive country. The name only subsists universally, the head or managing labourer being termed a metayer, although he is paid a fixed wage, and has a fixed allowance of corn and wine. The money amount in question may average about 200 francs. One intelligent old man near Montpellier reckoned the average sum as about ten Louis-d'ors—the old people in this part of France commonly count by the ancient coinage in gold and silver—other estimates came to nearly the same mark. The farm-servants placed under the metayer have about the same amount of money wages as their superintendent, minus the grain allowances. I tried to ascertain definitively the extent of the independent powers of this, the leading working man of the farm, and the sum total of the replies which I received amounts to that he was the master when the master was away, the plain fact, however, being that routine is the lord of both master and man, and that no sort of agricultural skill other than practical acquaintance with the style of ploughing, sowing, reaping, and manuring practised in the district, is ever in demand, or ever thought of. The cases are few, indeed, in which a course of experiment and reforms demands an intelligent overseer—a man of ingenuity and resource. As in the Bezier district, the metayer is frequently the ramoner. The winter allowance per day, per man, for the purchase of animal food, I found in the neighbourhoods of Montpellier and Nismes to be generally low, not more than 2½ sous. The best class of workmen were, however, those hired by the day, and paid a fixed money wage without food. The ability to tend the olives beneath ground, to hoe and manure the land, does not at all necessarily include skill in pruning, grafting, and training the tree. The general run of agricultural labourers are, therefore, in the olive districts to be divided into two classes—those who meddle only with the spade, hoe, and plough, and those who are skilled with the pruning knife. The latter class, as may be imagined, generally include the former. The ordinary farm workers receive the ordinary average wage of 20 sous and their food. The more skilled pruners earn in the season, lasting about four months, during which they are mainly employed, as much as 40 or 50 sous per day, and a man whose reputation is firmly established can frequently command, if called to operate upon a frost-bitten or injured tree, still higher wages. As perquisites, the individuals in question are also generally entitled to the lopped off branches. Around the large towns, more particularly Nismes, the working men, who are tolerably well off, possess almost universally patches of vineyards and olive grounds. Further a field are many large properties, among the nooks and corners of which the infinitisimal estates of the peasantry lurk, so that, as is common in France, the farm-servants are proprietors.

The olive harvest [illegible] and taking place until the beginning of December. The fruit is allowed to remain on the tree until it becomes perfectly black. The olive grounds, so lonely and desert-looking for the most part of the year, then swarm with men, women, and children; but somehow the harvest has little or none of the joyous festival feeling which attends the vintage, the whole work being managed in a very cold and business-like fashion. In the Beziers district it is common to spread sheets beneath the tree and shake the fruit down into them. Further east the olives are gathered more carefully by the hand. Broad, light, self-supporting ladders are used, or the men strip off their *sabots*, and, in the case of the larger trees, clamber up among the branches. Each olive gatherer has a basket strapped round his or her neck, the contents of which are emptied into the panniers of a mule or a donkey and carried home, or to the mill. As there is no particular hurry requisite in getting the olives in, the time of their gathering produces no temporary rise in wages, and, wonderful to relate, the owners may begin their harvest when they please, M. le Maire having for once nothing to say or do in the matter.

The olive-pressing mills are, for the most part, simple machines enough. They abound in the outskirts of the towns, in the scattered villages, and sometimes the better class of farms or country houses each possess an implement of the kind. Generally the olives undergo two distinct processes —that of crushing and that of pressing. The crushing mill is a circular stone trough, round the interior of which revolves, upon its edge, a ponderous mill-stone, set in motion by water in some of the best mills, but generally by a mule or a couple of donkeys. Half an hour suffices to crush the quantity of olives flung in at the same time. The oil which rises and gurgles in the trough is virgin oil, and of considerably more value than the pressed sort. When it has been extracted, the mass of crushed fruit, mashed into a species of cake, is placed in flat baskets, or rather straw-woven bags, called *cabasses*. These are piled up one upon another in the *pressoir*, a ponderous machine, made on the same principle as a wine-press, the moveable portion working by means of screws and vices. In first-class establishments there is a system of furnaces and boilers arranged behind the *pressoir*, from which hot water streams into a stone or wooden trough in front, while upon the surface of this water flows out, by gradual degrees, the oil strained from the olive cake as the ponderous vices and screws force down upon the heap the massive planks which press it. The oil of course floats on the hot water, and is spooned up every half hour, until the recumbent mass above has been thoroughly drained and squeezed almost as dry as hay. The oil is preserved in vessels of earthenware, stone, and wood. The cost of squeezing is, I understand, from five to six per cent. on the value of the oil.

Above Nismes rises a range of stony hills, that is to say of hills composed almost entirely of masses of splintered and fractured rock and boulder stone —a sister eminence, in fact, to the miniature mountain overhanging Cette. The hill is laid out in precisely similar fashion; being a maze of vine-

yards and olive-gardens, intersected by steep scrambling paths, fenced by high dykes. Toiling along one of these I encountered a broad-faced, honest-looking, working man, a weaver, as he afterwards told me, of Nismes. Almost the whole of the vineyards and olive grounds by which we were surrounded belonged, he assured me, to the working people of the city; the richer merchants and traders had their country houses further afield. The majority of the hill patches were cultivated upon Sundays and *fête* days by their proprietors. Metayers were occasionally employed by those who tried to turn a penny from their rural possessions, but generally the results were slender. The country people about, who really understood the culture of the vine and the olive, were, my informant assured me, to be by no means implicitly relied on as to giving up the fair half of the proceeds; in fact, he said, unless a man spent half his time in watching, his metayer, in nine cases out of ten, managed quietly to make away with at least two-thirds of the whole produce. I should not have reported this statement had it not been in the fullest manner confirmed to me upon indisputable authority at Marseilles. The *métaire* system for the cultivation of small patches of ground round the city was there, I was told, falling into great disfavour, principally on account of the general dishonesty and bad faith of the persons employed. It is common with the Marseilles citizens to contract for the management of the plots of ground attached to their *bastides*, or country houses, upon strict *métaire* principles, extending even to the very flowers in the gardens, not one of which the proprietor can venture to cull, so strict are the cultivators in the interpretation of their rights. It would be well, however, I was informed, were their adherence to the terms of the contract as strictly observed on the one side as it is enforced on the other. The fact is, said my informant (a gentleman many years resident in Marseilles), that if you embark in a metairie speculation in this part of the world, and are not as watchful as a sentinel, your farmer will quietly dispose of one half of the crop for his peculiar profit, by private bargain, and considerately allow you the stipulated moiety of the remainder.

I return, however, for a moment to my Nismes weaver. He had been up at his *barraque*, a distance of two good miles from the town, and some 800 feet above it, to feed a couple of rabbits, which afforded a portion of his Sunday delectations. Presently, as we talked, he found an opportunity of hinting that I was possibly an Englishman. I admitted the fact, and he straightway insinuated, "Et monsieur est aussi probablement Protestant?" I again acquiesced. The man's face brightened up like a sun-burst; he caught my hand in both of his, wrung it with the most enthusiastic fervour, and suddenly burst out—"We're 14,000 here—14,000 strong. The *others* (strongly accented), the *others* say only between 12,000 and 13,000, but I say 14,000—I tell you 14,000—all understanding each other, all ready to stick by each other, all good fellows, all *bons enfants!*"

For an instant I could hardly tell what my honest weaver was driving at, when my eye caught a glimpse of the distant ridge of steep and rocky mountains, stretching away east and west in the northern horizon, and immediately I remembered all. The hills were the chain of the Cevennes, once the wild abode of the Covenanters of France. A hundred and fifty years ago, the Grand Monarque had attempted to bring them back to the bosom of the Church by the means of artillery, dragoons, the provost marshal, and the hangman. Then arose the warrior enthusiasts, the Camisards. Then, led on by their prophets and prophetesses—simple peasants inspired by fanaticism and persecution—they gave battle again and again to Louis's dragoons—again and again cut to pieces his most veteran troops, and foiled his ablest generals. It was one of the fiercest religious wars ever waged. Neither side gave nor took quarter. The King's troops shot, burnt, or tortured all their prisoners; and when, in turn, any of the Royalists fell into the hands of the Camisards, all they had to look to was a high gallows and a short shrift. At length the strong hand so far triumphed. Open rebellion was put down; but the moral energy remained—opinion flourished and flourishes still—for the Cevennes and the adjacent plains form one of the most firmly-established Protestant strongholds in France. So far so good, but the *odium theologicum* is tough of life; there is yet a gulf between the Protestants and the Catholics of Nismes. They keep apart, and count heads, as if they meditated some day a rush at each other. There is an apparently implacable animosity and mistrust betwixt the two bodies of religionists. On the hill they have their different districts for gardens; and, ludicrous as the thing may seem, it is oddly and deeply significant, that in the city they have different places of public entertainment—no true Protestant drinking his beer in a Papist café, and no devout Catholic rattling his dominos in an heretical estaminet.

THE APPLE COUNTRY OF THE UNITED STATES.—The old apple country of the United States—the home of the Newtown Pippin, the Spitzemberg, and other highly-prized varieties—is on the Atlantic border, between Massachusetts Bay and the Delaware. But western New York and northern Ohio have now entered into earnest competition with these old districts, and threaten to bear away the palm. By its residents, the new apple country is regarded as the finest fruit country in the world. The mollifying influence of Lake Ontario—which never freezes, as Lake Erie does—extends more or less over the whole level, or slightly undulating region occupied by the lower portion of the upper Silurian rocks, on which the rich soils of this part of the State rest, and from which they are generally formed. From Oswego, near the west end of Lake Ontario, to Niagara, beyond its western or upper extremity, this region forms a belt about forty miles wide, by one hundred and fifty miles long; and over it the early frosts of autumn, which are so injurious to fruit trees, are comparatively unfelt. The rich soils

of this district produce larger and more beautiful fruit, though inferior, it is said, in that high flavour which distinguishes the Atlantic apples; and the profit of the cultivators is estimated, on the average, at from £20 to £30 an acre. In Wayne County, about the middle of this belt of land, the merchants of Palmyra (a shipping village on the Erie Canal) sent off 50,000 barrels of green or fresh, and 10,000 of dried apples in the same year, besides 1,000 bushels of dried peaches. In Oneida County, part of four townships shipped on the canal, in 1848, as many as 18,000 barrels, at from 62½ to 100 cents per barrel. This is a very low price for good apples; but in New York the best apples sell for three or four, and in London for nine dollars a brl. Indeed, so rapidly is the fruit culture rising into importance in this region, and so great the number of persons now interested in it, that a pomological convention has recently been formed, for considering and investigating everything connected with the culture of the apple. Nearly two hundred recognized varieties of apples, says Professor Johnston, are already cultivated in the States; and one important object which this convention may usefully keep in view, is the classification and nomenclature of these different kinds. In the States, only the finest apples are sent to market, the waste or refuse being generally made into cider. But it is to be remembered that those varieties which are best for the table are unfit alone to make a palatable cider. The culture, growth, and selection of apples—the proper mixture of varieties in the crushing-mill, &c., is a branch of husbandry requiring special knowledge, the acquisition and diffusion of which may be greatly promoted by a judiciously conducted association of growers. In the United States, also, as elsewhere, the apple trees naturally yield a heavy crop only every second year. But Mr. Pell—the owner of one of the finest orchards in America, on the River Hudson—has recently been investigating whether an *annual* crop might not be secured from his valuable Newtown Pippin trees, of which he has 2,000 in full bearing. His experiments, we are told, were perfectly successful; only he had begun to apprehend that the life of his trees might be shortened by this course, and that he might have to replace them so many years sooner. Should this prove the result, it will still, probably, be found more profitable, as it is with the peach-orchards of New Jersey, to have a succession of new trees coming up to replace the old, than to continue to gather only one full crop in the two years. Mr. Pell cultivates his orchard-grounds as if there were no trees upon them, and raises grain of every kind except rye, which crop, strange to say, he finds so injurious, that he believes three successive crops of it would destroy any orchard which is less than twenty years old. This is a physiological fact as yet incapable of being explained, but well deserving of scientific investigation. It is well known that the quality of both soil and subsoil has a very material influence on the growth of fruit tree, the apple, the pear, the peach, and even the coffee tree refusing to thrive or continue bearing in favourable climates, if the soil be unpropitious. This is not uncommon anywhere, but it is distinctly brought out in the case of the apple trees at Miramichi, in New Brunswick, where the young trees die, though the climate is most favourable; yet if a good deep soil be put under them they will thrive well, and bear good fruit. Another curious illustration of the connection of geology, even with this branch of rural industry, is, that the nature of the rock over which the apple trees grow affects the flavour of the cider which is made from the fruit. Thus the cider of the chalk soils in Normandy differs in flavour from that of sandy, and both from that of clay soils, the variety of fruit and the management being the same. Hence the *gout deterrain* spoken of by French connoisseurs, is a correct expression for this recognisable difference. Doubtless among the varied geological deposits of western New York, similar differences must likewise be observed, both in the fruit and in the cider made from it, which will give peculiar characters and recommendations to the productions of the several districts. Of course climate must have its due, and its effects are striking enough. Thus, in New Brunswick, fruit of good quality may be raised, and the cultivation for home consumption carried on, with a profit; but the apples, though of a pleasant agreeable flavour, are in general small, and cannot compete with the large delicate apples of the Hudson River, of western New York, and of northern Ohio. "It is probable, I think," says Professor Johnston, "that the great heat of the sun is in reality a chief cause of the smallness of the fruit, hastening the ripening process before the apple has had time to swell. Its scorching effect was seen upon the fallen fruit, which was dried and altered, as if by artificial heat, on the side which had been exposed to its rays. The *ten o'clock* sun has the effect also of scorching the young trees, burning a stripe all the way down the stem, and finally killing them. The preventive is to wind a straw rope round the stem, and to let all the branches grow till it has got a rough bark. It is an interesting fact, that part of a stem thus protected will thicken faster than the uncovered portion, and, when the straw is detached, will sensibly be of a greater girth." The celebrated apple-toddy of Maryland, Mr. Johnston informs us, is made as follows:—"Take a red-streak apple, roast it before a slow fire, on a china plate, put it into a half-pint tumbler, mash it well, add one wine-glassful of good Cognac, and let it stand twelve hours. Add then two wine-glasses of water, dust it over with nutmeg, put in a spoonful of white sugar, stir up well, and drink." This is genuine apple-toddy, taken as a water drink, mint-juleps taking its place in summer. Among these jovial middle States men, a stranger has a chance of living according to his humour, which the determined temperance-upholding people of the north-eastern States scarcely permit.—Journal of Agriculture.

ABD-EL-KADER'S ACCOUNT OF THE ARAB HORSE, WITH HIS NOTICE OF THE TRIBES OF ALGERIA, &c., &c.

(FROM THE MORNING POST.)

"GLORY TO THE ONE GOD. HIS REIGN ALONE IS ETERNAL."

Greeting to him who, in his excellent qualities, equals all the men of his time, who seeks only what is good, whose heart is pure, and whose speech is admirable, the wise, the intelligent Lord General Daumas—from your friend Sid-el-Hadj Abd-el-Kader, son of Mahhi-Eddin.

Behold the reply to your inquiries.

1. How many days can the Arab horse travel without repose or injury?

Know that a horse, sound in all his limbs, fed on barley, which his belly demands, can do whatever his rider wishes him to do. With reason the Arabs say—

"*A lef ou annef*"—"*Give barley and abuse.*"

But, without abusing the horse, you can make him travel sixteen parasangs* every day; that is the distance between Mascara and Kondiat Aghelizan, on the Oued Mina. A horse making this journey every day, and fed on barley, to the utmost of his appetite, can continue unfatigued for three or even four months on the road, without resting one single day.

2. What distance can the horse traverse in a day?

I cannot tell you with precision; but that distance ought to approach fifty parasangs—from Tlemsen to Mascara, for example. We have seen a vast number of horses do the journey in one day. However, the horse which has accomplished that distance must be spared next day, and would not be able to do at all so much without a twenty-four hours' interval.

Most of our horses used to go from Oran to Mascara in one day; and for several days together they could repeat the journey. We have left Saïda at eight o'clock in the morning (*au dohha*) to surprise the Arbaa, who were encamped at Aïn Toukria (among the Oulad-Dïad, near Taza), and we reached them at break of day (*fedjer*). You know the country, and you can understand the distance we had to accomplish.

* A parasang is about three miles, as will be seen in this very letter of Abd-el-Kader's, under the head of the 4th question.

3. What examples are there of the abstemiousness of the Arab horse, and what proofs of his power to bear hunger and thirst?

Know, that when we were established at the mouth of the Melouïa, we made razzias in the Djebel-Arnour, following the road of the Sahara, pressing our horses to the gallop for five or six hours together in one breath on the days of attack, and accomplishing our excursion thither and back in twenty or twenty-five days at the most. During this interval our horses had no barley to eat, except what they could carry along with their riders; that is, about eight ordinary meals. Our horses found no straw, but only some *alfa* or *chilh*, or, in spring, a little grass.

Nevertheless, on our return home, we performed the games on horseback, the day of our arrival, and struck the dust with some of our horses. Many which could not exhibit this exercise, were yet in a condition for the campaign. Our horses used to remain without drinking for one or two days. Once they had nothing to drink for three. The horses of the Sahara do more than this. They remain for about three months without eating a grain of barley! they know not straw except on the days when they come to purchase grains in the Tell; and they eat, for the most part, only *alfa*, *chilh*, and occasionally *guetof*.

Ths Arabs say—

"*Alfa* enables the horse to travel—
Chilh makes him fight—
And *guetof* is better than barley."

Certain years pass without the horses of the Sahara having a grain of barley to eat during the whole year, when the tribes have not been received in the Tell. Sometimes, then, they give dates to their horses; this nourishment fattens them; they are then marched out, and enter on expedition.

4. Why, as the French do not ride their horses until after they have passed the age of four, do the Arabs mount theirs extremely young?

Know that the Arabs say that horses and man can be well taught only in the tenderest age. This is their proverb on the subject:—

"The lessons of infancy are graven on stone."

"The lessons of riper years disappear like the nests of birds."

They also say, "The young branch recovers its pasture without much difficulty, but the thick wood never recovers from a warp."

In the very first year, the Arabs begin to instruct the young horse to go with the *reseun*, a sort of cavesson; they then call him *djeda*, beginning to break and bridle him. As soon as he becomes *teni*, that is when he enters his second year, they ride him one mile, then two, then a parasang; and when he has completed his eighteenth month, they are no longer afraid of fatiguing him.

When he has become *tebora telatu*, that is when he enters his third year, they cease to ride him; they fasten him, cover him with a good *djelale* (cloth), and fatten him. On this head they say, "In the first year, tie him for fear of accident. In the second year, ride him till his back curves. In the third year, tie him again; and if he has not become what you wish, sell him."

If a horse be not ridden before his third year, it is certain that he will never be good for anything but speed, which he does not require to learn, it is his natural faculty. The Arabs express the idea thus — "El djouad idjri be daselouh." — "The djouad runs according to his blood." The noble horse needs not to learn swiftness.

5. Why, if the stallions impart more qualities to the breed, should the mares nevertheless be dearer?

This is the reason:—He who buys a mare, hopes that, while using her as a steed, he will at the same time rear a numerous brood from her: whereas, he who buys a horse only employs him for riding, no money being taken by the Arabs for commercial purposes.

6. Do the Arabs keep registers to establish the genealogy of their horses?

Know that the Arabs of the Sahara trouble themselves as little with registers as little as do those of the Tell. Notoriety suffices; for the pedigree of their blood-horses is as well known as that of the riders. I have heard that some families keep registers, but I cannot quote them. These books are used in the East, as I mention in the little treatise which I am about to address to you.

7. What tribes of Algeria are the most renowned for their horses?

Know that the best horses of the Sahara are those of the Hamyan, without exception. They possess none but excellent horses, because they never employ them either for tillage or with the pack-saddle, but solely for expedition and war. These are the steeds which best bear hunger, thirst, and fatigue. Next to the horses of the Hamyan, come those of the Arbaa and of the Ouled-Nayl.

In the Tell, the best horses for nobleness and blood, for figure, form, and beauty, are those of the people of the Chelif, especially those of Oulad Sidi-Ben-Abd-Allah (Sidi el Aarbi), near the Mina; and again those of the Oulad Sidi Hassan, a fraction of the Oulad Sidi Dahhon, who inhabit the mountain of Mascara. The swiftest on the race-course (fine also in shape) are those of the tribe Flita, of the Oulad Sheriff, and of the Oulad Sekreud. The best for a march over stony ground, without being shod, are those of the Assassena tribe in Yakoubia. A saying is attributed to Moulay Ismail, the celebrated Sultan of Morocco—"Let my steed have been reared in Maz and watered in the Biaz."

Maz is a place in the country of the Assassena, and the Biaz is the stream known by the name of the Foufet, which flows in their territory. The horses of the Oulad-Khaled are also renowned for the same qualities. Sidi Ahmed Ben Yussouf has said, with reference to that tribe, "long tresses and flowing manes will be seen amongst you till the day of the resurrection," thus panegyrising their women and their horses.

8. You say to me that you are told that the horses of Algeria are not Arabian but Berberian—that is, *barbs*.

This is an opinion which recoils upon its holders. The Berbers are genuine Arabs. A celebrated author has said—"The Berbers inhabit Moghebbo; they are all sons of Kaïss Ben Ghilan." It is averred, moreover, that they spring from the two great Hemiarite tribes, the Senahdja and the Kettama, who entered with the invader Ifrikech-el-Malik.

According to these facts, the Berbers are certainly Arabs; and historians establish the filiation of most of the Berber tribes, and their descent from the Senahdja and the Kettama. The coming of these tribes was anterior to Islamism. Since the Mussulman invasion, the number of Arabian immigrants is incalculable. When the Obeïdin (the Fatimites) were masters of Egypt, immense tribes passed into Africa, and among others, the Riahh. They spread themselves from Kaïroun to Merrakech (Morocco). It is from these tribes that the Douaouda, the Aïad, the Madid, the Ouled-Madi, the Oulad-Jacob-Zerara, the Djendel, the Attaf, the Hauris, the Braze, the Sheha, the Flita, the Medjahar, the Mehal, the Beni Amer, the Hamyan, and many others, spring. Doubt there is none but that the Arabian horse came with his Arabian rider. In the days of Ifrikech-Ben-Kaif, the empire of the Arabs was omnipotent. It extended itself towards the west as far as Morocco; as in the days of Chamar the Hemiarite, it extended itself in the east as far as China. The account of this is given by Ben Konteiba, in his book entitled "El Marif."

It is very true that, if all the horses of Algeria

are of Arabian blood, many of them are fallen from their nobleness, because they are only too often employed in tillage, in retillage, in carrying, in drawing loads, &c., because the mares have been subjected to the ass; whereas, nothing of that sort was done among the Arabs of old. On this point they say that it is enough for the horse, but to walk over tilled ground to make him lose some of his merit.

The following story is told on the subject:—"A man was travelling, mounted on a blood-horse. He is met by his enemy, he also being mounted on a noble courser. The one pursues the other, and he who gives chase is distanced by him who flies. Despairing to overtake him, the pursuer cries: 'I ask thee, in the name of God, has thy horse ever worked?' 'He worked once for four days.' 'Good; mine has never worked; and, by the head of the Prophet, I am certain to overtake thee."

Accordingly, he continues the pursuit. Towards the close of the day, the fugitive begins to lose, and the pursuer to gain ground. He soon contrives to come up with, and to fight him whom he had despaired of catching.

My father (God have him in his mercy!) was wont to say—"No more blessing is there on our country since we have turned our war-horses into beasts of burden and of tillage. Did not God make the horse for the charge and the race, the ox for tillage, and the camel for carrying loads? There is no gain in amending the ways of God."

9. What are our precepts for the nurture and nourishment of our horses?

Know that the owner of a horse gives him at first but little barley, augmenting his ration by small quantities, then diminishing it again a little as soon as the animal *leaves* any, and finally maintaining the allowance at that measure.

The best moment for giving barley is the evening. Except on the road, there is nothing to be gained by giving any in the morning. The saying on this head is—

"The barley of the morning is found on the dunghill; the barley of the evening in the croup."

The best manner of giving the barley is to give it to the horse saddled and girthed; as the best manner of watering him is to water him bridled. They say:—

"Water with the bridle, barley with the saddle."

The Arabs, above all, prefer a horse that eats little, provided he be not weakened in consequence. He is, say they, "a treasure beyond price." To give a horse drink at break of day makes him grow thin; to give it to him in the evening makes him grow fat; and to give it to him in the middle of the day keeps him in his condition.

During the great heats, which last forty days (*semaïme*), the Arabs water their horses only once in two days; and they aver that this practice has the best effects. In summer, autumn, and winter they give an armful of straw to their horses; but the chief part of the food is barley, in preference to all other substance. The Arabs have a saying—

"If we had not seen that horses beget horses, we should say that they were begot of barley."

Again—

"Buy the big horse, barley will make him swift."

"Of forbidden meats," say they, "choose the lightest." That is to say, choose the lightest horse: horse flesh is interdicted to the Musulman.

Among their further proverbs are—

"A man becomes a good rider only by having his bones broken repeatedly." "Thorough-bred horses have no malice." "The horse trained is the master's honour." "Horses are birds without wings." "There is nothing distant to the horse." "Those who forget the beauty of the horse for that of woman shall not prosper." "The horse knows the horseman."

The holy Ben el-Abbas (may God be pleased with him) has also said:—"Love the horse, care for him, spare not your pains," &c., &c.

I have finished the letter of which our friend and companion, the friend of every one, the Commander Sid-Ban-Senna, will be the bearer. Health.

General Daumas, to whom this remarkable epistle was addressed, in reply to inquiries which it specifies, remarks:—"The whole of this letter was written by Abd-el-Kader with his own hand; the original is in my possession, and is certified by the *Chef d'Escadron d'Artillerie* Boissonnet, who has for three years occupied with honour a difficult and delicate position with regard to the Emir. It is to the Commandant Boissonnet that I owe the translation of this precious document.

(Signed) "Le General E. Daumas."

THE OBJECT OF KEEPING AND GENERAL TREATMENT OF CATTLE IN YARDS.

BY AN EX-FARMER.

The season is now on the move when country life is somewhat gay, the feelings of the heart receiving indulgence rather than the intellect cultivation. Social meetings are convened, and neighbours wend their way to the well-known and respected country "house," to meet the friends and

relatives of the Esquire, whose face shines brightly from the influence of the anticipated display of hospitality. The hoary, the vigorous, and the light of heart assemble for one common purpose of making each other pleased; and many angry feelings are being torn from the breasts of their possessors, or are being buried in oblivion by the persons in whom they lurked in being brought together by accident or intention, to quaff the best of the stock of beverages which our host reserves for the set times when Englishmen willingly give way to the inviting flavour of some exhilarating juice. Our cards of invitation may not have been but half attended to, and the visits we are desired to return may yet be numerous, whilst each one adds to the foretasted pleasure of the next to come, weariness being a word unknown to the lovers and seekers of FRIENDSHIP. But amidst all this self-satisfaction on the one hand, and inspiration on the other, and governed, as all seems to be, by the mutual participation of the mirth and gaiety which is exhibited at the suggestion of the occasion, the naturally cool temperament and consistent disposition of English men of business, cause a dulness to exist, as matters and questions connected with their daily avocations spring uppermost in their minds, and they turn to consultation in an under-tone with their nearest friends. This inattention to the jokes and laughter of the more merrily disposed, is the beginning of that re-arrangement which companies are accustomed to, as the day wags on; for the sparkling eyes and the smiling faces of fathers and grandfathers have turned to steadiness and calmness, and all things seem to say that a division of tastes is essential; whereupon the softer sex withdraws to consider by itself the affairs of daily life, and the younger shoots of Old Father Agricola skip and jump to the hall, where they may more freely give vent to the emotions their age is subject to, and where they sooner or later portend "*what they are coming to,*" by stepping up to the spot beneath the emblem of the season, with a view of having a little practice in the art of "billing and cooing." Thus the minds of the fathers are freed from disturbance, and the temperament of the hour is that which admits of strength of thought and eloquence of expression, whereby each question raised is dispensed with in a manner both masterly and rapidly. Imposts, taxes, prohibitions, "reckless repeals," and general politics, receive an occasional allusion, but the general subjects discussed are the quality of such and such a Christmas bullock, such and such a sheep, and so on; and how the quality of these was obtained; and, further, how such artificial treatment may be extended with profit to the individuals who practise it. Whoever, therefore, practically and scientifically argues a question, which is not only vitally connected with the means we have for fostering friendship in the future, but also connected with the question of our prosperity: whoever does this is advancing the progress of the human family, and his writings are read with attention and respect, inasmuch as every man free of infirmities seizes every sentence of reasonable counsel with a view of turning it to account, that he may gratify that principle he inherits, which prompts him to advance his position.

The art of "manufacturing manure" (as it is termed by the lovers of novelty) has been so often explained, and by these explanations so simplified, that it is unnecessary to blend it with the present consideration. However, the object of each skilful farmer is to make each annual produce of straw into manure as early as possible, that it may increase the produce of the next crop of corn; and, also, of fodder for the support and greater comfort of his animals the following winter. In doing this, expenses are narrowly watched; for if persons be careless of them, and expend more to obtain a certain end than the profit in the shape of increase can possibly be at the end of the course, or when the return comes, why the imagination will be indulged by means of emptying the pocket. It is true that it costs more on some farms than others to produce that which will effect proper fermentation in the straw of them. This is one of the reasons for mixed soil being worth more rent per acre than heavy soil. But expenses on any farm may be unnecessarily heavy, and it is the object of calculating men to run up the cost of their husbandry no higher than they are compelled. Their only object is to *rot* the present crop of straw; for they have perceived the influence of the agent which effects this on soil, its power of disintegration being so strong that it cannot be passed over without being observed by even the careless. It is nonsense to talk about a "splendid yard of manure;" for every load of turnips, cake, and corn, that is fed in a yard after there is enough acid to accomplish the desired and above-named object; every load thus appropriated is a *mis*-application of food to the improvement of the farm. When straw is thus overcharged the foreign essences escape, and are lost by every touch of the labourer; whilst, if these expenses be applied with judgment, even rain will not wash them from the manure-heap, for the affinity they have for those substances which do not contain them is so great that a union takes place of the various elements, and so they remain till buried in the soil, unless the heap they compose is left so long as to waste down and become so rotten as to suspend in water, and thereby run away with it, when it falls abundantly.

It is no uncommon thing (to apply this reasoning to practice) to perceive farmers fatting bullocks in a house, tied up by their necks, even when they have not enough turnips, or do not use sufficient corn, to tread *all* their present straw into manure. This is the most inconsistent practice that can be carried out. No one can be so unobservant as not to look upon feeding bullocks in the homestead as a means of gaining profit *indirectly*. This indirect profit comes in the shape of increased crops the following year. Why, therefore, are bullocks housed, when they will accomplish the desired object in a yard with ten times the rapidity? Even supposing that they will fatten faster—which is doubtful, as I shall shortly show—it is better to do with a smaller number, if the same object can be accomplished: for it is a fair calculation to say that *one* bullock eats as much as *ten* sheep; and a given quantity of turnips will make as much value of mutton as it will of beef. Well, then, which is the better system—to house bullocks and keep less

sheep, or to make manure with fewer fatting bullocks and keep more sheep? Mutton is generally preferred to beef, and it, therefore, generally makes a higher price in the market: independently of which, it is truly said that "a sheep has a golden hoof"; for by treading the soil at certain seasons—which the practical farmer alone is acquainted with—there is that development of the various metallic basis of the soil, which is required to neutralize and govern the accumulated acid in the shape of roots and green crops, that the following grain crops may neither be diseased nor lodged, but stand uprightly and stiffly. Even now, our British farmers have generally brought their farms to that condition of richness, which makes it often impossible for the atmosphere to perfect that in the stems of grain-bearing plants which is by nature required of it. Science cannot improve the atmosphere, further than make it dryer by draining and clearing woods and thickets; therefore too much may easily be deposited by an unskilful manager, which is done by those persons who cart their turnips and green crops to the homestalls, and do not facilitate the development of the elements of the soil, by the friction of the feet of sheep, after the application of a heavy dose of some manure to force the green crops. Nay, by this system the roots themselves undergo oxidation, which lessens the amount of that process necessary to the formation of a fine quality of grain. This is why the produce of a field, which was sown at the same time and of the same kind of grain, is often so different both in quantity and quality. Treading soil is like exercise to animals; that natural action of the air takes place, which the allwise Creator of the earth and its productions thought proper to make one of the laws of nature. Lastly, though not the least insignificant part of the argument, if *ten sheep* eat no more than *one bullock*, and if the fleeces of the former make only 5s. per head, why, there is a profit on the *same* return of 50s. over and above what there would have been had greater expense of cartage and so on been incurred, with a view of making an *exhilarating* display of "the volatile salts." Surely some of our "progressive" gentlemen will soon be tired of their experiments, and the labour of reporting them, when want of amusement will turn their reflections inwardly, and they will shortly think to themselves—it is not to be thought they will publish it—"Well, I used to fancy I knew a thing or two, but I have recently made an 'accurate analysis,' and to my alarm I discovered that that which I thought predominated, came only up to *a trace*."

Every grazier and feeder of bullocks is aware that a herd of these animals will differ very much in the degree they have grown, and the amount of fat and muscle they have made during the run of a given number of months. It frequently occurs, too, that those which progressed more favourably in the meadow, improved slowly in comparison with the others, when their food was changed, and they were subjected to the confinement of a yard or house. These phenomena arise from difference of *constitution*, which need not be discussed here, as every interested reader is familiar with the same, more especially as each peculiarity of construction must be considered as the remedy is made plain.

When bullocks are taken from the pastures and put in yards, the ordinary feeder seldom gives them much besides turnips of some kind. A little chaff, and perhaps a little meal of such corn as may be at hand is given, as an antidote to the purgative nature of autumnal food. It is supposed that all feeders have provided some portion of their bullock feed in the shape of turnips, and also that all give a certain quantity of "dry" food, in the form of corn or oilcakes, to their bullocks, as it is not only cheaper to do this than it is to cart an equivalent of turnips from the field, but more turnips may be fed on the land to its greater enrichment. The few farms which are so rich as not to require the aid of corn, or other food than green crops, are not alluded to in this place. Well, then, it remains to be decided whether it be right in practice to feed all our bullocks alike, or whether it be necessary, when a division is made, to consider the formation and temperament of the animals, and then place those together which are likely to thrive under a particular treatment in regard to food and so on. That it is necessary to do this may be easily illustrated, as every yard of cattle contains specimens of wrong treatment consequent upon treating different constitutions after the same way.

To make a bullock fatten regularly, that is, to make him good at all his "points," is an impossibility, unless nature formed him for the purpose, which is not the case with one in fifty. But to say that these "points" cannot be made of a proper consistency, or made to "handle well," by proper feeding, would be as much as to say that one animal grows as fast as another, and that a given lot will be fit to kill on the same day for certain. This we know never occurs; and, as one animal thrives faster on certain food than it does when it is eating what we term "better" food, why it is very clear that this "better" food is not suitable for assimilation by its organization.

To understand the remedy for these things, we must consult and reflect upon our experience. We know that beans and peas make meat hard, particularly pork; and that linseed makes it tender and oily where it should be fat. If, therefore, a part of a herd be "hard handlers," why those animals should be put together, and have such food as is conducive to softness; and, on the contrary, if the remaining ones be "soft handlers," such food as will make them firm should be given them with the green crops. And so should cattle be divided according to their constitution, and the *extra* food they have given them should be regulated accordingly as they turn soft or firm, which constitutes the art of feeding.

Some whimsical persons feed at certain hours, and fancy that a pound or two of meat is missed of being formed if a meal is varied a few minutes. No one can censure regularity, but it is ridiculous to imagine that a bullock is ready as regularly as the clock strikes. If reasonable quantities are given at a time, and he is left to himself, there is no fear but his own feelings will dictate the time, and he will eat when he is hungry, and drink when t'other. It is by supplying proper food that he progresses

satisfactorily. And as beans and peas will make fat muscle-like or hard, and linseed act otherwisely, when the one or the other should be supplied may be decided by those interested. Wheat-meal has the next greatest influence in softening the flesh and loosening the skin; barley-meal next; but rye-meal has a tendency to cause costiveness, which is the inward cause of outward hardness. When this costiveness is suffered to exist for some length of time, scurf forms on the skin, and this increases until it is considered necessary to use inward and outward "heal-alls" to get rid of it. Cupids' "Constitution Balls" are recommended, as "high-fed cattle will thrive faster if one is occasionally given." But if feeders will consider the foregoing, and remember what their practical experience must afford, and then reflect on the two parts in combination, they cannot fail to understand that a change of food would have, not only made the skin loose and pliable, but also made the animal thrive faster, even although it consumed per day food of less value in the market. This subject was chosen because the season affords the opportunity of carrying it into practice, or working it out; which experiments will beget that knowledge of the question, which will admit of a skilful division and selection of food at the beginning of the season, which we expect to arrive by-and-by.

To buy any kind of food for cattle because it happens to be cheaper than other kinds, is to do that which betrays as much want of experience as any one does when he goes to a fair or market, with a view of buying "if he can pick up a cheap lot." It is not always the cheapest lot which proves to be the best bargain, neither is the cheapest food always the most profitable; for as the former may not be adapted for the food they will have to eat, so the food which is cheap may be unsuitable to the cattle it is intended for. When a feeder has food to consume, his consideration should be, what character of animals will suit all the circumstances attending it—how long it will keep, when it should be finished with the most advantage, and what will be the number necessary to do this, and so on; when he may go to a mart with some comfort, and if he have to give more than the market value for what suits him, it is very certain that they will prove to be three or four times cheaper than such as would not have suited, supposing that they could have been bought for less money per stone. And when any one has got cattle by him, his consideration should be, what food will be proper to give to them as a corrective to the food they have, and the condition they are in. Beans may be cheap, and linseed dear, but it does not follow that it is proper to buy the former; for they may prove dear in the end, for the above reasons; whilst, if linseed had been purchased at its high rate of value, it might have been more profitable, after the same rule.

In regard to the breed or "blood" of cattle, nothing can be advised; for some which have a pedigree as long as their tails, are as often in as bad a condition from bad feeding as can well be found, and those which bear a high name from bad judges, because they have been bred "in and in" till they will breed no more, are "specimens" which it would not avail any one to consider. However, the condition of their disgusting backs may be materially altered by an alteration of provender. It is the feeding which produces the superiority, and not the breed alone, as many would-be first-prize-receivers fancy. Symmetry of "points" and size of bone, may be found in "humble herds," and the remainder is brought about by skill and care, as it goes in at the mouth.

If any readers should have any of their cattle in the particular conditions described above, they will undoubtedly do honour to this theme by trying what it recommends, when they will subsequently be rewarded by having their own judgment strengthened and their experience extended, if they should not be able to realize, on the first trial, that which the perusal of it may have led them to expect. The Arts are slow of growth; but when once acquired, they are never forgotten: and it is a bad practice to reflect upon the evil of knowing too much. The head had better ache from some other cause.

ROOTS THE PRODUCE OF IRELAND EXHIBITED AT THE SMITHFIELD CLUB CATTLE SHOW.

At a period when so great an extent of landed property in Ireland is changing hands, and farms of all sizes and of every variety of soil and character are needing occupiers—when English capitalists are weighing the probabilities of advantage from investments in the purchase of land in that country, and when both in England and Scotland many farmers are pondering whether a better prospect is not opened for farming operations in the sister island than in their own respective localities, it is not surprising that the exhibition of roots from Ireland, displayed at the late Smithfield Club Show in Baker-street, should have attracted so much attention. The reputation of the Messrs. Thos. Gibbs and Co., of Half-Moon Street, of Mr. Skirving, of Liverpool, of Mr. Grove, of Great Baddow, Essex, and others, is so well established, that they need fear no competitors in such a display: but had there been a competition between either or all of them, and the Earl of Clarendon—for to that noble lord we were indebted for the exhibition of Irish roots—the struggle for superiority would have been severe, the result doubtful.

Some of our readers may not be aware that there exists in Dublin a society established in the year 1731, called "The Royal Dublin Society," for the promotion of agricultural improvement in Ireland. Of this society the Earl of Clarendon is President.

This society has an annual exhibition of roots and cereal productions, butter, &c., at which prizes are awarded for the best specimens of each kind. There is also a spring show of cattle, the prizes offered being open to the United Kingdom. The Society has an extensive museum of natural history in Dublin, as also an agricultural museum, and Botanical gardens at Glasnevin—all of which, with their schools of design lately formed in connexion with the Government, are open to public inspection gratuitously, and which will be found deserving the attention of persons visiting Dublin who take an interest in such objects. Although Ireland has heretofore produced a considerable quantity of wheat for the supply of this country, independently of her own consumption, it is exceedingly questionable whether oats and roots will not, in consequence of the moisture of the climate, be found the most profitable articles of agricultural produce. The natural fertility of a great portion of the soil of the "green isle" is proverbial, and its capabilities for producing artificial as well as natural green food for the use of cattle would seem, from the specimens recently exhibited, to be almost fabulous were they not respectably authenticated. The collection of roots, &c., to which we refer was sent to the Smithfield Show, upon the suggestion of the noble President of the Society, and a more judicious and *practical* (we trust the term will not give offence) mode of proving incontestibly the root-producing capabilities of the Irish soil, could not have been adopted. We believe we are correct in stating that nearly the whole, if not all the specimens shown in Baker-street had already been exhibited in competition for the prizes of the Dublin society. Amongst the contributors we observed the following :—The Marquis of Drogheda, Moore Abbey; Viscount Monck, Charleville; the Hon. Charles Hancock, Athlone; Lord Talbot de Malahide; Lord Chief Justice Blackburn, Rathfarnham; the Earl of Charlemont; Mrs. Evens, Portrane; Colonel La Touche, Luggelow; Francis Dinagh, Esq., Meidlin, Drogheda; Henry Sugden, Esq., Castlenock; George Watts, Esq., Delgany; William Dargan, Esq., Kildinan, co. Cork; R. P. O'Reilly, Esq., M.D., Castle Wilder, Longford; J. E. Vernon, Esq., Clontarf Castle; Christopher Fitzsimon, Esq., Glencullen; Thomas Ball, Esq., Malahide; R. C. Wade, Esq., Clonabrany; Mr. Charles O'Hara Harrolds, Cross Fields, who exhibited onions, of which 15 tons per Irish acre had been grown; and the Earl of Roden, field cabbages, four of which weighed 160lbs. Dr. Kirkpatrick, agricultural inspector of national schools, exhibited some specimens of Kohl Rabi raised by the pauper inmates of the Galway Union; the produce being at the rate of 25 tons per acre. We cannot afford space to go into the details of all the prize roots exhibited, but the amount of produce stated in some instances is so startling, and is regarded with so much scepticism by many of our farmers, that we deem it necessary to refer to particulars in two or three cases. And here we must observe that our information is obtained from the cards displayed with the roots at the stand. Specimens were exhibited by the Earl of Charlemont, all of which obtained first prizes from the Dublin Society. The first and most prominent is, "Red Globe mangold wurtzel," of which 112 tons per Irish acre, or 69 tons 3 cwt. nearly, the imperial acre, were produced. The soil is described as being "a light loam on a gravelly subsoil." (The previous crop wheat.) Manured with 35 tons of farm-yard manure per Irish acre, being 21 tons 12 cwt. per imperial acre. Sowed on the 26th April, in drills 30 inches apart. The plants were thinned out to 15 inches apart, and the after culture was done with the spade. 2dly, Orange or Yellow Globe mangold wurtzel, of which 96 tons per Irish acre, being nearly 60 tons per imperial acre, were produced. The soil, manure, and cultivation the same as the preceding. Thirdly. Long red mangel-wurzel; soil, a deep loam, on a clay subsoil; previous crop, grass, manured with 40 tons farm-yard manure per Irish acre, being 24 tons 14 cwt. per imperial acre. Sowed on the 30th April, in drills 30 inches apart. These were grown on lea ground, which was subsoiled 20 inches deep. At the time of sowing, the drills were formed by the plough, but all subsequent culture was done by the spade.

Mr. James Brady, who, it appears, superintended the cultivation of these roots, states, in his account of the mode of cultivation, that, in addition to the farmyard manure, the ashes or burned earth from roots and clods burned in the field, were put into the drills over the manure. As before stated, the culture was done with the spade, and at each of two diggings after thinning the plants, a plentiful soaking of liquid manure was applied. We may here observe that in the statement by Mr. Brady, all the land is described as "lea;" whereas, in the description upon the cards exhibited, it is stated that the land on which the Red Globe and the Orange Globe were grown, had been previously cropped with wheat. Mr. Brady gives in detail the cost of these roots, which he makes £25 11s. per Irish, being £15 15s. 6d. per imperial acre, or 4s. 7d. per ton for the Red Globe wurtzel, and 5s. 3d. per ton for the Yellow Globe and the Long red wurtzel.

The second prizes for mangold-wurtzel were awarded to Mrs. Evens. The preparation for and cultivation of all the three kinds of mangold were the same—nearly. The soil a dark mud on a blue clay subsoil. The previous crop, oats. Sowed the last week in April, in raised beds, three rows in each bed; manured with 40 tons of farm-yard manure per Irish acre. From a description given by Mr. William Kelly of the treatment of Mrs. Evens's crops, it appears that the rows were 28 inches apart, and the plants 18 inches asunder in the rows. The soil was dug between the rows, and two dressings of liquid manure were given. The produce was as follows :—

		Tons.	cwts.
Red Globe.....	Roots..	51	8½
„	Tops ..	13	12
Yellow Globe.....	Roots..	47	11½
„	Tops ..	18	17
Long Red.....	Roots..	47	7
„	Tops ..	15	4½

Mr. Kelly also gives the cost per acre in detail, and which he makes exclusive of the expense of sending to market, his plan being to dispose of the

produce in that way, £23 per Irish acre, and taking the average of roots at 49 tons per Irish or 30 tons per English acre the cost will be 9s. 4d. per ton.

Some White Globe mangold grown by Mrs. Evens produced 42 tons per acre, and some sugar beet 36 tons per acre. Some Yellow Globe grown by Mr. Ball, of Malahide, with 40 tons of farm-yard manure, and 4 cwt. superphosphate of lime, produced 55 tons per acre. It is very remarkable that in neither of these cases, although the cultivation was most liberal, the produce should have reached more than half of the Earl of Charlemont's crop. It would be exceedingly desirable if the parties who are acquainted with all the circumstances of the respective localities would endeavour to account for the extraordinary excess of the Earl of Charlemont's crops, which render them, in the cant term of the day, "*exceptional*."

Of turnips we find the following crops grown :— Aberdeen turnips, Viscount Monck, 55 tons per acre, a first prize was awarded for this crop. Swede turnips, Mr. Ball, 50 tons per acre; Purple Top, Mr. Dargan, 50 tons per acre; Swede turnips, do., 62 tons per acre, without tops; White Globe, do., 50 tons per acre, without tops.

A crop of cabbages, grown by Mr. C. Wade, Clonaberry, Crosakeil, Meath, produced 80 tons per Irish acre, or 49 tons 8 cwt. per imperial acre.

The information to be derived from the foregoing facts shows that, excluding the exceptional case of the Earl of Charlemont, about 48 tons per acre of mangold-wurtzel may be grown at a cost of about 9s. 6d. per ton. We have no account given of the cost of raising the turnips, but we see no reason to regard it as less than that of mangold wurtzel. We find that the turnips average about 53 tons per Irish acre, and if we take Mr. Kelley's estimate of expenses, £23 per acre, as equally applicable to the turnip crop, the cost of the turnips will be about 8s. 6d. per ton. That a produce of 53 tons per Irish acre, or 32½ tons the imperial acre, is far above the average of crops grown in this country or in Scotland, is perfectly manifest; but on comparing the expense of producing mangold wurtzel and turnips in Great Britain with the quantity grown per acre, it will readily be ascertained whether the large crops obtained in Ireland at a cost of 9s. 6d. per ton for the former, and 8s. 6d. for the latter, exhibit any, and what advantage. It should be observed that in the calculations of expenses above referred to, no rent, taxes, or rates of any description, or interest of capital, are charged, nor any allowance made for the time of the bailiff or farmer. The facilities afforded by steam navigation enable the Irish farmer to forward his produce, and himself to attend the English markets with as much ease and at as small a cost as the Northumbrian or Scotch farmers; if Ireland, therefore, presents advantages for the employment of capital in the cultivation of the soil, there are at all events no difficulties on the score of accessibility. We consider that not only the Irish but the English public are indebted to the Earl of Clarendon for having shown the British agriculturists, by the exhibition of roots referred to, what the Irish soil is capable of producing. Nor can we close our remarks without expressing our approbation, from personal observation, of the exemplary manner in which Mr. Corrigan, the curator of the Dublin Society's Museum, executed the mission with which he was entrusted, in clearly and courteously replying to the numerous inquiries made by the visitors at the Smithfield show, who in crowds surrounded his stand, and catechized him upon all points, some with no inconsiderable want of confidence in the statement that 112 tons of mangel wurzel had been grown even upon an Irish acre of land.—Mark Lane Express.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR DECEMBER.

During the greater part of this month the weather has been seasonably fine, and highly favourable to all farming operations. The sowing season having been concluded somewhat earlier than usual, and under the most satisfactory auspices, farmers in general, in order to meet future demands upon them, have threshed out very large quantities of both wheat and barley, of which extensive sales have been effected at drooping prices. It is much to be regretted that so splendid a crop of wheat as that grown this year should, from necessity be forced off at the present low figures.

On the whole, the cattle trade has ruled tolerably firm, and prices have been from 2d. to 4d. per 8lbs. higher than at the corresponding period in 1850. The turnip and other root crops having turned out very good, both as to quantity and quality, the stock in most of our large grazing districts has fared extremely well. Hay continues in great abundance, and may be purchased on very low terms. In the London markets meadow-hay has sold heavily, at from £2 12s. to £3 15s.; clover ditto, £3 5s. to £4 6s.; and straw, £1 to £1 7s. per load. The supplies in the hands of the growers are unusually large.

With very few exceptions, our accounts respecting the appearance of the winter wheats are very satisfactory. The weather having continued comparatively mild, they have not stood much in need of snow to protect them from easterly winds. It is stated that the breadth of land under wheat culture in the eastern, midland, and northern counties, has somewhat increased this season, as some farmers are of opinion that that grain will be selling at higher rates during the greater portion of next year, and which opinion is certainly favoured by the present state of the trade abroad.

Exceedingly large imports of Peruvian guano having taken place, the stock of that article has increased to 80,000 tons. For home use, very few sales have been reported at from £9 to £9 5s. per

ton; but about 2,000 tons of other kinds, chiefly from Valparaiso, have sold for shipment to the continent. The crushers of linseed have been more actively employed than for some time past; hence prices, both on the spot and for forward delivery, have been on the advance. The supply of cakes having become small, rather more money has been paid for both English and foreign parcels. In the quality of the latter, especially America, a decided improvement has taken place, some of the cakes being nearly as good as those manufactured in this country. It will be recollected that, shortly after potato-raising was commenced, we gave it as our decided opinion that the crop was unusually large, and of very fine quality; that it would keep well during the winter months; and that the imports from abroad would be very trifling. So far as we have yet progressed, it must be admitted that our premises have been correct. The whole of our markets, including those in Ireland and Scotland, have been very heavily supplied with all kinds, for which the demand has ruled dull, at from 50s. to 80s. per ton. Very few losses have yet been sustained by the growers, and the arrivals from the continent have been under 300 tons. Unless a very great change takes place in the appearance of the root, prices are likely to continue low.

In the Scotch and Irish markets the demand for all articles of grain has been in a very inactive state. Prices, however, have undergone very little change. Farmers have been busily occupied in threshing out barley and oats, liberal supplies of which have been forwarded to the metropolis. The produce of spring corn generally is represented as good.

As is usually the case at this period of the year, the imports of foreign stock into the United Kingdom have exhibited a falling off.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

The holding of the various cattle shows has, of course, been one of the leading features of the month. Notwithstanding that the prices of fat stock have ruled extremely low during the whole of the present year, arising from the immense importations from abroad, the exhibition of both beasts and sheep in Smithfield has proved exceedingly fine. In the Baker Street Bazaar, however, we have noticed a falling off in the number of each kind of stock compared with 1850; but this decline must, in a great measure, be attributed to the great success of the Midland Counties Show, and not to any want of spirit on the part of our breeders generally. Last year, it will be recollected, very severe losses were sustained by those who forwarded supplies for the "great day;" but this season, notwithstanding that the supplies on offer in Smithfield have been large, and that very extensive receipts of dead meat have taken place up to Newgate and Leaderhall, a steady business has been doing at prices about 4d. per 8lbs. above those obtained in December last. We will not enter into the question of actual profits; yet it is clear, from the appearance of the stock, and the comparatively "ripe" age at which a large portion of it has been brought forward, that oil-cake has been somewhat sparingly used of late. The reports from the various grazing districts state that both stall and home-fed beasts continue tolerably free from disease. In most quarters the supply of food is unusually abundant and good.

The total supplies exhibited in Smithfield have been as follows:—

	Head.
Beasts	20,554
Cows	451
Sheep	93,462
Calves	1,201
Pigs	2,872

COMPARISON OF SUPPLIES.

	Dec., 1847.	Dec., 1848.	Dec., 1849.	Dec., 1850.
Beasts	18,978	19,016	23,853	24,239
Cows	500	490	442	316
Sheep	101,720	87,240	119,180	99,944
Calves	1,240	1,113	1,413	1,864
Pigs	2,765	1,549	2,139	2,619

From the above comparison, it will be seen that the supply of beasts has fallen short of 1850 by nearly 4,000 head, and that it has been considerably less than in 1849. The total number of sheep has likewise been small; nevertheless the consumption in the metropolis has been readily met by the immense quantities of meat forwarded from different parts of England, as well as from Scotland, by railway conveyance.

The average prices have ruled thus:—

Per 8lbs., to sink the offals.

	s. d.	s. d.
Beef, from	2 10 to	4 2
Mutton	2 10 to	4 4
Veal	3 0 to	4 4
Pork	2 8 to	4 0

COMPARISON OF PRICES.

	Dec., 1849.		Dec., 1850.	
	s. d.	s. d.	s. d.	s. d.
Beef, from	3 4 to	4 6	2 8 to	4 0
Mutton	3 6	4 6	2 6	4 2
Veal	3 2	4 0	2 6	3 6
Pork	3 4	4 2	2 8	4 0

A slight falling off has been observed in the arrivals of foreign beasts, but those of sheep have increased, whilst their general condition has greatly improved, especially the sheep and calves. The supplies have been as under:—

	Head.
Beasts	3,237
Sheep	16,396
Calves	1,564
Pigs	397
Total	21,594
Same month in 1850	20,435
Same month in 1849	16,368
Same month in 1848	12,346
Same month in 1847	11,028

At the outports only about 1,800 head have been received, chiefly from Holland. Newgate and Leadenhall markets have exhibited unusually large supplies of each kind of meat, for which the demand has been steady, at fluctuating prices.

METEOROLOGICAL DIARY.

	Barometer.		Thermometer.			Wind and State.		Atmosphere.			Weath.
Day.	9 a.m.	10 p.m.	Min.	Max.	10 p.m.	Direction.	Force.	8 a.m.	2 p.m.	10 p.m.	
	in. cts.	in. cts.									
Nov. 21	30.—	29.84	28	43	38	Westerly	lively	cloudy	cloudy	fine	rain
22	30.—	30.16	35	42	38	N. by West	gentle	cloudy	sun	cloudy	dry
23	30.16	29.80	31	42	41	S. Westerly	lively	fine	fine	cloudy	rain
24	29.56	29.49	30	47	33	W. by North	gentle	cloudy	fine	fine	rain
25	29.49	29.40	31	42	30½	S. Westerly	gentle	fine	sun	fine	dry
26	29.54	29.74	29	34	34	N. West	calm	fog	cloudy	fine	dry
27	29.81	29.88	29	39	36	W.N.W.	calm	cloudy	cloudy	cloudy	dry
28	30.—	30.07	32	42	36	W.N.W.	calm	cloudy	fine	mist	dry
29	30.12	30.16	28	47	34	S. by W. by E.	calm	fine	sun	fine	dry
30	30.16	30.21	30	45	29	E. by South	calm	fine	sun	fine	dry
Dec. 1	30.20	30.23	27	37	37	N.N.W.	gentle	cloudy	fine	haze	dry
2	30.23	30.24	34	40	33	N.N.W.	calm	fine	cloudy	fine	dry
3	30.29	30.20	32½	39	39	N. West	calm	cloudy	cloudy	cloudy	dry
4	30.23	30.22	31	40	40	Westerly	calm	cloudy	sun	cloudy	dry
5	30.22	30.23	39	48	47	Westerly	calm	cloudy	cloudy	fine	rain
6	30.25	30.25	46	51	47	West	airy	cloudy	cloudy	cloudy	dry
7	30.25	30.10	46	47	44	S. West	lively	cloudy	cloudy	fine	dry
8	29.94	30.22	44	54	42	W.N.W.	lively	cloudy	sun	fine	dry
9	30.20	30.12	38	53	53	S. West	lively	cloudy	cloudy	cloudy	rain
10	30.08	30.07	49	52	50	S. West	lively	cloudy	sun	fine	rain
11	30.44	30.53	40	52	36	W. by North	gentle	fine	sun	fine	dry
12	30.52	30.43	28	38	38	Variable	calm	cloudy	fog	mist	dry
13	30.43	30.41	37	42	41	E. by North	gentle	haze	cloudy	cloudy	moist
14	30.43	30.44	38	42	39	E. by South	calm	haze	haze	haze	same
15	30.44	30.40	34	37	37	E. by South	calm	haze	haze	haze	same
16	30.40	30.36	36	44	44	S. Westerly	calm	cloudy	cloudy	cloudy	dry
17	30.35	30.26	41	45	38	Vrble., Easterly	gentle	cloudy	cloudy	cloudy	dry
18	30.21	30.16	33	39	39	S., S. by W.	gentle	cloudy	cloudy	cloudy	dry
19	30.16	30.12	38	50	47	S. by E. by W.	fresh	cloudy	sun	cloudy	dry
20	30.12	30.02	47	52	48	S. Westerly	lively	cloudy	cloudy	cloudy	rain
21	29.72	29.61	40	47	45	S. or by E.	gentle	cloudy	cloudy	fine	rain

ESTIMATED AVERAGES OF DECEMBER.

Barometer.		Thermometer.		
High.	Low.	High.	Low	Mean.
30.320	29.120	55	17	39.3

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
44.26	36.0	40.13

Weather and Phenomena.

November 21—Cold thaw; some drizzle. 22—Hint of night rain; day fine. 23—Cheerless day; drizzle, late. 24—Much rain in night; day rather sunny. 25—Fine; frosty rime remains on shaded herbage. 26—Fog, and hazy till the evening. 27—Here the changeable weather ceased. 28, 29, 30—Three calm fine days; sun very warm after 10 A.M.

Lunation.—New Moon, 23rd day 2 h. 6 m. morning. First Quarter, 30th day 3 h. 27 m. afternoon.

Dec. 1.—Very overcast and tranquil. 2, 3, 4—Uniformly calm; end of the frosty period; little sun. 5 to 10, inclusive—Similar; a period of change, with little sun, and a trifling drizzle; lunar double halo 8th evening. 11—Bright day. 12—A few hours' frost, followed by fog. 13 to 15—Three days of chilly dense haze, keeping the ground and herbage wet. 16—Clouds pack, with change of wind. 17—The same; gentle air. 18, 19—Change approached gradually. Astro-meteorology stated that from the 18th to the 22nd cold would prevail. Note the fact! Rain commenced, after a very protracted period of dry but gloomy weather.

Lunations.—Full moon, 8th day, 3 h. 27 m. afternoon. Last quarter, 15th day, 5 h. 26 m. afternoon. New Moon, 22nd day, 3 h. 34 m. afternoon.

Remarks referring to Agriculture.

The early frost, though of 19 nights' continuance, checked vegetation, but did no injury; in fact, here it seldom made the surface hard by day. It then passed away without rain, and the ground was always open for farming operations. It is possible we may have a little cool weather at Christmas, as the barometer recovered its high position after the seasonable rains which fell lately. I am aware that some tables quote a harder temperature: here we have not had one hour's snow.

Croydon, Dec. 23rd. J. Towers.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF DECEMBER.

Though the year now about to terminate has been characterized by auspicious seasons and a plentiful harvest, favoured by which the products of the soil of Great Britain have been fully equal to the yield of good average seasons, the position of our farmers has not been improved. Overwhelming importations have kept down prices of grain too low to remunerate the producer, and the agriculturists have been deprived, by free-trade, of the benefits which would otherwise have been derived from crops superior in quality and of a full average quantity.

How long the present suicidal policy will be persisted in, it is impossible to foresee; but that it will not pay to grow corn in this country at such prices as those which have prevailed since all restrictions on imports have been removed has been amply proved. The experiment has now been tried long enough, and the result to the farmers has been equally disastrous with deficient harvests or good crops; the supplies from abroad have always been in excess of demand, and the cultivator of the soil has found his occupation unprofitable. No better proof of this can be desired than the disclosures afforded by the balance-sheet of the renowned free-trade and scientific farmer Mr. Mechi, of Tiptree Hall. With all his ingenuity, capital, and science, he has found that wheat cannot be produced with profit at the prices foreigners can afford to sell at in our markets. The balance-sheet, though repeatedly called for, was long withheld, and there can be little doubt that the time for publishing the same was well considered. The loss shown, though great, is probably much less than in former years. The absurdity of recommending practical farmers to adopt an impracticable system of agriculture is now made clear. We by no means depreciate high farming, but there is a limit beyond which production cannot be forced. Artificial manures, deep draining, &c., we duly appreciate, and acknowledge the great advantages which have been derived from the many improvements in machinery &c. which have been introduced of late years; but, with all these adjuncts, Mr. Mechi has found it impossible to compete with the foreign grower of wheat. It may, therefore, be regarded as proved that the so-called *scientific* are in no better position than the *practical* farmer, and that, with present rents and the other charges on the land, the cultivation of the soil ceases to be a source of profit so long as the free importation of foreign grain and flour shall continue. All that farmers ask for is a fair consideration of the subject, and that means may be taken to put them in a position to obtain a living by their occupation; this is not an unreasonable request, and *must* be complied with, or the inevitable consequence will be that large breadths of the poorer kinds of land must go out of cultivation.

The averages for the year are not yet completed, but the returns thus far are sufficient to show that the price of wheat has, during the twelve months, been constantly below 40s. per qr.—a rate which is now admitted on all hands to be unremunerative.

In taking a retrospective view of the trade during the year, few features of novelty or interest present themselves, and the business of the corn merchant and the miller has been nearly as unsatisfactory as that of the farmer. Supplies have almost always been in excess of demand; the purchases made one day have been found too dear the next. The millers have been deprived of a large portion of their legitimate occupation, viz., the manufacture of flour for the consumption of our own population, by the large imports of foreign flour; and when we take into consideration the general stagnation under which every branch of commerce has been labouring, and the consequent dearth of employment, it may well be questioned whether the labouring classes have derived benefit from the low prices of provisions. But, to return to our subject: with the opening of the year 1851 great expectations were entertained by many that, in consequence of the Exhibition, the consumption of corn would be increased to such an extent as to cause a much higher range of prices than had been previously known under free-trade. This expectation failed most signally; for, from January up to near the period of the opening of the Exhibition, price continued to droop, and no rally took place until June and July, when a temporary rise was caused by fears (which afterwards turned out to be groundless) respecting the state of the growing crops. For some weeks previous to the commencement of harvest the general average price for wheat for the kingdom ranged between 42s. and 44s. per qr., but the

weather afterwards took up, and, though cutting was commenced somewhat later than usual, the crops were, almost without exception, well secured. All apprehension on this head having been thus set at rest, and it having been found that the influx of foreigners into this country had occasioned no apparent increase of consumption, the small advance established in June and July was again speedily lost, and the weekly averages fell below 40s. per qr. The first day on which any supply of new wheat of importance appeared at Mark-lane was the 18th August; the prices were then, for red 40s. to 42s., and for white 43s. to 45s. per qr., the weight per bushel ranging from 63lbs. up to 66lbs. From that time till the end of September, prices gave way, week by week, until excellent Kent red wheat, 63lbs. to 64lbs. per bushel, receded to 36s. per qr., and the decline on other sorts was in the same proportion. In some of the Lincolnshire markets, fair qualities were about that period sold at 32s., and inferior sorts below 30s. per qr. Matters remained in this position until October, during which month, and in November, the value of wheat crept up about 4s. per qr., but since then the tendency has again been the other way. The cause of these ruinously low prices is evident—undue foreign competition. This will be at once seen by giving an account of the importations into the United Kingdom. These have been as follows :—

Month ending	Wheat.	Barley.	Oats.	Rye.	Beans.	Peas.	Maize.	Flour.
	qrs.	qrs.	qrs.	qrs.	qrs.	qrs.	qrs.	cwts.
February 5 ..	328,482	70,742	41,917	354	20,123	8,956	56,007	411,979
March 5	283,416	65,907	56,829	2,866	17,759	3,737	82,644	446,803
April 5.....	493,954	49,017	31,644	2,259	44,775	3,656	139,163	480,227
May 5	337,755	105,502	100,259	1,899	17,120	6,325	119,755	416,509
June 5	308,802	114,282	110,575	3,581	17,988	3,248	154,223	479,261
July 5	451,369	95,092	149,018	2,291	24,647	11,725	316,495	465,302
August 5....	480,993	111,133	284,057	7,506	39,851	21,213	213,308	473,448
September 5 .	394,201	79,161	190,732	2,332	28,470	14,147	160,286	649,600
October 5 ..	300,280	59,799	106,676	1,521	28,894	4,117	193,211	624,476
November 5..	141,926	23,438	51,102	—	23,921	2,826	133,594	256,307
December 5..	135,014	24,715	44,162	—	24,708	10,435	126,710	294,510
Total ...	3,655,792	798,788	1,166,971	24,609	288,256	90,385	1,695,396	4,998,422

So much for the past; we shall now say a few words respecting the probable future. That low prices have stimulated the consumption of wheat cannot be questioned; and notwithstanding the generally favourable result of the last harvest, it may be doubted whether the stocks in the hands of our farmers are larger than usual at this period of the year; we believe that more is held than at the corresponding time last season, but not more than in good average years. With regard to the stocks of foreign wheat, we should certainly be disposed to estimate them at less than at the close of 1850, and in consequence of the partial failure of the rye and potato crops over a great part of northern Europe, the probability is that the supplies from the continent will—at least for a time—be on a much more moderate scale than they have been during the year now about to close. In this position of affairs, we deem an advance of a few shillings per qr.—perhaps 4s. to 5s.—by no means improbable during the winter and early spring months. We fear, however, that the less wealthy class of farmers will receive little or no benefit from any advance which may now take place, as they have long since been compelled, by pecuniary pressure, to part with their produce.

Barley has all through the year commanded a relatively higher value than wheat, which may be accounted for, in the first place, by the fact that the crops of spring corn have not, as a whole, given so satisfactory a return as wheat; and further, by the small proportion of malting barley imported. The opening price at Mark-lane immediately after harvest was 28s. to 30s. per qr. for fine samples, and when the malting demand increased 32s. to 33s., and even 34s. per qr. was paid. These rates being more remunerative than those at which wheat has been selling, have naturally led to a falling off in the deliveries of the latter, and an increase in the supplies of the former; still superior malting samples have not fallen below 32s. per qr. Grinding sorts were relatively low in the early part of the year, say 20s. to 23s.; but since the supplies from abroad have fallen off a gradual improvement has occurred, and the heavy qualities of Danish have lately been selling in the London market at 25s. to 26s. per qr.

The quantity of oats imported into the United Kingdom from Russia during the summer exceeded expectation; we have besides received large supplies of this grain from France, and though we commenced the year with very small stocks of home-grown corn, nothing like scarcity has at any period been experienced. During the first three

months prices underwent very slight fluctuations, but just previous to the first arrivals from Riga and Archangel there was a temporary rise, and in the month of June, when scarcely any home-grown oats remained, good English and Scotch feed brought 25s. to 26s., and Russian were then worth 20s. to 22s. per qr.; this, however, did not continue long, and we find that in July Rigas were sold at 17s. 6d. to 18s. per qr.; since then we have had an occasional rise or fall of 1s. per qr., and at present the last-named quality may be procured in the London market at 18s. to 19s. per qr.

The yield of the pulse crops in Great Britain has been good in quantity and fine in quality; prices of beans and peas were low during the early part of the year, and no move occurred till some time after harvest; indeed, as regards the former article, the improvement has not, up to the present period, been great, but white boiling peas have risen considerably. The opening price for the first parcel of new brought to market was only 26s. to 28s. per qr., from which point a steady advance took place, and in November as much as 38s. to 40s. per qr. was realized; since then, however, prices have again receded 3s. to 4s. per qr.

That the potato disease has not proved nearly so destructive in these islands this year as was at one period feared, may be considered certain: at all events, up to the present time there has been no deficiency in the supplies, and the quality has on the whole proved better than in any preceding year since the first appearance of the disorder: we are therefore inclined to hope that the disease is gradually being overcome, and that in a few seasons it will be no more heard of.

A review of the occurrences at Mark-Lane during the month will suffice to give a tolerably correct idea of what has taken place elsewhere, the fluctuations in London having been pretty closely followed at most of the country markets.

The arrivals of wheat coastwise, though not particularly large, have been fair for the time of year, having averaged 3,300 qrs. per week. The changes in price have not been important. On the first of the month an advance of 1s. per qr. was obtained, but this was again lost on the succeeding Monday, and since then a decline to about the same extent has taken place, in consequence of the indifferent condition in which the samples have lately come to hand. Making allowance for that circumstance, the value of the article is nearly the same as it was at the close of November. Good red Kent and Essex wheat may be quoted 37s. to 38s.; picked samples 39s.; and white varies in value from 42s. to 46s. per qr. The town millers have conducted their operations with considerable caution, and have manifested no signs of being in any immediate want: whenever an attempt has been made to obtain an advance, it has had the effect of checking business; whilst, on the other hand, a little giving way in price has been in most instances followed by an improved demand. Within the last week or two some purchases have been made to fulfil a government contract for wheat: this has prevented prices receding, which they otherwise might have done if the millers had been the only buyers.

The receipts of foreign wheat at the port of London have been smaller than in any preceding month for a long time past. Altogether, only 10,000 qrs. have been reported during the four weeks ending 27th inst. Notwithstanding this important decrease in the arrivals, and the certainty that little more will now reach us from any of the northern continental ports, there has been no disposition to speculate, and the operations during the month have been on a strictly retail scale. This is, however, not to be wondered at, when we consider the relatively high prices demanded for old as compared with those at which new English has been selling. Moderately good red Baltic has not been obtainable below 42s. to 43s., and for fine Rostock 45s. to 46s., and even 47s. per qr. has been asked. Danzig has been equally dear, and buyers have therefore confined their purchases to as narrow limits as possible, but the millers have been compelled to take a somewhat larger quantity for mixing since the damp weather.

The transactions in floating cargoes of wheat have not been extensive, but prices have rather crept up, though the foreign demand has slackened. At one period, Polish Odessa, on passage, realized as much as 35s.: the price at present is 33s. to 34s. per qr., cost, freight, and insurance. The most important operations have been in Egyptian wheat, large sales of which have been made from time to time; the purchases have been principally on Irish account. Good Saide wheat was not worth much over 25s. in November, but has since risen to 26s. 6d. to 27s. per qr., cost, freight, and insurance. By the latest advices from Alexandria we learn that a large fleet of vessels (about 200 sail) had arrived out there to load, and we may consequently reckon on receiving a considerable quantity of wheat from that quarter.

The value of town-manufactured flour has not varied since our last, but the sale has certainly not been brisk. Country flour rather advanced in price in the beginning of the month, but has since become less saleable, and is not dearer at present than at the close of November. The arrivals from abroad have been to a fair extent—say, about 8,000 sacks from France and nearly 30,000 brls. from America. The chances are that the French supplies will for a time cease, as prices are now relatively

higher in that country than here, but from America we look for further supplies; the present price for barrels ranges from 19s. to 21s. The stocks of flour on the wharves have been much diminished of late—a good clearance having been made of sour and stale qualities, which have been serviceable for mixing with the flour made of new soft wheat.

The market has been well supplied with barley of home growth, but from abroad very little has come to hand for some weeks past. The demand for this grain has hardly been so active as it was in November: the maltsters and distillers having then got pretty well into stock, have since acted with greater caution. Superior malting qualities have nevertheless commanded a ready sale, and have suffered little or no decline, picked qualities being still worth 32s. to 33s. per qr. Common malting and distilling parcels have not moved off so readily, and have, in many cases, been parted with at an abatement of 1s. per qr. on the rates current when last we addressed our readers; quotations for these kinds are now 26s. to 28s. up to 30s. per qr. Most of the foreign barley which has come to hand has been only suitable for grinding purposes. Egyptian has realized from 19s. to 20s., and Baltic from 23s. to 25s. per qr. At these rates there is still a good request, and the prospects are in favour of a further rise during the winter and early spring months.

Quotations of malt have scarcely varied: occasionally the supply of the article has been slightly in excess of demand, but sellers have not given way, and the changes in value have been too unimportant to require notice.

The arrivals of oats have, on the whole, been moderate, but they have exceeded expectation—a good many cargoes having been received from France, and the quantity furnished by Ireland has been rather more than anticipated. Under these circumstances, the dealers have been enabled to purchase on somewhat easier terms, but the decline has scarcely been quotable on any but new Irish, which have certainly receded 6d. to 1s. per qr. in value. At present good English and Scotch feed may be bought at 18s. to 22s.: Irish range wider, there being some as low as 16s., and very fine parcels being worth 20s. or even 21s. per qr. Scotch potato oats have met with little attention, owing to the relatively high terms at which they have been held. Most of the French oats lately imported have, we believe, lost money, and the position of affairs here holds out little encouragement to consign; we are consequently disposed to think that the foreign supplies will fall off, and, as prices are also higher in Ireland than on this side the channel, a moderate rise here does not appear improbable.

The quantity of English beans brought forward at Mark-lane has proved more than sufficient to satisfy the demand, and the tendency of prices has been decidedly downwards. The first reaction occurred on the 8th inst., when a decline of 1s. per qr. had to be acceded to before sales could be made, and since then a further abatement to about the same extent has occurred. Floating cargoes of Egyptian beans have not been offered below 22s. per qr., cost, freight, and insurance.

The rise which took place in peas in November has not been supported; white boilers have fallen in value since then 3s. to 4s., and grey and maple 1s. to 2s. per qr. We are not likely to receive any foreign supplies of the article at present, but we are of opinion that our own crop gave a very good return, and that whilst prices continue even as high as they now are, the home supplies are likely to keep pace with the demand. English white boilers are still worth 34s. to 35s., and foreign 32s. to 33s. per qr.—tempting rates when compared with prices of wheat.

In the beginning of the month there was a very active inquiry for Indian corn afloat, principally on Limerick account, where a considerable extent of speculation appears to have taken place; prices consequently advanced, and as much as 29s. per qr., cost, freight, and insurance, was paid for Galatz. Since then the demand has in a great measure subsided, and there are now offers at 28s. per qr., without meeting with much attention.

We shall devote the remainder of our space to a brief notice of the state of the grain trade at the principal foreign ports. By the latest advices from the Baltic it appears that though the speculative demand for rye had in some degree subsided, that the article still ruled very high, and all that has been previously said relative to the failure of the rye crop in Germany is confirmed. Wheat was consequently being used much more extensively than in usual seasons, and as the produce of the latter has not been particularly abundant in that quarter, the probability is that there will be less for export in the spring and summer than in former years. This, at all events, seems to be the general feeling on the continent; and notwithstanding the continued dull reports from hence, prices have not, as yet, given way much abroad. The most recent accounts from Danzig state that the weather was mild and open, so that no impediment existed to shipments being made, except the want of encouragement to do so. The supplies of wheat from Poland had not increased, higher prices having been given in the Vistula markets by buyers from different parts of the interior than had been obtainable at Danzig. The deliveries from the neighbouring farmers had also been moderate, and ordinary qualities of new, weighing only 59lbs. per bushel, had sold at equal to 37s., whilst for high-

mixed old, 61 to 62lbs., 40s. to 41s. per qr. free on board had been asked. Little or nothing was being shipped to Great Britain, and business was dull in the extreme. The accounts from Konigsberg, Elbing, and Stettin are of a similar character. Holders having remained firm at all those places, prices were relatively higher than in this country, and hardly any contracts had been entered into to ship grain in the spring to Great Britain. At Rostock, some business seems to have been done, principally, however, on account of Hamburgh speculators, few purchases for England having been made there. The enquiry was more active in the early part of the month than subsequently: the highest price obtained was 39s. 6d. per qr. for fine 62 to 62½lbs. wheat. The supplies from the farmers having afterwards increased, sellers had become somewhat more anxious to realize. The reports from that quarter speak well of the yield of wheat, and we are inclined to think, notwithstanding what may be said to the contrary, that the crop of that article gave a good return in most of the continental countries, as well as in Great Britain. At the near ports, quotations of wheat are quite as high as at Mark-lane. From Hamburgh the advices have, within the last eight or ten days, become rather less animated; but holders do not seem to have lowered their pretensions, and for red Wahren wheat, weighing 60lbs. per bushel, 43s. per qr. free on board in spring had been asked, whilst for parcels to be shipped from Pomeranian ports 40s. 6d. per qr. had been demanded. Barley is worth about 21s. to 22s. per qr. free on board in spring, in the Danish islands; and oats of 38 to 39lbs. weight 16s. to 17s. per qr. In the Dutch markets prices of wheat have not varied materially since our last; but the tendency has been rather downwards, both at Rotterdam and Amsterdam. In France the value of wheat and flour has risen materially during the last two or three weeks; and the new order of things appears to be well thought of by the commercial classes of that country, business of all kinds having improved since Louis Napoleon has seized the reins of Government. From the Mediterranean we have no news of interest to communicate. The latest accounts from Marseilles quote Polish Odessa wheat 29s., and Marianopoli 32s. per qr. free on board. The advices from America announce the closing of the inland navigation by ice, and the consequent cessation of supplies of breadstuffs from the westward to the ports on the eastern coast. This had caused much firmness to be assumed by holders of flour, and at New York prices of the article had risen 12½ to 25 cents per barrel, good brands of Western Canal being quoted 17s., and pure Genessee 18s. to 18s. 6d. per brl. Shipments were still in progress for Great Britain.

CURRENCY PER IMPERIAL MEASURE.

	Shillings per Quarter			
WHEAT, Essex and Kent, white	36 to 40	fine	up to 45	
Ditto ditto old	38	40	„	45
Ditto ditto red, new	36	38	„	39
Ditto ditto old	35	38	„	39
Norfolk, Lincoln, & Yorksh., red	34	36	„	37
Ditto ditto old, none			„	—
Ditto ditto white new	36	38	„	43
Ditto ditto old, none			„	
BARLEY, malting, new			27	28
Chevalier			31	33
Distilling			24	26
Grinding			24	25
MALT, Essex, Norfolk, and Suffolk, new	53	55	extra	58
Ditto ditto old	45	48	„	51
Kingston, Ware, and town made, new	53	55	„	58
Ditto ditto old	48	53	„	55
Irish feed, white	17	19	fine	21
Ditto, black	16	17	fine	18
OATS, English feed	17	18	fine	20
Ditto Potato	19	22	extra	25
Scotch feed	20	23	fine	25
Ditto Potato	25	26	fine	27
RYE	26	28	old 26	28
BEANS, Mazagan	25	27	„ 25	29
Ticks	26	28	„ 28	31
Harrow	28	30	„ 30	32
Pigeon	29	33	„ 31	34
PEAS, white boilers	31	35	„ 32	35
Maple	30	32	„ 30	33
Grey	29	30	„ 28	31
FLOUR, town made, per sack of 280 lbs.	—	—	„ 32	37
Country marks	—	—	„ 28	33

FOREIGN GRAIN.

	Shillings per Quarter					
WHEAT, Dantzic, mixed	38 to 40	high mixed	41	45	extra	50
Konigsberg	36 39	„	40	42	„	44
Rostock, new	42 43	fine old	43	44	„	47
Pomera., Mecklbg., and Uckermk., red	40	41	extra	41		42
Silesian	„ 38	40	white	40		43
Danish and Holstein	„ 36	38	„	38		42
Rhine and Belgium	„ 38	41	old	40		42
Frene	„ 36	38	white	38		40
Odessa, St. Petersburg, and Riga	32	35	fine	35		36
BARLEY, grinding				22		25
Distilling				23		26
Malting			none	—		—
OATS, Dutch, brew, and Polands				21		24
Feed				18		19
Danish and Swedish feed				17		19
Stralsund				18		20
Russian				18		19
French				16		18
BEANS, Friesland and Holstein	24	26	Konigsberg	28		30
PEAS, feeding	28	30	fine boilers	32		34
INDIAN CORN, white	27	28	yellow	27		29
FLOUR, French, per sack	28	31	fine	31		34
American, sour per barrel	19	20	sweet	20		21

IMPERIAL AVERAGES.

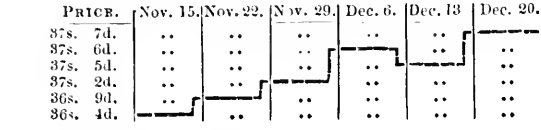
FOR THE LAST SIX WEEKS.

	Wheat.		Barley.		Oats.		Rye.		Beans		Peas.	
WEEK ENDING:	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Nov. 15, 1851..	36	4	26	7	18	1	26	0	28	8	28	3
Nov. 22, 1851..	36	9	27	0	18	3	23	2	29	8	28	7
Nov. 29, 1851..	37	2	27	1	18	8	25	7	30	5	28	10
Dec. 6, 1851..	37	6	27	0	18	2	27	6	30	6	29	6
Dec. 13, 1851..	37	5	26	8	18	6	27	2	30	2	30	0
Dec. 20, 1851..	37	7	26	6	18	3	27	4	29	9	29	6
Aggregate average of last six weeks	37	2	26	10	18	4	26	2	29	10	29	1
Comparative avge. same time last year	39	11	24	3	17	3	25	1	28	4	29	0
DUTIES	1	0	1	0	1	0	1	0	1	0	1	0

COMPARATIVE PRICES AND QUANTITIES OF CORN.

Averages from last *Gazette*.	Qrs.	Friday's Av. s.	d.	Averages from the corresponding *Gazette* in 1850.	Qrs.	Av. s.	d.
Wheat	114,214	37	7	Wheat	98,905	39	5
Barley	116,531	26	6	Barley	106,277	23	10
Oats	24,767	18	3	Oats	23,527	17	1
Rye	341	27	4	Rye	30	23	1
Beans	8,604	29	9	Beans	5,168	27	8
Peas	3,674	29	6	Peas	1,611	28	2

DIAGRAM SHOWING THE FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT DURING THE SIX WEEKS ENDING DECEMBER 20, 1851.



AN ACCOUNT SHEWING THE QUANTITIES OF CORN, GRAIN, MEAL, AND FLOUR, IMPORTED INTO THE UNITED KINGDOM IN THE MONTH ENDED 5TH DECEMBER, 1851, 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	5802 0	5802 0	9 2
Barley, do.	—	—	—
Oats, do.	—	—	—
Peas, do.	3 4	3 4	—
Maize or Indian Corn, do.	—	—	—
Wheat, foreign	128061 7	129212 3	7483 1
Barley, do.	24715 3	24715 3	15 5
Oats, do.	44162 1	44162 1	24 0
Rye	—	—	—
Peas, do.	10365 3	10431 7	88 7
Beans, do.	24308 1	24708 1	4208 5
Maize or Indian Corn, do	126710 6	126710 6	—
Buckwheat	70 7	70 7	—
Malt	—	—	—
Beer or Bigg	—	—	—
	cwts. qrs. lbs.	cwts. qrs. lbs.	cwts. qrs. lbs.
Flour from British Possessions	54437 0 20	54437 0 20	6 3 18
Flour, foreign	240073 1 18	240073 1 18	1230 3 6

HOP MARKETS.

BOROUGH, MONDAY, Dec. 29.

The hop market remains in a quiet state, the little business doing been confined to the purchase of old hops for exportation. Prices are without alteration.

Sussex pockets	108s. to 126s.
Weald of Kents	130s. to 145s.
Mid and East Kents	140s. to 240s.

POTATO MARKETS.

SOUTHWARK, WATERSIDE, Dec. 29.

Since our last report there have been considerable arrivals, both coastwise and by rail. The trade is very depressed at the following quotations:—

	Per Ton.
York Regents	70s. to 80s.
Scotch	60s. to 65s.
Kent and Essex	65s. to 75s.
Shaws	55s. to 65s.
Lincolnshire and Wisbeach	55s. to 70s.
French	60s. to —s.

PRICES OF BUTTER, CHEESE, HAMS, &c.

	s.	s.		s.	s.
Friesland, per cwt.	90	to 92	Double Gloucester, per cwt.	46	to 56
Kiel	94	96	Single do.	44	52
Dorset	100	102	York Hams	64	74
Carlow new	80	82	Westmoreland do.	66	72
Waterford „	78	80	Irish do.	50	66
Cork „	78	82	American do.	28	36
Limerick	64	70	Wiltshire Bacon,		
Sligo	70	76	green,	44	48
Fresh Butter, per doz.	11	13	Waterford Bacon	43	45
Cheshire Cheese, per cwt.	50	70	Hamburgh do.	38	42
Chedder do.	56	68	American	—	—

WOOL MARKETS.

BRITISH WOOL.

LEEDS, Dec. 26.—There has been a fair extent of business done this week in the English wool market, and prices are firmer, with an upward tendency.

LIVERPOOL, Dec. 27.

SCOTCH.—There has been a fair business doing in Laid Highland Wool, but so far no alteration in price. White Highland is still inquired for. There is more doing in both Cross and Cheviot, at about late rates.

	s. d.	s. d.
Laid Highland Wool, per 24lbs.	9 0	to 9 9
White Highland do.	12 0	13 0
Laid Crossed do...unwashed	11 0	12 0
Do. do...washed	11 6	13 0
Laid Cheviot do...unwashed	11 6	13 6
Do. do.. washed	13 0	16 6
White Cheviot do... do.	22 0	24 0

FOREIGN.—Since the public sales here on the 19th inst., there has been little doing by private contract; this arises from the want of stocks as much as anything else.

FOREIGN WOOL.

There has been more inquiry for foreign Wool than of late, and French buyers are purchasers of low wools, but cannot take much, owing to their limits being too low.

LEEDS, Dec. 26.—It is usual to find, at this season of the year, business operations conducted on a very limited scale, and the past week has formed no exception to the rule. We are, however, looking forward, with the beginning of the nw year, to a considerable improvement in all branches of the wool trade.

AGRICULTURAL QUERIES.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—In your number for October I have read with great interest the article "On the Improvement of Chalk Soils," and being the proprietor of high chalk lands, where there is no fuel within many miles of the place, either in the shape of coals or timber, to convert the chalk into lime, I should feel greatly indebted to any of your correspondents who would inform me if there is any cheap chemical process of doing so, with the expense attending it, or what would be the most economical plan to pursue.

To send coals thirty miles by rail from London, and then waggon them twelve or fourteen miles, is a very expensive operation, and prevents many improvements on stiff clay lands or chalk which are necessary in these "free-trade" times.

If any of your scientific readers would afford this information, it would, no doubt, be of great service to all who are similarly circumstanced to,

Sir, your most obedient servants,

AN OLD SUBSCRIBER.

28*th October*, 1851.

Printed by Rogerson and Co., 246, Strand, London.

GROUND PLAN OF

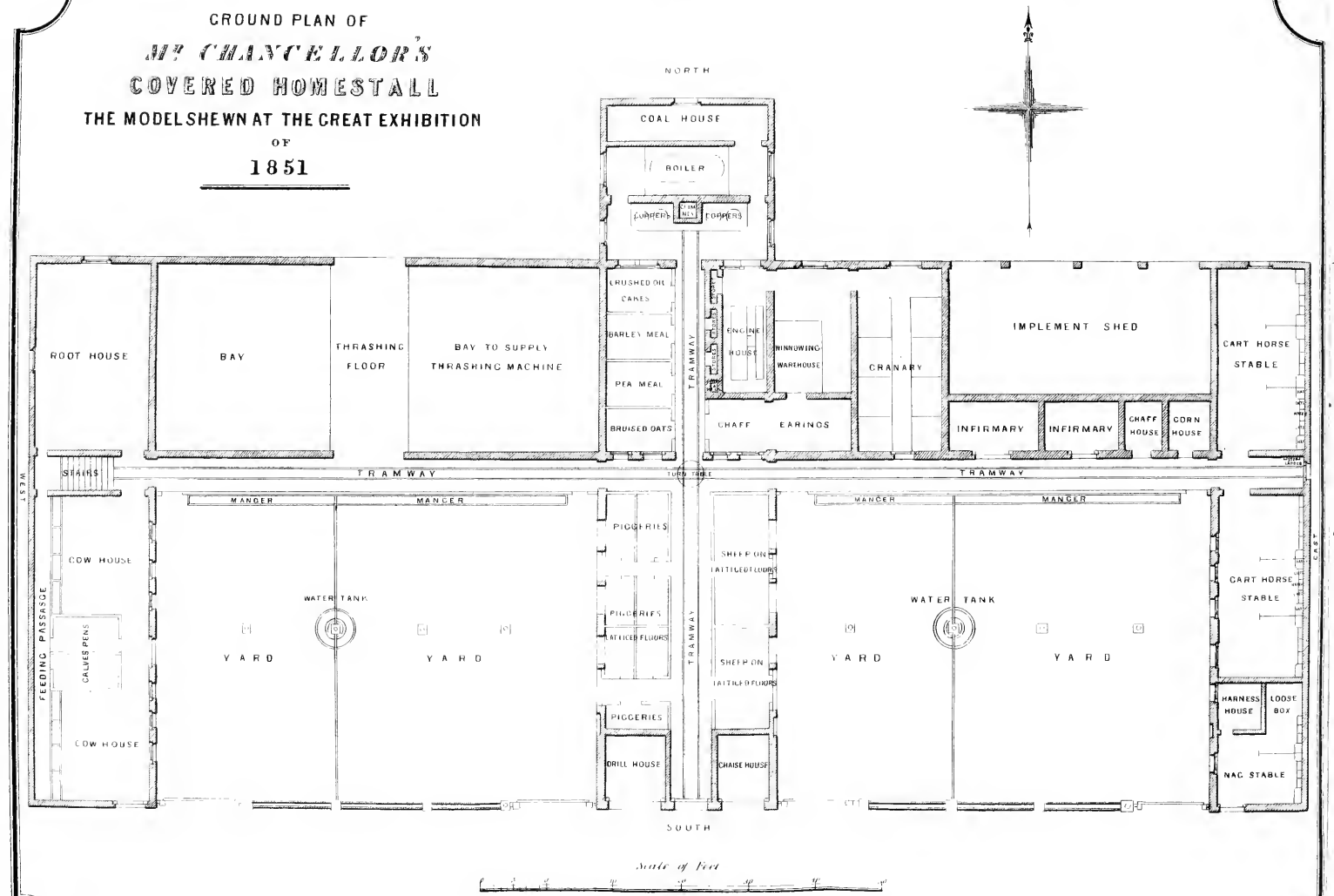
Mr CHANCELLOR'S

COVERED HOMESTALL

THE MODEL SHEWN AT THE GREAT EXHIBITION

OF

1851



Scale of Feet

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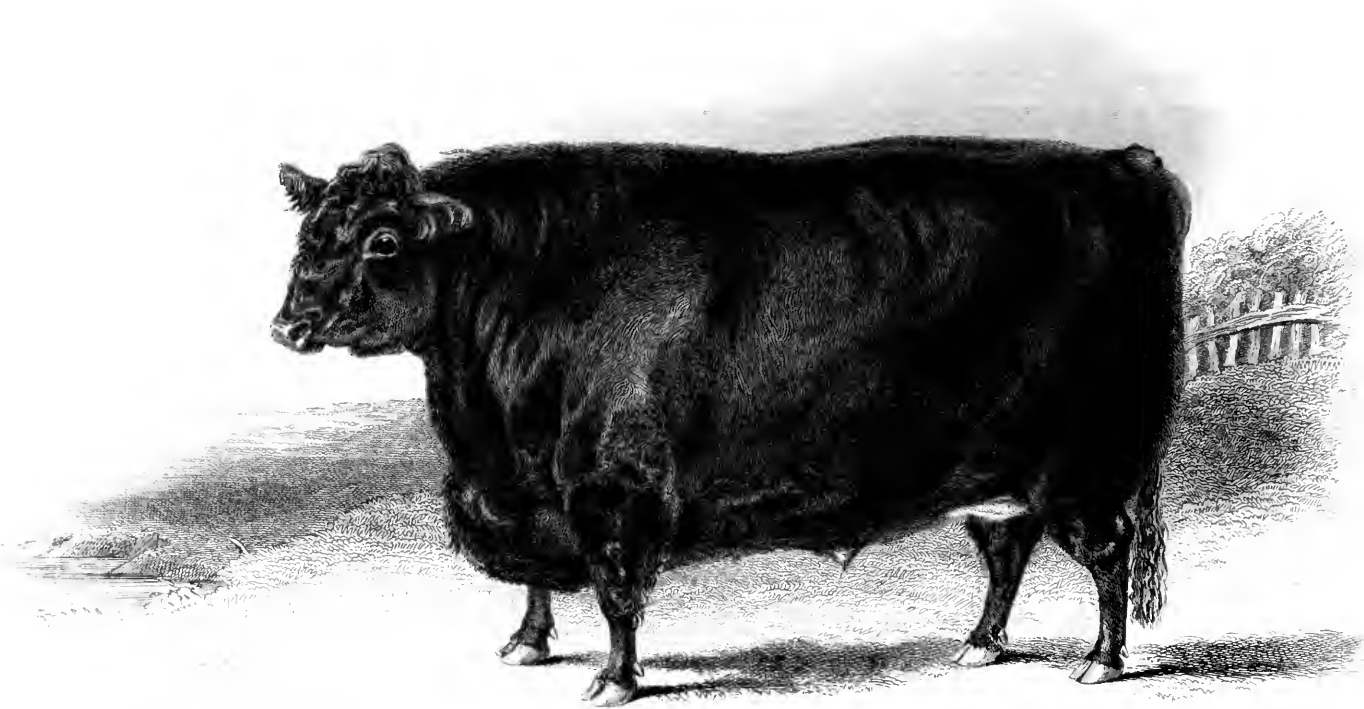


THE FARMER'S MAGAZINE.

FEBRUARY, 1852.

PLATE I.

FARM BUILDINGS.—COVERED HOMESTALL.

BY MR. CHANCELLOR.

PLATE II.

A GALLOWAY SCOT.

The property of William Heath, Esq., of Ludham, near Norwich, for which a prize of £10 was awarded at the Smithfield Club Cattle Show, in December, 1850.

The district to which this breed of cattle belongs comprehends the range of hills in the counties of Wigton and Kirkcudbright, and a portion of the shires of Ayr and Dumfries on the west coast of Scotland. The cattle are larger than those of the Highlands, but smaller than the long-horns and breeds of the lower parts of Scotland. The skin is thick, though soft to the touch; the hair is long and soft. The predominant colour, black, is that preferred by breeders, as indicative of the purity of its blood, as well as hardness of constitution. The form of the body is compact, the neck coarse, the throat is furnished with a dewlap, the chest is deep, and the limbs short and fleshy to the knee and hock. The distinguishing characteristic is the sides of the animal, which are very long. The animals are hardy, docile, good feeders when placed in suitable pastures, and weigh well in proportion to their bulk, the average dead weight when fat, three years old, being about 79 stone of 8lbs.; some four-year-olds have been sold at Smithfield (where the Galloway rib is well known) weighing from 96 to 105 stone of 8lbs. Another characteristic of this race is, that neither the male nor female has horns.

David Low, Esq., the author of "The Breeds of Domestic Animals," published in 1840, remarks, in reference to the trade in these animals, "It is computed that upwards of 20,000 are annually exported from the district, of which from 16,000 to 18,000 are sold at Smithfield; but it is probable that the total export exceeds the quantity mentioned. They are reared to the age of two or three years on the farms of the country, and are driven southward mostly in the latter part of the season, and chiefly to the counties of Norfolk and Suffolk. They are purchased by the English feeders, wintered on straw, hay, and green food, and fattened on the grass of the following season, and driven to Smithfield, supplying a large part of the consumption of the city from Christmas to July. They are well known accordingly in this great market, and are greatly valued by butchers and consumers."

THE GREAT EXHIBITION.

FARM BUILDINGS.—COVERED HOMESTALL.

One of the most interesting models in the Exhibition was that of Mr. Chancellor; though, placed as it was in an obscure corner of the Fine Arts Court, it probably escaped the attention of many visitors. Its nature and construction will be found fully described in the following account and annexed plan, obligingly afforded me by the architect. Before doing so, it may not be out of place to remark that "The Advantage of Covered Homestalls as regards the Fattening of Stock and Manufacture of Manure," formed a subject of discussion in the London Farmers' Club in June last, being introduced by Mr. J. Beadel, of Broomfield Lodge, Chelmsford.

"The model for a covered homestall, exhibited by me in the Great Exhibition, was designed and made for the purpose of explaining to those interested in such matters the system of feeding and fatting stock under cover, which just now is attracting some considerable attention in this part of the country, and also for the purpose of showing how the various buildings and yards required in a farmery might be so concentrated as to be covered by one roof.

"The advantages claimed for this arrangement are as follows:—

"1st, Increased value of manure by being made under cover.

"2nd, Economy in fatting stock, by their being kept in a more equable temperature.

"3rd, Economy of space by concentration of buildings.

"4th, Economy of labour by the application of steam-power.

"5th, Facility of supervision.

"And 6th, Security against depredation.

"In the practice of my profession it has fallen to my lot to examine, either with the view of repairing, rebuilding, or for the purpose of assessing dilapidations, very many farm homesteads in this and the adjoining counties, and I have been struck with the enormous annual expenditure required from both landlord and tenant, for the purpose of keeping the badly constructed buildings in repair.

"Very little attention appears formerly to have been paid to the arrangement or construction of farm buildings; indeed the majority of them forcibly remind one of the wigwams, constructed of sticks and mud, of the aborigines of these islands; and even now greater anxiety is shown by agriculturists to have a number of roughly constructed sheds, &c., rather than spend some little time and thought in arranging their buildings, so as not to have more places to keep in repair than are absolutely necessary for carrying on the business.

"I have inclosed with these remarks a plan of my model. You will bear in mind that the whole space is covered by three roofs of 25 feet span, running longitudinally, with a transept roof (if I may use the expression) running transversely over the centre range of buildings. The height from the ground to the eaves of roof is 16 feet, thus allowing space for lofts over the back, side, and centre buildings. The water is conveyed from the lead gutters between the roofs, and from the eaves, by iron rain-water pipes communicating with drain pipes below the soil, so that no water is allowed to run on to the manure.

"The buildings would be of course constructed of the usual building materials in the neighbourhood. One I erected in this county, about two years ago, is built of brick, with boarded and slated roofs; this has simply an arrangement of yards the whole length, with barn and root-house at the back; the other buildings, such as stables, &c., being already in existence. Another I had erected about three years ago, in Hertfordshire, is built of stone with slated roof.

"You will observe that the principle can be applied to a small arrangement as well as a large one—for instance, Mr. James Beadel, of Broomfield, near Chelmsford, who, by-the-bye, is the great advocate of this system, has a small one erected upon his estate, about 60 feet square; it is divided into equal portions, one half accommodating 10 bullocks, the other half being subdivided into three equal portions, for cows, horses, or bullocks, as he may require: at the back is a range of enclosures, about seven feet wide, for fatting sheep and pigs. I might here observe that Mr. Beadel has now tried this system for some time, and highly approves of it. The manure when required is taken out of the homestall direct on to the land: thus the expense and loss of clamping and turning is saved.

"Another one now erecting in this county, with two yards, each 60 feet by 30 feet, the one for bul-

locks, the other for cows, with a feeding passage between; at the head is a range of enclosures for pigs, and sheep and calves, with feeding passage in front; this passage communicating with the other one, and also with a range of buildings at one side of the covered homestall, containing nag stable, harness room, root house, cutting house, and meal house, with hay and straw lofts over. This building is built of brick, boarded and slated roofs, is just finished, and has cost £350.

"Mr. Beadel's is built of brick, with tiled roof, and cost a little over £200. To erect one similar to my model, exclusive of the steam-engine and machinery, would cost in this district about £1,500: you will therefore perceive that no greater expenditure is required to construct a building of this description, in a solid and substantial manner, than would be required to erect all the buildings required in a common farmery.

"The space occupied by the building of which I have enclosed the plan, and which is the same as my model, is about 180 feet long and 75 feet wide. Commencing at the west end, a portion the whole depth is divided off, forming thereby a cow house for eight or ten cows, with calves' pens between, with a root house 25 feet by 16 feet; over this root house is a store for oil cake, &c., and over the cow house a straw loft. At the back of the building, east of the root house, is a small barn, with one thrashing floor and two bays: the eastern bay is for the purpose of feeding the thrashing machine, and the floor would be found useful for knocking out a few oats, &c., when it would be inconvenient to work the steam engine; the western bay would of course feed the floor. In the centre of the back range of buildings is the engine room, boiler house, and bins for receiving the ground meal, bruised oats, crushed cake, &c., as the machines for doing these various things are on the floor over. Immediately adjoining the engine room is a space for fixing the winnowing machine, the thrashing machine being over—a place for cavings communicates with the winnowing machine, and the space allotted for this machine is large enough to fill the sacks, which are then ready to put in the granary, which opens out of the former place. The granary is binned off, and of course communicates with the exterior. Adjoining the granary, and still forming part of the back range of buildings, is the cart lodge, opening to the north, with two hospitals or loose boxes opening to the yard. This brings us to the east end: here a portion about 15 feet wide is divided off similar to that at the west end; it forms the carthorse stables and the nag stable, affording accommodation for twelve cart-horses and three nags.

"A space 25 feet wide is divided off in the centre of the whole building, in continuation of the engine house, and forming the transept before alluded to; this is devoted to the piggeries and places for fattening a few sheep on boards. In front, opening to the road, is a chaise house and a drill house. Between the end and the centre buildings are two spaces about 60 feet wide by 50 feet deep; these are divided each into two yards, for fatting bullocks, or for any other purpose the farmer may wish to apply them to—they form, indeed, the bullock and sheep arrangement: supposing that the yards were all filled with bullocks, they would hold about 40 or 50. Along the centre of the transept, between the pigs' and sheep's places, is the boiler house; and at the top of the yards is laid a tramway, for the convenience of drawing in a waggon the food required for the various animals—thus, if cut turnips are required the waggon is run into the root house, filled, and emptied at the mangers; or if boiled meal is to be given to the pigs, &c., the waggon is taken up to the coppers, filled, brought down to the piggeries, and then emptied as required. This passage way, as it communicates with every part of the building, would enable the farmer to inspect the whole of his stock, or his machinery, without going through the yards, and thus disturbing the cattle; indeed the front yard gate need never be opened except when the manure is carted out. I had almost forgotten to mention that straw lofts are provided over the implement shed, hospitals, granary, stables, and pigs and sheep places, to hold the straw as it arises from the thrashing machine, whence it is thrown into the yards below as required.

"I have thus endeavoured to give you some idea of the principle I wish to carry out. I see no reason why a farm homestead should not be as carefully and economically arranged as a cotton mill or other factory.

"This homestead is adapted for a farm of 500 acres."

The covered homestall of Mr. John Baxter, of Lewes, will form the subject of a succeeding paper.

W. H. R.

ON THE CONTINUED PROGRESS OF LIQUID MANURE IRRIGATION IN SCOTLAND.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

It is gratifying to find that considerable progress is now steadily making in the introduction of liquid manure irrigation. The steam-engine, whose employment for this purpose I have so long advocated, is getting more and more into use. In this Scotland is again taking the lead. The English farmers have long been acquainted with the use to which the sewage of Edinburgh is applied; and a recent report published by the General Board of Health not only shows that the Edinburgh meads have been greatly enlarged chiefly by the use of the steam-engine, but that the system is now extending to other portions of Scotland, and into England.

In this paper, however, I purpose to confine my examination of the progress of liquid manure irrigation chiefly to Scottish farms. I think this will be the more useful, because the Scotch landholders have a good habit of keeping excellent account books of their outlay and returns, upon the result of which other proposed improvements may be pretty safely based.

The extent of land now irrigated by the foul burn of Edinburgh is about 260 Scotch acres (equal to 1¾ English acres.) To these must be added other Edinburgh meads, such as those of Mr. Skirving, near Leith Walk, of about 10 acres, let at £32 to £24 per acre; Mr. Tompson's, on the west side of Edinburgh, of about 30 acres, let at from £26 to £30 per acre.

Such is the extent of land irrigated at Edinburgh. Let us next follow Mr. William Lee, in his valuable report of his examinations in other portions of Scotland, where the farmer has neither a city's sewage to aid him, nor a neighbouring dense population to consume and raise the value of the milk of his cows fed upon the grass which is produced by the irrigation. The first speaks of the irrigation works of

Mr. James Kennedy, Myer Mill Farm, Ayrshire. — "In visiting," he remarks, "the farms in Ayrshire I derived much information and assistance from Mr. Young, engine-maker of Ayr, who accompanied me. The irrigation works here, and also at Mr. Telfer's dairy farm and Mr. Ralston's farm, have been constructed under his management. He is now engaged in laying down similar works on a home farm of 60 to 80 acres, belonging to the Marquis of Ailsa, about nine miles south of Ayr, on the sea coast.

"Myer Mill farm is an instance in which the application of liquid manures, and, indeed, all other arrangements for scientific farming, have been carried to great perfection. The land, consisting of 400 acres, was formerly drained only 18 to 20 inches deep, but it is now being drained from three to four feet all over the farm. I need not enter into a full description of the works, because that has been done by others who had previously visited the place. Pursuing my object, however, of making the question one of figures, and of bringing out the result in pounds, shillings, and pence, it may be necessary to say, that the stock consists of about 200 feeding bullocks and other horned cattle, 140 pigs, 1,200 to 1,400 sheep, 20 horses, and 4 or 5 dairy cows. The urine and drainage from all the farm buildings,—from the house,—and the percolations and washings from the solid manure, are received into large covered tanks.

"In some respects this farm labours under peculiar disadvantages, as water for the purpose of diluting the liquid has to be raised 70 feet, and from a distance of more than 400 yards. There are four tanks, of the following dimensions in feet, namely,—48 × 14 × 12; 48 × 14 × 15; 72 × 14 × 12; 72 × 17 × 12. The tanks, with the agitators, cost about £300. There is a steam-engine of 12-horse power, working about 50 strokes per minute, and consuming 15 cwt. of coals per day, at 5s. per ton. The engine works on the average 10 hours per day, but the irrigation does not require quite one half of the power. There are two pumps with five-inch barrels, two feet stroke, and 25 strokes per minute, raising about 80 gallons per minute; equal to a discharge of 48,000 gallons per day of 10 hours. The steam-engine cost £150, and the irrigation-pumps £80, making £230 together.

"The iron pipes and hydrants in the fields throughout the farm cost £1,000, equal to £2 10s. per acre.

"The distribution from the hydrants is by lengths of gutta percha pipe, connected by union

joints, so as to obtain a reach of upwards of 300 yards every way round the hydrant. The discharge is from a brass hand-pipe, such as is used for fire-engines. The jet reaches the ground in the form of a shower at a distance of 40 to 50 feet from the man in charge of the pipe. It will be obvious from this that the capability of distribution is very great; and I find that a man with the discharge-pipe, and a boy to move the flexible hose, can cover 10 acres in an ordinary day's work.

"Taking the discharge, therefore, as given above, the quantity laid on at each dressing would be 4,800 gallons per acre.

"With such an economical distribution Mr. Kennedy is able to dilute the fluid in warm weather to three or four parts water and one of liquid manure, and to lay it on the land six or seven times per annum. In wet weather, when the ground is comparatively saturated, the irrigation is still carried on, but with equal parts of water and manure. The advantages resulting from this varying dilution fully prove the propriety of what I have urged on the subject in the earlier part of this report. In wet weather manure in a soluble state is added to the water from the clouds; and in dry weather, when the ground is parching, the operation combines both watering and manuring.

"There is a man to attend the engine, and a man and boy distributing. Their united wages are less than £2 per week. The gutta percha pipe is bought by weight, and when broken or worn out will sell at 8d. per pound. There are 300 yards of two inches diameter, which cost 3s. 1½d. per yard run; but the article is cheaper now, and 50 yards of pipe, 1½ inches diameter, cost only 2s. per yard. Some of the pipes in use at the time of my visit were purchased two years ago, and will still last a considerable time. They appear, however, to be stronger than necessary, and this extra strength gives an amount of rigidity sufficient to cause crinks here and there, from folding and unfolding the lengths. On every occasion the pipes give way again at the same points, and this goes on until the tenacity of the material is destroyed, and a transverse fracture takes place, about half the circumference of the pipe. I think it would be well to substitute canvass hose pipe for this, as being cheaper and more durable; but if gutta percha be preferred, a much thinner pipe would suffice, and being more flexible, I believe it would last longer.

"Taking into the irrigation account the whole cost of the engine, and the whole of the fuel and wages,—although half these might have been deducted,—the following appears to be the capital account and working expenses for fertilising Myer Mill farm:—

	£	s.	d.
Tanks complete	300	0	0
Steam engine	150	0	0
Pumps	80	0	0
Iron pipes, laying, and hydrants	1,000	0	0
Gutta percha distributing pipes, &c.	56	0	0
	£1,586	0	0
Annual interest on £1,586, and wear and tear, at 7½ per cent.	118	19	0
Annual wages	104	0	0
Fuel	58	10	0
	£281	9	0

This amount, divided by the number of acres, is equal to the annual sum of 14s. per acre.

"I now come to the practical result of so cheap a mode of fertilising land.

"Mr. Young informed me, that in one of the fields he had himself measured the growth of Italian rye-grass, and had found it to be two inches in 24 hours; and that within seven months Mr. Kennedy had cut from a field we were passing at the time 70 tons of grass per acre. Where the whole is cut, four or five heavy crops are thus taken; but upon some of the land during the last two years 20 sheep to the acre have been penned in hurdles, and moved about the same field from time to time; after each remove the fluid has been applied, and immediately followed by an abundant growth of food. There is not the slightest appearance of exhaustion in the land—its fertility appears to increase. I was informed, that before the liquid manure was used the land would not keep more than a bullock or five sheep to an acre; now it will maintain, if the crops are cut and carried in, five bullocks or 20 sheep to an acre. Some beans, bran, and oil-cake are bought for the stock, but, on the other hand, one third or more of the farm is kept in grain, notwithstanding the great number of live stock."

The next Scotch farm visited by Mr. Lee was Canning Park, Mr. Telfer's Farm, near Ayr. —"This is a small dairy farm of 40 acres, near the level of the sea, and about a mile and a half west of the town of Ayr. The subsoil is beach gravel with a slight admixture of clay. Water is too abundant. It lies dead within about 20 inches of the surface, and in winter nearer than that.

"No bedding or litter is used here. The cows, 48 in number, lie on cocoa-nut mats. The ventilation is perfect, and the air sweeter than in the majority of the dwelling-houses of human beings. Behind the standings of the cattle there is a long row of perforated plates 18 inches wide; the urine

passes through these, and is conveyed in hollow semi-circular channels to the tank, placed at the end of the byre, where it is diluted in the same manner as at Myer Mill farm, with three or four times its own bulk of water in dry weather, and less in wet weather. The cost of the tank did not exceed £30. The engine, of three-horse power, is used to raise the fluid, and also for churning, grinding oats, chopping hay, pumping water to supply the cattle, &c. The comparatively small extent of land only requires the engine to be occasionally used for irrigation; and, as the surface is flat, and the height to which the liquid manure has to be lifted small, the engine, when in use, is capable of doing the other work of the farm at the same time. The cost of the engine was £60, and there are two pumps for liquid manure, having 4-inch barrels, and 14-inch stroke, making 25 strokes per minute. The capability of the pumps is therefore about 31¾ gallons per minute, or about 19,000 gallons per day of 10 hours. The quantity of the liquid laid on at each application is about 5,000 gallons per acre, so that the whole farm could be covered in 10 days if required, so far as the power of the pumps is concerned. Iron pipes three inches' diameter extend from the engine pumps through the fields, laid in the manner already described, and not exceeding in cost the sum of £2 10s. per acre. The hose-pipe is of gutta percha, making a total length of 150 yards, and costing, with the discharge-pipe, about £20. I was informed that the engine is used for irrigation about six hours per week on the average, and therefore the wages of an engine-man and distributor, and the fuel used, would not be due to the irrigation account for more than 31 days out of the 12 months; taking them for that time, the annual amount of working expenses would be about £11. The following appears to be the cost of carrying out the system at Mr. Telfer's farm:—

	£	s.	d.
Tank	30	0	0
Engine	60	0	0
Iron pipes and hydrants	100	0	0
Distributing hose-pipe, &c.	20	0	0
	£210	0	0
Annual interest on £210, and wear and tear, at 7½ per cent.	15	15	0
Wages and fuel	11	0	0
	£26	15	0

"This amount, divided by the number of acres, is only 13s. 4½d. per acre, when spread over the whole 40 acres of land.

"The liquid manure is applied to all kinds of crops upon Mr. Telfer's farm; and though Italian rye-grass is the favourite, it is also used for turnips, mangel wurzle, and cabbages, rhubarb, and fruit.

"In summer the cows have a quantity of oil-cake, as well as grass; and in winter they have turnips or mangle wurzle, bean or barley meal, and cut hay or grass; the whole mess being steamed together. Miss Bell, the cousin of Mr. Telfer, manages the dairy, and said that last year the hay bought would amount to from £30 to £40, and she should think the grain to not less than £200. In general terms, the other food is produced upon the farm. As to the produce of grass, which is the chief article, the first cutting during the present year was in the latter end of March, about 18 inches thick. The second was from 18 inches to 2 feet thick. The third was from 3 feet to 4 feet 6 inches thick. The fourth nearly the same. The fifth was 2 feet thick; and the sixth, in process of cutting at the time I was there, we measured at 18 inches thick. Taking the mean, where two dimensions are given for the same crop, I find the aggregate depth of grass, grown and cut off this farm, within seven months, to be no less than 14 feet 3 inches. All this is, however, eaten upon the premises, and the whole marketable produce of the farm is represented by the milk and butter.

"As to the quantity and value of these, Miss Bell stated, that the previous week the butter was 114 lbs. and 120 lbs.—together, 234 lbs.; sold at 1s. per pound. This, she stated, was about the average quantity and price. The amount for butter would therefore be £11 14s. per week, or, per annum, £603 8s. She informed me further, that during about eight months in the year, the cold milk realizes about the same amount as the butter. In the summer months, during hot weather, the market value of the milk is only about half that of the butter. From these data, the amount for milk sold per annum is £507. The total receipts for the two articles of milk and butter amount to £1,115 8s. per annum. I only need to add, that, previously to the adoption of the present system of farming, these 40 acres of land were barely sufficient to support eight or nine cows, and would have been well let at a rental of 30s. an acre."

The detail of these two farms will suffice to show the extended working in Scotland of the steam-engine for the distribution of liquid manure irrigation. Details relating to other Scotch and English farms will be found in the same valuable report. Such as of Mr. Ralston's farm at Leg, in Ayrshire; of the Marquis of Ailsas, near Ayr; and Mr. Robert Harvey's, near Glasgow. In England Mr. Lee alludes to or describes similar irrigation works

at the Duke of Sutherland's Home Farm, at Hanchurch, near Trentham; at Mr. Robert Neilson's, at Halewood Farm, eight miles from Liverpool; at Liscard Farm, belonging to Mr. Harold, Littledale, near Birkenhead (in all of which instances the steam-engine is used); besides several others where the elevation of the homestead above the level of other portions of the farm is sufficient to allow of the distribution of the irrigation fluid by its own gravitation.

The extent of the power of a common steam-engine will be a very likely consideration with many farmers. Now, this question is plainly and practically answered by Messrs. Ransome & May, at p. 10, of the "Farmers' Almanac" for the present year. From this work I take the following table, which gives the gallons of water which may be lifted to various heights by the consumption of 112 lbs. of coal, the pumping apparatus being good and adapted to the power of the steam engine:—

Height.	Gallons.	Height.	Gallons.
1 foot	1,600,000	9 feet....	177,777
2 feet	800,000	10 feet....	160,000
3 feet	533,333	11 feet....	145,454
4 feet	400,000	12 feet....	133,333
5 feet	320,000	13 feet....	123,076
6 feet	266,666	14 feet....	114,444
7 feet	228,571	15 feet....	106,666
8 feet	200,000	16 feet....	100,000

This great question is now rapidly increasing in importance; and, in times like these, I feel that there does seem to arise, in the use of the steam-engine, a means of aiding the English farmer, which can hardly be materially interfered with by foreign landholders, who have neither English steam-engines, nor English coals to work them. It is true that it is only in certain situations that water can be had in sufficient quantity for the use, in this way, of the irrigator; but then these localities (either by using river, or lake, or well water) are much more common than is generally believed.

BARLEY—ITS PRESENT IMPORTANCE, AND PROPER CULTIVATION.

BY AN EX-FARMER.

This species of corn-bearing plants has now become of more importance than any other, inasmuch as the British Farmer cannot compete with foreigners in the production of wheat, and no country produces so fine a quality of barley for malting purposes as England; besides, the fermentative character of good samples makes it almost a matter of certainty that very large quantities will not be imported, for no other reason than that the heat a body of it acquires when in the form of a ship's cargo destroys a great number of the germs of it, and thereby makes it totally unfit for the uses in question. Therefore, it is doing good service to discuss, by the force of experience and comparison, the cultivation of the plant which has supplanted the one on which farmers used to focus the greater part of their rent-paying affections.

The most popular regulation which governed the sowing of this grain—renowned in song, of about the same date, as John Barleycorn, was—"that the mould should feel warm;" and many farmers, of many localities, contend, with a large amount of assurance of the rightfulness of their argument, that it is good practice to plough and plough again, harrow and roll, previously to placing the above-named gentleman in a situation to increase and multiply exceedingly. But, however right such practice might have been when the experience of some oracle burst into the above quotation, such argument no longer holds good, now that the climate of this kingdom is improved by its surface being open and artificial drainage abounding, and an improved character of barley is at our command for sowing. Indeed, it is now totally impossible, in an ordinary season, to obtain a sample of what is termed "malting barley" unless it be sown on soil of a tolerable consistency, and at an early time of the spring season.

The superior manner in which new crops have been cultivated on barley land for these last twenty years, has rendered the soil so abundant in acid that it requires a greater length of time for a crop to perfect, by elaboration, that which can be assimilated by a plant, and subsequently transformed into large, plump, and bright-coloured berries: and, as all crops of the same kind ripen within a little at a certain time, whether they be sown late or early, it is clear that time must be taken advantage of, and, by these means, allow more time for the plants to accomplish what is required of them.

It is sometimes argued that, as barley is a more tender plant than other grain, it must be wrong to treat it in the same way, in regard to time, season, and cultivation; but no greater misconceptions can exist in the mind of any one than the belief that it will not stand a severe frost or two, and send its

roots into soil which has been subjected to the heavy rains of winter; for if there be six or seven weeks allowed for it to make blades and roots (and every blade it makes, other roots are formed) before the time arrives for the stems to make their appearance, why it must be in a better position than if there had been only just a beginning of its germination, even although the soil was in a fine state of cultivation, and warm, for receiving it. If roots, foliage, and stems are to be made or formed at the same time, and the latter are to flourish away at a racing pace whilst feeding on that which is bad for its "digestion," unless there be more of certain constituents (to be hereafter mentioned) than soil in this condition possesses, how is it possible that a fine quality and a large quantity can be produced? To illustrate this (one of the broad and scientific questions of the day) with perspicuity, it may be supposed that an individual was placed astride a barrel of beverage of some kind, say beer; and the only means he had of allaying the cravings of nature was by sucking its contents: it is certain that he would soon change in hue; but whether to blue or purple, or to no hue at all, is no matter; and all this would arise from the queerness of his sensations, consequent upon being restricted to one kind of nourishment, and that not of the exact kind to keep body and soul together, and of a proper condition in regard to health and vitality. By the same unmistakable method of reasoning, if a crop of barley be forced to imbibe water which contains more than enough acid in the shape of decayed turnip roots and so on, whilst it requires a great proportion of other constituents (to be spoken of separately, to prevent confusion or pain in the "particular"), why should this crop not *feel* queer? its appearance will be one which comes under that forcible and comprehensive appellation "queer;" and it may be depended on, that its owner will experience the disagreeableness at certain sensitive and sometimes expressive regions, which the reader is left to imagine, or call to mind, the situation of.

There are two distinct classes of constituents assimilated by plants—one of the air, the other of the earth—which we will now briefly consider in one or two important positions: they are alkalies, soda, potash, alumina, silicon, lime, oxide of iron, and others, which are not worth naming, as the proportion to those compounds just named is so minute as to make them beneath notice, particularly as they are developed by the same husbandry as the ones which predominate in quantity. It is known as a fact by all, that these compounds are formed by cultivating the metallic bases of them. And the theory has been so often discussed in this journal that it is unnecessary to go through the details of it again; but there is one part of the subject which cannot be too firmly impressed upon the mind of the practical agriculturist: it is the influence of acids on metallic bases. If a green crop be fed by sheep upon the land in the autumn, the acid which falls from them in the form of urine unites with the surface-soil, and at once begins its influence, by dividing these bases so that they will suspend in water and enter into the system of plants: but, if the green crop remain in an undisturbed state, so that its juices are not at liberty to act as above explained, why there must be a different character of food for the after-crop (supposing the green crop to be turnip, and fed off in the spring); and this food is more or less beneficial, or injurious, according to the quantity of it, and the cultivation of the soil containing it before sowing the seed. This is the point. If a given quantity of urine contains, say 90 per cent. of caustic properties when it falls on the land, and it lies three or four months before it is taken up by plants, it may then, and I believe it would contain only 50 per cent. of any caustic elements; not that this acid would be less in the whole, but because it had developed and united with earthy constituents or compounds, and thereby reduced the per-centage, or proportion of acid, to those matters wherewith it had united, and this to the degree named. If, on the contrary, this urine falls upon land which is to be immediately sown, and this, too, at a season when the crop grows away rapidly at once; why, it is clear that the land does not receive the benefit it otherwise would have done, as the crop takes up the disintegrating liquid, and appropriates it to itself in the shape of increase of roots, stems, and so on.

Now, this theoretical explanation shows why barley differs so in colour in the field, and in quality in sample, even after the same cultivation in regard to the soil, and time in regard to sowing. By the acid exhausting itself in the soil in the manner described, it becomes governed by an alkali, or some other earthy compound, and is thereby deprived of its tendency to ferment, as is the case when it enters plants in the proportion at which we started—90 per cent. It is the law of nature that gases shall be as near upon an equality as possible, or of such proportion as they are found in general, which is the cause of this fermentation. Such barley as is of a very dark colour under ordinary treatment, is that which has been feeding on a fluid containing too great a proportion of acid to earthy matters; and this, as every farmer knows, is the character of crop that becomes diseased or mildewed in an ordinary season, and produces a good quality only when most other, or the general crop suffers from drought and heat. This is all

understood in practice. And, as it cannot be avoided where turnips must be kept late in the season, a remedy must be sought of the most counteracting kind. Science suggests and practice confirms the necessity of land in such a position being ploughed shallowly, and compressed to a degree of tolerable consistency by means of a heavy roller. By so doing the general rapid growth will be prevented, and therefore a good quality may be insured, by stiffness of straw being the result where weakness of "pins" must inevitably have taken place. Sometimes a trifle less per acre may be grown, but the quality is sure to be better and will make up the value in this case; and I have not the slightest hesitation in saying, that the land in question will grow more per acre in seven years than it will if ploughed two or three times, and harrowed and rolled by the dozen. This is opposed to the opinion of many; but my practical experience and scientific knowledge allow me to say with confidence, that it is far better to plough only *once* in the spring; and, where the soil is in a state of neither wet nor dry, to roll down and drill "*right* away" is *right* practice. Where there are clods breaking up, this plan may not do; but then the scarifier is the implement, and should be used as it is where the soil has lain up, in readiness for a scratch, all the winter. What a waste there is made of horse-labour, in this particular, by some farmers! What a state of backwardness are the fallows of some, in the months of April and May, in consequence! To say nothing of the likelihood of clover missing of plants, or, if it grow, of its being smothered by the lodging of a crop so weakened by the influences of the circumstances described.

It only remains for me to add, that all the barley on well-cultivated farms should be sown as early as possible, and by the scarifying system; and such land as is likely to grow too much in quantity of straw should be well consolidated, if it has been puffed up by frost. Thin sowing is recommended by some luminaries; but the remedy, or the precautions to be taken here, is to sow early: begin with the year if it will do well, and make the moulds solid, that the roots may not run too easily. Some persons sow all early because one field happened to answer last year. This is absurd. Poor fields are completely exhausted of their food before the time for the ears to make their appearance: therefore there cannot be any corn, except it be such a season as makes the crops of the good land rotten. So scheme and forecast as to have late spring feed on the poorer fields, and sow the richer ones when the first opportunity offers. By this system, the great item of horse-labour is both economised and well directed, inasmuch as justice is done to the one part; and the other part, or fallows, may have that attention which is requisite when fields are idle; and the turnips may, therefore, be sown when they should be; and thus the most important crop to the enrichment of a farm may be well treated; and by these means will that accumulation of atmospheric matters take place, which is the only means we have of taking advantage of the natural powers about us, to that extent which makes the process profitable, it being itself a gift of Heaven, and, therefore, needs no labour to facilitate it when once it has received the start, which the same celestial Power has ordained as one which must come about by the exercise of skill and the employment of the hands of man.

HEDGES AND FARM FENCES.

BY A PRACTICAL FARMER.

"As the twig is bent, the tree's inclined."
"Of all parts of wisdom the practice is the most valuable."

As this is the season of the year when all farmers are looking to their ways, and proceeding to repair their roads and fences, it may not be inappropriate to offer some observations upon their management. I propose for the present to confine myself to fences, or rather to hedges, hedgerow timber, useless hedges on small enclosures, and the management of a young quick hedge for the purpose of making good farm fences. With the view of aiding my brother farmers in obtaining a good and permanent one, I offer the following remarks:—

The best hedge is unquestionably the Hawthorn hedge; *i. e.*, Whitethorn, or Quickset hedge. It will be necessary to begin with the young quick; as upon its proper management depends the successful maintenance of the future hedge. The hedge to be planted should be with quick of three years' growth; *i. e.*, one year in the seed-bed, and two years after being transplanted out singly in trenches or rows. From *this* nursery the plants should be carefully taken up, their roots trimmed, and their longer fibres shortened; they will then be ready for planting. The line of fence

being marked out, a trench about 12 inches wide and 10 inches deep should be dug, and prepared with a strong mixture of loamy soil and partially-decomposed dung, to be thoroughly mixed, and extending the whole length of the fence. The planting should then take place, and may be proceeded with in open weather throughout the winter; care being taken to avoid frosts, lest the tender fibres should receive injury. The plants may be set at intervals of from 7 to 9 inches, according to their size and strength; their roots to be carefully covered to the top of the trench, and be well trodden down. In this way they must remain for the summer; but in the succeeding winter it will be desirable to take off the top, close to the ground, in order to thicken the bottom of the future fence. In the following summer its growth will be so vigorous as to require the top to be levelled; taking care to cut only those shoots likely to overtop their neighbours. This will cause it to grow compact, and regular in form; and on reaching the height of 4 feet it should be kept under with hook or shears, and never allowed to get away. By these means it will speedily become a strong thickset hedge, of suitable character for a permanent farm fence. To keep it such it ought to be kept in the best shape; every plant receiving equal encouragement and protection in its growth. For this purpose I suggest its being cut so as to leave a base of 3 feet in width, sloping equally upwards on both sides to a narrow top at 4 feet height. This, I think, is the best form of hedge either for pasture or arable land; every part of it receives equal benefit from sun and air, while from the width of its base the growth of grasses and weeds is more effectually prevented. What a delightful contrast would the whole country present—how agreeable and picturesque; and what an immense benefit would arise were hedges of this character universal, instead of those unsightly, cumbrous, vermin-stocked pests, now so general! Agriculture will flourish in proportion as it approaches garden-like culture, and this is one step towards it. Every hedge should be made to assimilate to it, except from peculiar circumstances. No land ought to be overshadowed or overgrown by either hedge, or hedge-row timber, if the occupier is to derive a profit; but for ornamental purposes, for fuel, for fencing, and the like, it should only be left on the grass and meadow lands, or at all events on those parts of the farm least likely to do injury to the cropping. The writer of this has on his own farm hedgerows in which are growing large trees, whose roots spread far and wide, and exhausting the soil to a great extent. In one instance some roots of the Ash which were dug up had extended in a direct line from the trunk upwards of 70 feet, and many from 20 to 60 feet around; and in no case had they entered the earth to a greater depth than 2 feet, but appear to have sought their food on the surface—a decided proof of their injurious tendency. Fancy an oblong field, of narrow width, beset with two such fences—hedge-rows; but I shall revert to this again under "Useless Fences," and shall now proceed to direct attention to the management of existing hedges.

It is indisputable that hedges properly managed are of very essential service, both in the protection of arable lands and in depasturing grass lands. The shelter given to young and tender corn-plants in inclement seasons, and to stock feeding off the turnip-crop on arable land, is very serviceable; and on pasture land hedges are almost indispensable. Neither do I object to a moderate sprinkling of good timber trees on such land; they are both useful and ornamental. In winter they break off the blustering winds, and in summer afford cooling shade; it is the negligent abuse of such fences that is to be so highly deprecated. It is advantageous to any land where the hedges are good and of moderate bulk; not encumbering, but affording protection and shelter both to stock and crop. The greatest difficulty is experienced in the management of existing hedges, particularly those of long standing. Where it has become thin and bad from age or improper management, the best way is to grub it up at once, and plant anew, taking care to avoid planting precisely in the old exhausted line of fence; but where the hedge is in tolerable condition, every reasonable method should be adopted to improve it. One very useful plan is to plash it (cut it up), and in every thin place to bend down a suitable branch, so as to lay it along the ground, or rather in a trench. Stake it firmly down, and notch it where a shoot is required. In this way it will grow and fill up the gap. Young quick or old stools, planted in old hedgers, of seldom do well. Another plan to improve an old hedge is by cutting it in what is termed "Scotch fashion"—*i. e.*, alternately on either side, allowing one or more years to intervene, the design being to obtain a thick bottom, as well as to retain a sufficient fence while so thickening. The hedger commences at the bottom, and cuts upwards, in a slanting direction, to the required height, or about 4½ feet, taking out only those pieces at the bottom most likely to throw out shoots, and all other branches in succession, as he proceeds upward to the required height. The opposite side of the hedge being left nearly untouched till the succeeding season, when it must undergo the same course or operation. Both sides being thus cut into similar form, it will soon become a thick, compact hedge. The most common method of managing an old hedge is by plashing and laying; and if properly done, it is a very good one: but, as usually cut and layed, it is very hurtful to the hedge. No live stakes ought to be left standing, and the whole should be cut closely up from the very bottom, every stool being cut in a slanting direction upwards, so as to prevent splitting them, or other injury, and thus permitting the rain to get down the crevices, or rotting the roots. It is also a folly to cram as much wood into the layers as possible, for the purpose of ensuring a temporary fence. This will prevent the future prosperity of the hedge; and the live or uncut stakes, taking the lead, soon cause a thin place on either side of them, from overtopping the cut stools. As this is the common way of managing hedges, and much evil has arisen from mismanagement, I will detail what I

think the best practice. The hedge to be plashed and layed should be carefully looked over by the hedger, so as to ascertain if it contains plenty of stakes and binders, and how they can be best obtained from it. He should then proceed to cut down *as closely as possible to the ground* all the hedge, except such suitable pieces as he requires for the layers, and which ought not to be too many. He should then cut out his stakes, and, as he proceeds with his work, drive them into the ground, about two feet apart, along the line of fence, and 15 inches from the stools or cut hedge. He should then lay along the bottom, and entwine with the stakes a layer of the smaller cut branches; next, a slight layer of somewhat larger growth; above them, the layers or pieces left standing, and intended to keep all fast; these to be again followed by a few layers of strong growth; and the whole to be carefully bound with the long and thinner branches or binders, by being thoroughly twisted on the top of the stakes. This must be very securely done, as upon its nice adjustment and execution the stability of the fence mainly depends. Great care must be taken not to overload the stakes. Only just so much should be put into the fence as will prevent lambs and smaller animals creeping through it. The binders ought to be sufficiently strong to obstruct the larger stock. If the stakes are heavily loaded, in a year or two, either from high winds or drifted snow, they will give way. By the above plan of setting the stakes away from the old stools, they have room, can be kept clean, and moulded up, besides having the advantage of sun and air. At the end of four years, the live or standing layers must be cut out, and, if requisite, the staked fence repaired, the young hedge "sided up," and the top levelled to the desired height. It may thus, in about five years, be brought into that form of hedge which I think is to be preferred for general purposes.

Another very common method of managing an old hedge is to "buck-head" it—*i. e.*, to cut it off at any required height. This is done by simply cutting equally on both sides, along the top from the bottom, in (as before stated) a slanting direction upwards, so as to leave a narrow top. In many situations it is a useful practice; but, if not required for a temporary fence, it is best to cut up from the very bottom, and in all cases, I again repeat, to be cut upwards so that no stool is split or splintered. If this is not attended to, the root is greatly endangered, if not destroyed. Assuming, then, that the hedges have been brought into proper shade and order, they ought to be kept so; and this can only be done by constant pruning and cutting, keeping as closely as possible to the desired form. The cutting should take place twice in the year—*i. e.*, early in June, and late in November; but this is not absolutely requisite. The hedge may be kept in fair order, and under moderate dimensions, by a good cutting or pruning in September. This would for a long period keep it in tolerable bounds, when it may be again cut up from the bottom. One great benefit to be derived from such prescribed bounds to hedgerows is, that birds, insects, and vermin are deprived of comfortable quarters; and it may be presumed that, owing to so little harbour being given them, they will neither increase so fast, and that birds, in particular, will not be so destructive as when screened by larger hedges. Other advantages I shall endeavour to show when treating of useless fences or hedges, in which I shall include the subdivision of fields, its injurious effect upon good husbandry, and the great loss it occasions to the country. This may be somewhat irrelevant; but I hope its importance will suffice as my reason for so doing.

AGRICULTURE.

ON THE IMPROVEMENT "OF THAT HUMAN MACHINE—THAT *MAN ANIMAL*, THE DAILY LABOURER."

BY A YOUNG FARMER.

Progress: This is a suggestive word to a reflective mind. It is one of those stones from which Shakspeare says, "Sermons may be written." What does it not imply? What of past inertness—of present imperfection and passage—of future realisation? Does it not stand as the illuminated motto of our age—the guiding spirit of our times—the pillar of cloud by day, and of fire by night?

There are many, however, who disbelieve in progress altogether, and judge all those who see "bright lights in the clouds" and "good in everything," as enthusiasts and visionaries, possessed of a diseased faculty of hope, whose action is increased in proportion to its unhealthy condition, and who, therefore, behold the most glorious visions when there is just the least foundation for them.

There are, we are aware, some people who believe in the stationary position or retrograde movement of society; and these resemble somewhat in character the celebrated Irishman who cried in his distress, "I *will* be drowned, and nobody shall help me." They affect to bemoan a condition on which with childish petulance they insist—insisting in the face of all reason and common sense. We say in the face of all

reason and common sense, because we are sure that any mind giving itself to reflect upon the signs of the times now visible, be it the dullest of all minds, can readily puzzle out the eight letters of the word progress; not in any faint, invisible, crude type, but in unmistakeable, indelible, deep, graven character.

There is no time to pursue this part of the subject further. Those who doubt can make their own investigations. But let no one laying his hand upon "Douglas's Advancement of Society," "Porter's Progress of the Nation," "Miss Martineau's History of the Peace," and "Professor Hoppus on Education"—let no one, we say, with his hand on these works, yet affirm that the evidences of a progressive movement are wanting.

We are materially assisted in ascertaining the kind, degree, and direction of this onward tendency by the perusal of Miss Harriet Martineau's "History of the Thirty Years' Peace." No work of late years has so forcibly impressed us. From no study do we arise more fully confirmed in our opinion of the blessing of peace. To oppose to the events of the last thirty years those of any previous period is most effectually to show that the whole phase of our history is changed.

The English chronicles present, up to the 19th century, one nearly unvarying record of misrule and dissensions—of despotism and civil war—of personal ambition and sanguinary strife—of war abroad and misery at home—of aristocratical oppression and democratical resistance—of military glory and commercial distress. In the levy of taxes to maintain our forces, the sinews of trade were paralyzed—public confidence was destroyed—the tram-way of speculation was torn up—and the slender earnings of the labouring classes were swallowed by this insatiable lust for empire; the only results of which were still more oppressive taxes, and a glory, the vanity of which was speedily discovered and cursed. All domestic and social wellbeing was sacrificed to a delusion the French have not yet exploded, and the disastrous effect of which we now feel through every nerve of society, and bitterly lament.

As we have already said, the annals of the last thirty years present us with a striking contrast. The historian of this period has had to record not actions such as those of Cressy and Agincourt, but such as have been performed under the command of Sanitary Reform and Towns' Health Acts, which have sent large corps of "street orderlies" through our thoroughfares and into the miserable haunts of our poorer classes, armed with besom, scoop, and shovel, to remove the pestilential source of our annual mortality. He has also to describe the subtle works of invention, and the rapid aggressive movements of machinery—that vast army upon which we alone can depend to conquer every waste, to subdue every barrenness—to obliterate the terms scarcity and dearness—to lay low commercial restriction—to reduce to servitude the elements of the three worlds: the terrene, the aqueous, and the gaseous; and make them minister to the necessities, comfort, and luxuries, of mankind. He has also to note the growth of charity—the increase of public spirit and public virtue—the spread of religion and the extensive nature of scientific research and discovery. From the debates in the House of Commons he may also discover what subjects have particularly engaged the nation's attention. Civil and religious liberty—social and political economy—moral and political reform—education and the labour question in all its branches—the desirability of a pacific relation with foreign affairs, of reduction in our war establishments, and a substitution of a simple form of arbitration in the place of diplomatic manœuvring and armed force, are questions that must be mentioned as having been discussed. Then come measures concerning commerce, manufacture, agriculture, trade, art and industry, the great exposition of which marks an era which shall stand out in all coming time as a thousandfold more memorable and better entitled to admiration than our Blenheims, Trafalgars, or Waterloos. Such is the difference in the aspect of our former and our present history.

It is now our business to enquire what good has resulted to agriculture from this turning of the eye of the nation upon its own inner and vital workings. Has it shown itself susceptible in the same degree to improvement as other interests that have been mentioned? What is there lacking to the perfection it approximates? Its alliance with the foundry, the forge, and the laboratory have rendered it distinguished; and other means that have contributed to this result are the revisal of its code of laws, the extended and varied nature of its methods, and the superior breeds of domestic animals that judgment and diligence have introduced. We are sorry to say that it has been in a great measure coerced to this improvement. Be this as it may, it is now however reduced to a science very different from what it was when Old Thomas Tusser gave forth his "Five Hundred Points of Good Husbandry," or Arthur Young published his well-known reports.

But are the implements, the drainage, the daily routine of farm work, and the rearing of cattle, the only respects in which agriculture is open to improvement? Is there not one consideration of still infinitely higher importance than all these? That human machine—that *man animal*, the daily labourer—what of *it*? Can we raise no charge against any one? Is no one guilty with respect to them? What is it that stimulates the tenants against the landlords, and the labourers against their masters, but the want of that humanizing sympathy that should breed a common feeling of neighbourhood, and of united interests? and how many of our farmers are there who show a proper regard for their men? how many who manifest any sort of interest in their domestic concerns, and who will step forward with generosity to assist a man honestly and heroically struggling against poverty? how many whose only effort to instruct and improve them is performed in the witness or the jury box? There are bitter complaints of the ignorance and depravity of labourers, and of the illfeeling cherished amongst them against their employers. We do not

palliate the sulky, resentful, spirits in the poor; but unless there is some change in the employers it must ever be thus, for it is the natural consequence of the heartless behaviour of the masters to their dependants. If they would have it otherwise, let them proceed to better elevate their labourers, and show that they have more than a money interest in their wellbeing.

Apart from these considerations, and regarding the subject in a purely commercial point of view, would it not be *good economy* to treat this workman better? A farmer, possessing some influence in the village, may reason thus—"A well-conducted, sober, honest, labourer is worth far more than one that is a sot and a thief. More attention must, therefore, be given to the children of the poor; they must be drawn from the streets and the beershops, and from vicious practices, and cared for morally and spiritually; their homes must be rendered attractive, and industry must be encouraged. An educated labourer is more profitable to us than a dolt. The schoolmaster must then visit us, and our children must not only learn to read and write, but they must be taught both the theory and the practice of the operations they will have to conduct. These will then be intelligent labourers. A thriving labourer is a better workman in all respects than a half-starved, squalid man. It will be well, then, to reconsider the subject of wages—piece-work and the like. The poors'-rates and the county rates will be lessened, and it will not be unpleasant to see some part of the return upon this extra outlay visible in the bright faces and happy hearts of our village population."

To some these may seem ill-timed hints, coming as they do in a season of distress. But we would force the farmer to acknowledge that in neglecting the moral, mental, and physical condition of the workingman, he is acting a most short-sighted part. It is said, "Bad farming will not answer in the best of times, and most assuredly not in the worst;" but it is not borne in mind that this neglect is perhaps just the most rotten source of bad farming.

It is fitting that every thinking man should look upon his fellow-man as made for something better than to be driven whither and thither as a herd of animals—for something better than mere gold seekers—for something better than mere material machines. And with respect to his fellow-men, it is also fitting he should remember that he has right and duty to fulfil, social obligations to discharge, and minds to cultivate and enlarge. The practical remarks we intend to throw out on such topics, relative to the improvement of the labouring classes, in our future numbers, we hope may not fail of some beneficial results.

LAW OF HYPOTHEC.

The Bill introduced by Lord Brougham into the House of Lords for altering the law of hypothec affords another instance of the reckless and inconsiderate manner in which laws, the most conducive to the prosperity of Scotland, are tampered with, and the great interests of the country interfered with, without any adequate cause.

As the law at present stands, the whole community have it in their power to go to the public market, and purchase agricultural produce exposed for sale. The right of a purchaser who has thus bought, received, and paid for grain or other produce, is complete, and cannot be challenged at the instance of a landlord or any other party; but if a party choose to purchase privately, or in a market by sample, he must then take care that he transacts with a responsible person, who can deliver him the grain, &c., free from challenge. The practical advantages derived from the law have led the tenants freely to acquiesce in the restraints imposed on their power of sales, and also to the recognition by the community at large of the propriety of the statutary regulations. Only a few restless individuals have refused to recognise its salutary effects, and urge forward a change which would seriously affect the interest of a large class of the tenantry of Scotland, without any adequate advantage.

Any serious alteration of the law would have the effect of materially encroaching on the resources of the tenantry, because it must be followed by earlier payment of their rents. Nearly a year's rent is at present left to fructify in the tenant's pocket during the whole of his lease, under the security afforded to the landlord by the existing law. Throughout the greater part of Scotland, no rent is payable by the tenant under a lease until he has been fifteen or eighteen months in possession of his farm. If he enters, for instance, at Martinmas, 1850, his first half-year's rent will not be payable till Candlemas, and in many cases till Whitsunday, 1852. The postponement of the rent thus attained has no doubt, in conjunction with leases, been of much avail in aiding the intelligent and industrious tenantry of Scotland to occupy the advanced position they hold among the agriculturists of Britain; and in the benefits of their advancement the whole of society has participated. A more effectual mode of encroaching on their means and discouraging leases could hardly be devised, than the proposed alteration of a law which has hitherto been a main-spring of the liberal arrangements which landlords have been willing to make both as to terms of payment and periods of occupation.

In its effects upon the landlord's rights the bill is equivalent to a breaking-down of settled security for private engagements, unless it provides for an alteration of the terms of payment of rents. Trusting to the security provided by the law, the landlord has entered into a covenant with his tenant to allow him credit for his rent for a certain length of time. Unless the proposed

alteration is to be inoperative as to all existing leases, the result will be an indirect attack upon the existing rights of property. In some parts of Scotland, particularly in the Highlands, the tenure of farms is from year to year; in which case what is called a "forehand" rent is stipulated to be paid. There the tenant enters to the grass of the farm at Whitsunday, and to the arable land at Martinmas—the first half-year's rent becoming payable at the Martinmas term in the year of his entry, and the other half at the following Whitsunday, so that in fact he has paid a full year's rent before he reaps any crop from the arable ground; and if the existing law is infringed upon, the general adoption of the "forehand" rent must be immediately looked for in all new bargains. Without a saving clause as to the landlord's security under existing leases, the bill must be looked upon as the first breach proposed in parliament on the security of property; and let the country be aware lest it should ere long be quoted as a precedent for more direct attacks.—*Fifeshire Journal.*

TO THE EDITOR OF THE MONTROSE STANDARD.

We have been requested to publish the following letter on the Law of Hypothec, which appeared in an Edinburgh contemporary:—

SIR,—I take leave to send you a few remarks on the Law of Hypothec, on points I have not seen noticed at either of the meetings which have been held in Edinburgh.

At the time this law was first made, all rents were paid *in kind*—so much barley, bear, oats, and oatmeal; and if the farmer sold this part of the crop, he sold what was *not his own*, but the landlord's. *Now*, all rents are paid in cash, and farmers, unless they are men of large capital, cannot pay their rents till they sell part of their crop. Rents are made payable at Martinmas and Whitsunday, or Candlemas and Lammas, after the crop is reaped. If a landlord sequestrate within three months, I believe, after the last half-year's rent is due, he may oblige the buyer to pay a second time, so that this may be more than a year after he has made the purchase and payment. This is certainly very unjust towards the buyer; but let us see in what situation the farmers are placed by this law.

1. Landlords, knowing they have such security, are not very particular to whom they let their farms, if rent enough is promised; and men of straw, and without experience, often outbid men both of capital and experience, and thus rents are unduly raised in the country, and the landlords, in a year or two, are obliged to make an abatement, or to take back their farms in bad order.

2. Farmers are not held by the law to be principals, *but mere agents* of the landlords, and *till their rents are due and paid*, they are not in a situation to prosecute a buyer. The buyer has a right, and *I have often known it executed*, to say, show me your receipt for your two half years' rent, and I will pay you, *but not till then*. All the farmer can do, may be to insist on the money being lodged in a bank; but, if it suit the buyer's purpose to hold it, it may cost him some trouble to get this done. It is easy, therefore, for men of straw to go to a market, buy of the farmers, and put them at defiance, and he may walk off altogether, with the money in his pocket, before the farmer is in a situation to prevent him. I have known this done in more instances than one, and the sellers never get a penny. Although the farmer produce his receipt for the first half-year's rent, that is not enough; he must produce the second also, and then it may be after August before he can compel payment. I have known farmers apply to their landlords for a letter to the purchaser, to say he will relieve him of his responsibility, and *I have known payment refused even on this being produced*, as with that the buyer can be compelled to pay.

It is true few cases have appeared in courts of law, as no one that knows the law will defend the claim; and I have known the money paid a second time, in several instances, rather than do so.

A bonâ fide delivery of payment should settle the transaction, without reference to sales by sample; and now that the prices are regulated by the weight per bushel, much grain is sold and delivered without any sample having been shown. In this part of the country, nearly a half is sent in without any sale whatever, and paid for at the market price of the day, according to weight.

Landlords could be protected were they allowed to sequestrate the *growing* crop for the rent of the previous one, as one crop is always worth two rents (but at present they cannot do so), and the name of the party sequestrated should appear in the Gazette, to put the public on their guard, and not, as at present, allow parties who are under sequestration to be buying and selling, and the public to be in total ignorance of it. I am told in grazing districts landlords keep their tenants under sequestration at *all* times, so that parties buying stock from them in a public market may be compelled to pay it a second time.

It is to be hoped the farmers will bestir themselves to get this law amended, and not remain, as at present, mere agents, who cannot compel payment of the corn they grow, if a buyer be disposed to hold the money, and also may, any day, be sequestrated by their landlords, even although *there is no rent due!*

Montrose, April 10, 1850.

There are few, we believe, of our intelligent farmers who, whatever their opinion on the corn law question may have been, entertain the idea that a protective duty on grain will be restored in this country, and still fewer who do not know that such restoration would only have the effect of preventing a new arrangement in the instances in which this is required in justice to the tenant. But while the ordinary commercial relations of those interested in land, whether as proprietors or tenants, have been and are in the course of being accommodated to the new system, a searching investigation will be made into those artificial causes which influence the natural relations of agriculturists with each other, and with the rest of the community.

Among the most important of these, is the law which

gives peculiar powers to the landlord, as a creditor of his tenant. It may be assumed that such a law owes its origin to a legislature in which "the trade of owning land" formed a very powerful party; but it by no means follows that it has been without useful effects, because it cannot be defended on the principles of abstract justice. The law of primogeniture, for example, which involves an arbitrary assumption, has, with some disadvantages, been productive of great benefit in this country. One leading evil of the law of hypothec is its tendency to enable the landlord to dispense with a proper scrutiny of his tenant's character and circumstances, and in many cases to encourage an undue competition for farms, in which the farmer with skill and capital is either beaten from the field, or forced to bid a rent higher than his judgment approves of, by parties whose position is such, that without the stern security of hypothec, their proposals would never have been entertained for a moment by any but the most careless landlord. On the other hand, it may be doubtful whether the competition might not be too much reduced by the abolition of the landlord's right, which would drive him into requiring some other security for his rent than the ample one which the law now allows him. In the summing up of his views on the present state of agriculture recently made by Mr. Caird, in the columns of the *Times*, we expected to find this important subject treated somewhat fully. He only touches upon it, however, in the following fashion:

"It may be very difficult to hit the happy mean; and, if there was no extraneous element to influence the result, that mean would probably be best regulated by supply and demand. But the preference over other creditors given to the landlord by the law of distraint is sometimes used to encourage competition between men of capital and skill, and men who have little of either, and the rent may thus be unfairly raised. Competition in the open market, therefore, is not always, in the present state of the law, the fair measure of the value of land to the tenant of capital."

We may assume, however, that the merits and defects of this law will ere long undergo a searching inquiry. It may be rather too delicate a question for discussion in agricultural meetings in this country, which have been with great judgment kept always clear of any thing savouring of politics; but there are other modes of discussion, and one of these—the columns of a newspaper—are open to the views alike of farmers and proprietors of land. In English farmers'-clubs, where the discussion of practical questions has not prevailed so exclusively as in Scotland, we may anticipate that "the law of distress" will not be overlooked. The London Farmers' Club have already taken it up; we publish in another page a summary of the discussion which took place last month, and it will be found worth the attention of many of our readers. Nor are landlords and tenants alone interested in this matter; every thing touching these two great and important classes must also affect the general community; but, moreover, the numerous body of shopkeepers and tradesmen who live by supplying the wants of the farmers, have a deep commercial interest in a law which too often has been a fatal one to them. It is all very well to say that the village grocer, or the country blacksmith, should not trust too much to his customer, the farmer's stackyard, as it may be swept away any day by the landlord. But looking at the position occupied by supplier and customer, it is impossible for the former to refuse credit unless under very peculiar circumstances. In this respect the law of hypothec, like the law of entail, has frequently enabled parties to run into debt to an extent far beyond their real position; and this evil is one of the most important elements in the consideration of the propriety of its retention on the statute-book.—*Dumfries Courier.*

CONVERTIBLE CORN RENTS *versus* FIXED MONEY RENTS.

Recent political arrangements affecting the value of agricultural produce appear to render it desirable that a change should be made in the usual mode of estimating rent, in order to equalize the burdens which the political arrangements just referred to have thrown upon the owners and occupiers of land. These burdens are particularly felt by such land occupiers as are bound by agreements, entered into prior to these political changes, to pay a fixed money rent, now that they have been deprived of the means of meeting their engagements by a depreciation in prices, consequent on unlimited foreign competition. Some benevolent landlords, indeed, having a tenantry so situated, have endeavoured to alleviate this distress by granting deductions from their actual rental of ten, fifteen, or twenty per cent., according to circumstances. But a deduction so granted bears no real proportion to the actual depreciation in price in the corn market—it is a mere temporary expedient—and does not possess either the character or advantages of a fair commercial contract between man and man. In short, it places the tenant in somewhat the same position as the recipient of eleemosynary aid, without providing a permanent relief from burdens which the tenant has not brought upon himself, and from which, without a fresh arrangement being entered into between landlord and tenant, it is in vain to look for a fair and lasting deliverance, assuming, as is most probable, the permanence of these political arrangements by which the effects referred to have been brought about.

The readiest and most equitable remedy for this state of things appears to be a change in the usual mode of estimating rent—a change that would confer on rent a *fluctuating*, in place of the *fixed* character it has at present in the southern districts of the kingdom; rent being regarded as that portion of the produce of a farm which accrues to the owner, after the expenses of cultivation and the legitimate profit of the occupier have been paid. The amount of this portion of the produce of a farm, being estimated in kind, but paid in money, becomes a corn rent; which rent rises and falls with the price of produce, assumes the character of self-adjustment to circumstances, and apportions fairly between landlord

and tenant the effects of a rise and fall in the price of grain.

Not only is a change in the usual mode of estimating rent desirable for the reasons stated, but the substitution of a fluctuating for a fixed rent appears to be the only arrangement under which a landlord can, with justice to himself and his successors, at present grant a lease for a term of years; for which tenants are becoming clamorous, and which the public are convinced is the only species of tenure under which the resources of the country can be fully developed, by inspiring confidence in possession, and assurance of enterprise reaping its reward. But, however willing a landlord may be to grant leases to his tenantry, to give free scope to their capital and exertion (now so necessary amid the universal competition to which they are exposed), he cannot do so, with justice to himself and heirs, at such a *fixed money rent* as he would receive under present prices, because his doing so would deprive him of all participation in a future rise in the price of corn, should such take place; nor is it possible to found a rent on a *prospective* range of prices in the corn market. But all those difficulties and all those chances of injustice vanish with the adoption of a convertible grain-rent, such as has been long since adopted in the northern portion of the kingdom; for there rent is estimated in the "times'-price" of grain, a proper proportion being allotted as the landlord's share of the produce. The value of this becomes easily reckonable by the average price of corn for the crop and year of each county; and thus, whatever be the price of grain, the rent being so adjusted, the tenant pays, and the owner receives, what is the fair rent-value of his property for the time being.

Such being the benefits which appear to us as likely to result from the general adoption of convertible corn-rents, it is with satisfaction we see, by a circular issued by Mr. Cowan, a land-agent in Devonshire, that the intelligent minds in the country are being drawn to this mode of adjusting the burdens of agriculture. Mr. Cowan, in his circular, fully points out the evils of a fixed money-rent, and the advantage of adopting, as a substitute, a corn-rent payable in money; and as the success and celebrity of north British farmers is said to be due in a great measure to the circumstance of their holding under corn-rents, there can be no doubt that equal advantages would attend the adoption of the system in England, where the burdens accruing from fixed money-rents are so severely felt; and now that leases are so much in request, the system recommends itself particularly to both landlords and tenants, as being the only system which, in those days of doubt and difficulty, can fairly secure the interest of both parties to a lease, whatever be the state of British grain markets at a future period. And although a convertible corn-rent can never free the farmer from those casualties to which his trade is liable, its decided tendency is to minimise the evils arising therefrom, and apportion them equally among all the parties interested in land.

The fixation of the standard, by which the money value of the corn rent shall be reckoned, is of course a matter for special agreement; but in justice to both parties concerned, the fair standard is the average price of grain in the district, for the crop and year for which the rent is payable. But we observe with surprise that this principle is departed from, or rather is not recognised on some estates, where it is proposed to extend the corn average which is to govern the amount of rent over seven years, as is the case under the Tithe Commutation Act—an obvious piece of injustice to one or other of the parties to a lease; for should the average price of grain for seven preceding years be higher than that for which the rent is due, then the tenant *pays* under an average price *higher* than that under which he *sells*; and should circumstances be the opposite of those supposed, then the landlord receives less than is the real rent value of his property for the time being.

Let us suppose a case to further illustrate the working of such a system of corn-rent as that referred to. Suppose a tenant to enter on possession of a farm at Lady-day in the present year, agreeing to pay a corn-rent, regulated in its amount by a seven years' average. In such a case the tenant will dispose of his produce under a free-trade regimen, but pay his landlord his portion of the produce at a price raised by the amount of import duty levied on corn throughout a portion of the last seven years. But reverse the supposition. Let us suppose a tenant to enter on a farm under such an agreement as that supposed, and that in consequence of war ensuing, or by some other combination of circumstances, the price of corn is raised above the average of recent years, then the landlord, by such an agreement, voluntarily deprives himself of all advantage from such a rise, and condemns himself, Tantalus-like, to the mortification of seeing his tenant reaping literally a golden harvest, in which he himself holds no adequate share.

We therefore maintain that the only just standard for guidance in such a case is the average price of that species of grain in which rent is payable for the crop and year for which the rent is due, and that any other system of payment must occasionally press unfairly on one or other of the parties to a lease.

That the most beneficial consequences have attended the substitution of a convertible corn rent for a fixed money rent, is evidenced by Mr. Cowan, in his circular already refered to, wherein he observes—

"The subscriber recently commuted the money-rent of several farms (taken when wheat averaged 60s. per quarter), and relet them—those wholly arable at entire grain rent; others, partly in grass, at rents payable in money and half in grain. The consequence has been, that the tenants, relieved from the perplexities which had previously beset them—liable as they were to the payment of a rent which could not accrue—have since pursued their business vigorously, and paid their new rents contentedly, because they feel that the arrangements in this respect have operated, and must continue to operate, with perfect fairness towards them; and as the market value of land depends upon the market value of the produce of land, the landlord, in this case, is placed in a position to obtain that value at all times, and is relieved from the necessity of letting his land at a low fixed money rent—and should prices *afterwards* rise—from the inconvenience, disappointment, and loss, which is generally the consequence of *then* giving a tenant notice to quit or pay more rent. Lands now let at money rents must be let at "times' prices," and therefore at *low* rents, because you cannot fix a present value of land upon a prospective value of produce. You cannot, in calculating a valuation, reject actual prices and adopt suppositious prices—you must base a fixed rent upon present or past prices, not upon those in prospect. Tenants are now, more than ever, anxious for leases, that they may, with safety, invest their capital in such improvements as the requirements of the times may dictate; but a landlord cannot, with justice to himself or to those who come after him, grant a lease at a low fixed rent—at a rent which present prices would point to as merely the present value. Substitute a corn rent, however, for a fixed rent, and justice is done to all parties."

The enterprise and contentment exhibited by those tenants referred to in the extract from Mr. Cowan's circular above given, upon their rents being placed on an equitable basis, would no doubt be universally exhibited throughout the country were the system of convertible corn rents universally adopted; and, firm in this assurance, we confidently recommend the system to the favourable consideration of the landed interest.

G. K.

REPORT ON REAPING MACHINES.

BY MR. JAMES SLIGHT,

Curator of the Highland and Agricultural Society's Models.

The process of reaping the crop in the season of harvest is the most engrossing event of the agricultural year, and that in which all the other operations of the farm may be said to centre. It is not surprising, therefore, that, from the earliest periods in the history of agriculture, there have been, from time to time, attempts made to facilitate the operation of harvest by the aid of machinery, more or less complex, for cutting down the cereal and leguminous crops. But it is a fact, not less curious than unaccountable, that this operation of reaping, simple though it may appear, continues to be almost entirely performed by the sickle and the scythe. There have certainly been examples, both in Britain and the Continent of Europe, and more recently to a considerable extent in America, of the application of mechanical means to this important purpose; but the attainment of a completely effective reaping-machine is an object yet to be sought for. In the present year an unusual degree of interest has been produced by two American reaping-machines which appeared in the great Exhibition, and which, under the general excitement of the period, as well as by being studiously brought into view, have had the effect of attracting a large share of public attention. From the great importance of the subject, and the wide distribution of advantages likely to arise from a really successful solution of a problem so long sought for, the present seems an appropriate time to take a retrospect of the progress of the reaping-machine during the past half-century, and, by so doing, endeavour to arrive at something like the due degree of merit appertaining to the different inventors and operators, as well as to establish for Scotland the claim of having produced, and for the Highland and Agricultural Society of having encouraged, the original of the machines now introduced from America.

Previous to the commencement of the present century, there had, even from the period of the Roman greatness, been occasional attempts at the accomplishment of a process by which the grain crops might be more expeditiously cut down than by the sickle; but none, it would appear, had ever assumed such a satisfactory form as to induce agriculturists to adopt them. Of the structure of such abortive attempts at a reaping-machine, little information has come down to us, and that little is vague and unsatisfactory. Nor is it of much importance that we are not in possession of direct information respecting them, seeing that nothing effective had ever arisen out of these attempts.

Soon after the commencement of the present century, when agricultural improvements were making progress in every direction, by the extension of the use of improved machinery to the various branches of the art, the important department of the harvest operation naturally occupied a share of the inquiries then going on. Agricultural societies, too, by the offer of premiums, called forth the energies of inventors, both amateur and practical, in this particular line. Very early in the century we learn of Boyce's reaping-machine, for which he secured a patent. This was based on the revolving-cutter principle; but the revolver was armed with a series of short scythes, which cut the corn as the machine moved along. It was destitute, however, of a proper apparatus for gathering and depositing the corn after being cut, and hence it never reached any degree of success.

About the same period, one Plunket, a London implement-maker, made a similar attempt, also on the revolving principle; but in place of the scythe of Boyce, he adopted a circular cutter, toothed like a fine saw or sickle. Being destitute, also, of a proper gathering apparatus, this machine acquired no reputation, and speedily was laid aside.

Nearly about the same time, 1806, Gladstone, a millwright, of Castle Douglas, Kirkcudbrightshire, brought out a reaping-machine that excited much interest, and possessed considerable promise. Its principle was the revolving circular smooth-edged cutter, supported in a carriage-frame, with two main-wheels only. A pair of long horse-shafts projected forward on one side, so that the horse walked alongside the standing corn—thus *drawing* the machine. The circular-cutter was ingeniously overlapped by a sort of shield, armed with pointed prongs, projecting in front of the cutter, which served to collect and to hold the straw until the cutter had done its work. A complicated and pe-

culiar apparatus was applied as a gatherer, to collect and deliver the cut corn in small parcels like handfuls. This machine, as given in the *Farmer's Magazine*, vol. vii., appears to have possessed great ingenuity of contrivance as a whole. Its cutter also appears to have been formed on a sound principle; and it was, besides, provided with an apparatus, by which the cutting edge could be whetted as often as necessary without stopping the action of the machine. Its gathering apparatus, however, carries too conclusive evidence that upon that member of the construction the whole design had failed, and the machine sank into oblivion like its predecessors.

At a still later period, Mr. Salmon, of Woburn, brought out a reaping-machine under promising circumstances. In this there appears the first indications of a cutter on the clipping principle, combined with an apparatus for collecting and delivering, that promised to lay the cut corn in parcels like sheaves ready for binding. Although this invention seems to have been brought out under the most flattering hopes of success, it does not appear to have ever obtained the approbation of the class for whose use it was intended, and has been, like its precursors, almost forgotten.

We may advert to one or two others in their proper order of date; of these, the first is that of Mr. Scott of Ormiston, factor to the Earl of Hopetoun, an amateur mechanician of no small merit. During the war, in the early part of the century, he had directed his mechanical views to the construction of self-acting floating machines, or vessels, for the purpose of disabling or destroying the fleets or ships of the enemy by stratagem. With the peace of 1815 he found that "occupation gone," and very adroitly turned his talent towards more peaceful objects. Amongst these came his reaping-machine, which, like most others, as the writer well remembers, was an object of considerable interest for a time, although it ended in a failure, like those that had gone before. Mr. Scott's machine had a cutter acting on the revolving principle, though not a circular cutter, but a wheel carrying sixteen small-toothed sickles, and had projecting prongs in front of them, like Gladstone's. He had copied Mr. Smith's imperfect gatherer (an inverted conical drum), but added to it twenty-four jointed prongs or fingers, acting in the form of collectors or rakes, which were expected to convey the cut corn from the cutter to the ground. This machine was supplied with other contrivances, such as a brush to keep the cutters free of stubble or weeds, which might otherwise have stopped their proper action; but with all these precautions and auxiliary appendages, it is known that the machine never performed beyond a mere trial.

About 1822, Mr. Ogle, at Renington, near Alnwick, invented a machine, by which he and a Mr. Brown, of Alnwick, engaged to combine every act of reaping, except binding and placing the sheaves in stook. This machine is reported to have performed very satisfactorily in the field upon wheat and upon barley; but in consequence of no encouragement being given to the makers, the manufacture of the machine was dropped after the first complete specimen was made. The inventor, in 1826, published a drawing and description of the machine in the *Mechanics' Magazine*, vol. v., from which the following abstract is taken. The framework or body of the machine closely resembled the skeleton of a common cart, with its wheels and shafts, to the latter of which the horses were yoked to *draw* the machine, walking by the side of the standing corn. To the right of the carriage was projected the cutting apparatus—a light frame, whose front bar was of iron, and armed with a row of teeth three inches long, projecting forward; immediately upon these teeth lay the cutter, a straight-edged steel knife, equal in length to, and a little more than the breadth of, the corn to be cut at one passage. By a motion from the carriage wheels, this knife was made to vibrate rapidly from right and left, as the machine travelled. Above, and a little before the cutter, a fan or vane was, from the same source, made to revolve, which thus collected and held the corn to be cut by the knife; and, on being cut, was by the vane carried backward, and laid upon a deal platform immediately behind the cutter: here, by the assistance of a man with a rake, it was collected to the extent of a sheaf, and then discharged: There is here observable a very curious coincidence in the almost perfect sameness, in every point, between Ogle's machine and one of the American reapers—Mr. M'Cormick's, to be afterwards noticed; the similarity is so perfect that the description of either would suit equally well for the other. But the curiosity of it is lessened from the consideration that similar coincidences are not uncommon amongst mechanists.

A case of this kind actually occurred at the period of Mr. Smith's invention of his reaping-machine, in Mr. A. Kerr, of Edinburgh, having produced a small model proposed as a reaper, in which the *cutter* and *gatherer* were exactly on the same principle as those of Mr. Smith, and were admitted to be so by that gentleman. Kerr's model, still in the museum of the Highland and Agricultural Society, exhibits these two members precisely as admitted; and placed within them is a pair of small wheels, which are all that appears for a first mover. That such wheels could ever have served the purpose of impelling the action of a reaping-machine seems altogether improbable,

though very applicable as an auxiliary to support the cutter at a proper height. To this defect it is easy to ascribe the failure of Kerr's machine, when extended to a working size.

It were easy to extend the number of competitors in this field of invention. At the period here spoken of they were numerous, besides occasional aspirants since; but, with the exception of the three principal, yet to be noticed, none seem to have proceeded beyond the formation of an imperfect model.

Mr. Smith, of Deanston, afterwards so well known as an agriculturist, came on the field with his reaping-machine in the year 1812, with very considerable promise of success; Mr. Smith, having been well trained as a mechanician, and being conversant in all the mechanical inventions and applications of machinery of the period to various manufacturing purposes, and having, of course, observed the numerous and successful applications of rotary motion in preference to any kind of reciprocating action, wherever the former could be applied, was very naturally led to the adoption of the continuous rotary action in the construction of a reaping-machine. This principle he accordingly did adopt, and, although his first trials were not altogether successful, they were such as led to a series of improvements that brought the machine, as we shall see, to a degree of efficiency which promised ultimate success. The Dalkeith Farming Society had previously offered a handsome premium for the invention of an effective reaping-machine, and Mr. Smith became the only competitor in 1812. In the following year the machine, in its improved state, was again exhibited in operation before a committee of the Dalkeith Club, when they, although not considering it entitled to the full premium, voted to Mr. Smith a piece of plate, value fifty guineas; and shortly after, the Highland and Agricultural Society having appointed a committee to examine and report on its efficiency, found that report so satisfactory that a piece of plate of fifty guineas' value was in like manner voted to the inventor, and at the same time a complete model of the machine was lodged by Mr. Smith in the Society's Museum.

In its original form this machine consisted of a horizontal wooded frame of about 7½ feet long and 3 feet wide. Beneath this was attached the main axle and pair of broad wheels, of about 5 feet high, the axle turning with the wheels by means of spring and ratchet, and carrying a spur-wheel, which geared into another fixed upon a shaft placed above the wooden frame, and parallel to the main axle, and thus gave motion to the succeeding movements of the machine. This last shaft carried a pair of reversed bevel-wheels, loose on their shaft, while they continued both in contact with a third wheel fixed on a shaft, placed horizontally above the frame; a sliding clutch on the former shaft brought either of the two bevel-wheels, at the pleasure of the conductor, into action with that upon the horizontal shaft, by which arrangement that shaft was turned to the right or to the left, or by placing the clutch so that neither was in contact with it—the third wheel and its shaft remaining stationary. On the forward end of the horizontal shaft was placed another bevel-wheel acting upon the pinion of an upright spindle; and this spindle, supported on the forward extremity of the horizontal frame, assisted by a three-ribbed iron arch raised above the frame, was, by means of the two bearings, kept sufficiently steady for its duty of carrying the circular cutter at its lower extremity. Here, however, the spindle had a further support from a pair of small wheels and frame, placed under the foot of the spindle, and by a stay of iron proceeding from the hinder part of the frame. The cutter, 5½ feet in diameter, was composed of thin steel segments bolted upon an iron ring, and this last was surmounted by an inverted frustum of a cone, formed of sheet-iron, whose lower diameter was 10 inches less than the cutter, or 4 feet 8 inches, while its diameter at top was 5 feet 4 inches. The front wheels under the cutter were only 14 inches diameter, and about as much apart; their duty was to keep the cutter at the regular distance from the ground to which it might be set for the time being. The gearing above described was so arranged as to bring out a velocity in the edge of the cutter, such that, for every inch of progressive motion of the whole machine, any point in the edge of the cutter passed through a space of 9 inches in its motion of revolution. The machine was moved by two horses yoked to a pole fixed to the wooden frame, and projecting from behind, so that the horses pushed the machine before them by drawing with trace-chains from a yoke-bar attached to the end of the pole behind them. By means of the clutch and bevil-wheels, the cutter could be made to revolve to right or left, and the cut corn laid down right or left accordingly; convenient means were also provided for placing the cutter higher or lower at pleasure, by means of a lever that lifted or lowered the cutter and conical drum, acted upon by a chain and screw, the latter brought to a convenient point at the end of the pole. In working, the grain was cut regularly and well. The drum revolving with the cutter carried the cut corn round until it fell off at the side of the machine in a pretty regular continuous swathe.

The description here given applies to Smith's machine, after it had undergone some improvements up to 1814; from that period, at occasional

intervals, it was brought out with renewed hopes of success, until, in 1835, at the Highland and Agricultural Society's Show at Ayr, it was exhibited in operation with remarkable éclat. Mr. Smith had now engrafted upon it an important addition, borrowed from a machine which has yet to be described, invented by Mr. Mann, of Raby, Cumberland. This was the attachment of a series of rakes placed vertically upon the periphery of the original drum, the teeth of the rakes being about six inches long. This served the purpose of a more certain conveyance of the cut corn to the place of delivery at either side of the machine. Although the application of the rakes was less efficiently done than in the machine from which the idea was taken, their velocity being here the same as that of the cutter, they nevertheless seemed to facilitate the process of gathering, which hitherto had been imperfect. The experiment was made on a field of wheat in a fair condition for being cut by a machine. The operation began, not at an outside, as was usual, but right in the middle of the field, the spectators being placed around the point of commencement, and amongst these the writer had the fortune to be placed. The passage of the machine through the field left behind it an open lane, where nothing was at first observable but a bare stubble, the cut corn being all laid down at one side against the standing. Never, perhaps, did an experiment come off with better effect, or greater success; the general impression was that the problem had at last been solved—that Smith's machine was complete. Not so was it, however, in fact; for, notwithstanding the striking effects produced by that day's trial, the machine remained, and to this day remains, without making further progress.

It is more than probable that the failure of this machine rested mainly on the following defective points—first, from its great length and weight, it was unwieldy in all its movements; secondly, from its great length also, and from the mode of attachment of the horses, together with the want of a swivel-carriage either before or behind, it was defective in turning at a landing; and, thirdly, from the small diameter of the bearing front wheels, and especially from these being placed nearly direct under the centre of the revolving cutter. This last and important member, when these wheels fell into a furrow, ran right into the brow of the adjacent ridge, and thus destroyed for the time the whole edge of the cutter, its projection before the wheels being nearly 2½ feet. And fourthly, it may be stated as an objection—namely, the price, which probably could not have been much under £50.

The next important step in this direction was taken by Mr. Joseph Mann, of Raby, Cumberland, who brought out a reaping-machine in 1820, in the state of a working model, before the Abbey Holme Agricultural Society, who expressed their approbation of the design, and advised a horse-power machine to be constructed with some proposed alterations, one of which was that the horses should *push* instead of *draw* the machine, the model having been upon the latter principle. These alterations seem to have turned out rather unsuccessful, for in 1822 a full-size machine was exhibited to the same society; but the mechanist having endeavoured to satisfy too many opinions, his machine became so complicated that its success was doubtful, and it fell aside till 1826, when Mr. Mann returned to his favourite method of *drawing* instead of pushing; and from this period to 1830 he was, from time to time, engaged in completing his improved design, which, from his own statement, at last possessed the four principal points of a good reaping-machine. First, it preserved the parallelism of the line of draught, though that draught was applied to one of its angles in front; secondly, a polygonal cutter; thirdly, the gathering process from the cutter, performed by a revolving series of rakes; and, fourthly, the process of stripping the rakes in such a manner as to lay down the cut corn in a regular swathe by the side of the machine as it progressed.

Mr. Mann's machine, possessing the above described points, was exhibited at the Highland and Agricultural Society's Show, held at Kelso, in 1832. On this occasion the writer had ample opportunity of studying its construction, and also witnessed its trial on a small portion of a field of oats, performed under very unfavourable circumstances. The portion of the field acted upon had been later than the other parts; hence it was left uncut, and was still unripened, and withal thought so worthless that cattle had been allowed to traverse it. But, notwithstanding all this, the machine performed the operation of cutting much better than could have been expected under the circumstances, while the laying of the cut corn in the swathe was performed very regularly. In working up-hill, and especially in crossing the ridges, its operation was less satisfactory; and on the whole, although the trial called forth much approbation, the judges could not take upon them to recommend a premium. Nevertheless it must be admitted that, making allowance for Mr. Mann being only an amateur mechanic, and having constructed the machine almost entirely by his own hands, it could not be expected to be other than a rude specimen of mechanism, and, therefore, not capable of doing all that the principles involved ought to have brought out: it deserves, however, to be looked upon as possessing the germs, at least, of the *four points* which its author held to be the ultimatum sought

for in a reaping-machine. It is the opinion of the writer also, in looking back, that the principles of that machine, in the hands of an able mechanician possessed of capital (for of that commodity, like many others of his kind, the inventor was deficient), might have placed it foremost in the competition for the solution of the problem.

As it may be interesting to those who may yet turn their attention to the construction of the reaping-machine, the following description is given from the writer's original paper, published with drawings in the Journal of Agriculture, which for more minute details may be consulted by the machinist* In Mann's machine the cutting process is performed on the revolving principle; but instead of a circular cutter like Smith's, one of a polygonal form had been preferred, having twelve equal sides. By this form of cutter the action upon the standing corn is somewhat different from that of the perfectly circular cutter: with the latter the cutting edge is constantly and equally acting upon the standing corn, but with the polygonal the effect is a rapid succession of strokes, arising from the inclination of the cutting edges in the sides of the polygon to each other; for, as will readily be understood, from the angles of the polygon being farther from the centre of revolution than any point in the straight side thereof, any opposing body, as a stalk of corn, will be forcibly acted upon when the angle is passing the stalk; and, if passing without completing the separation, the progressive motion of the whole machine will not only keep the edge in contact through the first half of the polygonal edge, but as the next angle approaches the stalk, it will receive the more impressive stroke from the remaining half side to complete the severance—and so of all the rest.

The cutter is formed in twelve separate segments of thin steel plate, fixed upon the extremities of a corresponding number of horizontal arms attached to a vertical revolving shaft. The joinings are formed by the ends of the segments lapping over each other, and situate posteriorly to the angles of the polygon in relation to its motion of revolution. The segments of the cutter were attached to the revolving arms be means of a slender slide-bar of iron, riveted on to each end of the segment; and these sliders, two together, being those of the contiguous ends of two segments, were passed through a clasp in the ends of the arms, and there secured by a pinching screw. This mode of attaching the cutter rendered the removal for sharpening extremely convenient, as a whole spare set of the segments could be carried with the machine, the change of the one set for the other being capable of accomplishment in a few minute. The cutter, when completed with all its segments, was 4½ feet diameter; and taking the rate of progressive motion at 2½ miles per hour, the cutters made 175 revolutions per minute, which corresponds very nearly with the rate in Mr. Smith's machine.

The framework of Mann's reaper was of rather irregular construction: in plan its form was that of a trapezium, the sides parallel, the back at right angles to them, and the front side had the acute angle at the left or nigh side, and to that the draught was applied by means of a pair of horse-shafts. This framework was supported on three principal wheels: of these two had a diameter of three feet, one being on each side towards the rear, but that on the off-side about a foot in advance of the other, and from the axle of it alone the movements of the working parts was derived. The third wheel had a diameter of two feet, and was attached to an upright or rather a sloping swivel-shaft, placed in connection with the acute angle of the framework, and to which the horse-shafts were firmly attached—making thus to the machine a swivel or fore-carriage, by which it could be directed or turned round in a small space. A fourth and much smaller wheel or roller worked in the fore-end of the perch that extended from the lower part of the framework, and on which rested ths foot of the cutter shaft directly over this fourth wheel; but of its utility there are doubts.

One of the peculiarities of this reaper was the application of the revolving rakes to gather the corn as it fell from the cutter. This was accomplished by the construction of a skeleton cylinder, placed over and revolving concentrically with the cutter upon the upright shaft of the latter, but independently of it, and with a different velocity. The cylinder was mounted with 25 rakes attached to it in a vertical position, each rake having 10 teeth of about six inches long. The revolutions of the rake-cylinder were made in the same direction as the cutter, but at a rate only as one to seven of the latter—namely, about 28 per minute. To complete the gathering part of the process, a second and fixed rake or comb was attached in a vertical position to the near side of the framework. The wooden teeth or prongs of this comb were of considerable length, and were projected horizontally between the lines of teeth in the revolving rakes. In the latter also a ring of light wire was carried round each row of the teeth horizontally, having at attachment to every tooth about two inches from its root; and as the point of the prongs of the comb lay within or nearer to the centre of revolution than those rings of wire, not a single straw could escape the comb, but were all regularly stript from off the rakes as they came round. The cut

* "Journal of Agriculture," vol. i., p. 250.

and gathered corn was thus regularly laid down in a continuous swathe, the stalks of grain lying parallel to each other, and nearly at right angles to the line of progress of the machine.

The gearing of this machine was extremely simply. On the axle of the off-side carriage-wheel, already alluded to, was fixed a bevel-wheel of 56 teeth, which acted on a horizontal wheel of 28 teeth; and upon the vertical shaft of this last were mounted two pitch or chain wheels, the one of 8 teeth, the other 28; these, by means of two pitch chains, acted upon two other wheels of 21 and 9 teeth respectively, placed upon the rake-cylinder and upon the cutter-shaft, bringing out the velocities before named for the two members. Besides these active motions, there was provision by means of levers, by which the height of the stubble could be regulated almost instantaneously, and the revolving parts thrown out of gear, and also for raising or depressing either side of the machine, to suit the rounding of ridges and deep furrows. The power required to draw this reaper was one horse, and with this it cut down a breadth of three feet; so, taking its rate of travel at 2½ miles per hour, its performance, by calculation, is limited to 9 acres in 10 hours, or thereby; but in actual work it might not exceed 7 acres in that time.

Of all the reapers hitherto taken notice of in this paper, it is believed that not one of them was ever worked throughout a harvest. Even Smith's and Mann's machines, which were the most perfect, do not appear to have been worked beyond a few hours consecutively; their actual capabilities, therefore, seem never to have been properly tested.

The year 1826 may be held as an era in the history of this machine, by the invention, and the perfecting as well, of a really effective mechanical reaper. This invention is due to the Rev. Patrick Bell, now minister of the parish of Carmylie, in Forfarshire. The principle on which its cutting operation acts is that of a series of clipping shears. When the machine had been completed, Mr. Bell brought it before the Highland and Agricultural Society, who appointed a committee of its members to inspect its operation in the field, and to report. The trials and the report being favourable, the Society awarded the sum of £50 to Mr. Bell for his invention, and a correct working model of the machine was subsequently placed in the Society's museum. The invention shortly worked its way to a considerable extent in Forfarshire; and in the harvest of 1834 the writer, in a short tour through that county, saw several of these machines in operation, which did their work in a very satisfactory manner. Dundee appears to have been the principal seat of their manufacture, and from thence they were sent to various parts of the country. It is known also that *four* of the machines were sent to the United States of America, and this circumstance renders it highly probable that they became the models from which the numerous so-called inventions of the American reapers have since sprung. At the great fair or exhibition held at New York in 1851, not fewer than six reapers were exhibited, all by different hands, and each claiming to be a special invention; yet, in all of them, the principal feature—the *cutting* apparatus—bears the strongest evidence of having been copied from Bell's machine. There are slight variations, as might naturally be expected, in the cutters, but the original type is evident throughout. It is remarkable, too, that in Hussey's reaper, which, by the American reports of the fair, appears to have been the first of the kind brought out in the Union, there is the closest possible resemblance to Bell's, the original; but, as we shall have occasion hereafter to notice, it is but an imperfect though cheap imitation.

Notwithstanding the perfection of Bell's reaper, it has rather unaccountably been allowed by our agriculturists to fall into disuse, and only in a few cases have its operations been kept up to the present time. One of the most interesting of these is that of Mr. J. Bell, of Inch-Michael, in the Carse of Gowrie, a brother of the inventor. Mr. Bell has a strong natural bias towards *mechanics*, and during fourteen years, in which he has regularly worked his reaper, he has taken a particular pleasure in seeing it put in proper working order at the commencement of the harvest; so prepared, it is then managed with perfect success by any ploughman of ordinary intelligence. By these simple precautions, Mr. Bell has been enabled in the most satisfactory manner to reap on an average four-fifths of all his grain crops every year; the remaining fifth, more or less, according to the season, being too much laid for the machine, has been reaped by the scythe—no sickle having been used on his farm during all this period. The expense of machine-reaping has, in this case, been found not to exceed 3s. 6d. per imperial acre. Under these favourable views of the efficiency and economy of Bell's reaper, a question naturally arises—What has been the cause of such a machine falling so much into disuse? One obvious reason is, that all the best reaping-machines herein referred to may very appropriately be said to have appeared before their *time*—that is to say, before the subject on which they were to act had been prepared for their reception. In the first quarter of the present century, furrow-draining, levelling high ridges, and filling up the old deep intervening furrows, were only beginning to assume their due prominence in the practice of agriculture; and so long as these im-

provements remained in abeyance, the surface of the land was very ill-suited for such operations as that of a reaping-machine. Hence serious obstacles were presented to its application; but as these are fast being removed, there is a prospect of a more successful application of machinery, of whatever kind, being now brought to bear upon the field operations of the farm.

Whatever be the causes that may have operated against the extension of Bell's machine, we have seen that, in the hands of a good manager, one of them has served well during a period of fourteen years, and it seems capable of serving at least fourteen more, thus holding out a strong recommendation to the re-adoption of it, or some other equally good or better, if such may be found. To enable our readers to form a just conception of the construction and principles of Bell's machine, and to compare it with those now being introduced after the American copy, the annexed plate is given, showing a full view, in perspective, of Bell's reaper in its most approved form.* The machine consists —first, of an open carriage framework of carpentry about four feet wide, the same in length, and about three feet high. This is supported on two principal wheels about four feet in diameter, and two minor wheels eighteen inches in diameter, supporting the forepart of the carriage, to the front bar of which the cutting apparatus is attached. The axle of the main wheels passes quite through the carriage-frame, and supports it by turning in bearings, fixed to the middle horizontal bars, on either side. On this axle is fixed a bevel wheel, twenty inches in diameter, turning with the main wheels and axle, and gearing into the bevel pinion fixed upon the sloping shaft, which, at its lower end, carries a short crank. This last, by means of the connecting rod, gives the vibrating motion to the cutter-tail bar, to which bar the tails of the moveable blades of the series of shears are loosely jointed.

The bevel-wheel gives motion also to the small sloping shaft through a pinion; and at the upper end of this shaft, by means of the small mitre-wheels, motion is given to a small horizontal shaft, on the end of which a combination of three bevel-wheels and clutch gives motion to the first web-roller, making the web revolve to right or left, as desired. The web, when in action, is stretched over the two rollers. The light iron bars serve to carry the revolving fly or vane to collect and carry the cut corn to the web. The vane derives its motion from a pulley fixed on the extreme end of the small shaft, another being fixed on the extremity of the axle of the vane; and a small band passing round these pulleys, completes the motion. The vane is readily adjustable to suit any height of grain, and also to distance horizontally, to suit the delivery of the cut grain upon the web. This machine is worked by two horses, pushing it before them by means of the pole to which they are yoked by the common draught-bars. In its original form, a castor or swivel-wheel was attached under the machine, and brought to bear up the hind-part of it from the ground, by a rack and pinion worked by a handle. The intention of this was to obviate a supposed difficulty in turning the machine. Experience, however, has shown that the supposition was groundless. The swivel-wheel has been laid aside; and as one of the main wheels necessarily required the convenience of being disengaged from the gearing that drives the cutter, &c., the same disengagement serves to make the machine turn with all requisite facility.

The cutter consists of a fixed bar of iron, six feet in length, so that it projects over and clears a passage for all the bearing wheels and other projecting points in the machine. The bar is strongly attached to the fore-part of the framework by two iron brackets, and to the bar are firmly bolted the thirteen fixed blades of the shears. The twelve moveable blades are likewise attached to the same bar, each upon a joint-bolt. Each of these last blades is prolonged backward in a tail-piece, till they rest in the vibrating bar, where the extremity of each tail rests between two pegs, which serve as a secure but simple and loose joint for it. Such are the different motions of the machine, and, when in operation, the effects are as follows:—The main or driving wheels being nearly four feet in diameter, one turn of these carries the machine in its progressive motion over twelve feet of surface. The bevelled-wheel and pinion and being in the proportion of six to one, the crank and cutter-tail bar will make six vibrations in the time that the machine moves over twelve feet; but as the moveable blades of the shears cut both ways, they will each make twelve cuts in the same time, each cut extending to twelve inches forward; and as the cutting-blades are fourteen inches long, the uncut corn can never reach the *root* or joint-end of the shears, to produce choking. The revolving vanes in front serve to catch hold of and retain the corn against the onward pressure of the cutter, but their chief duty is to assist in laying the cut corn upon the endless web. The duties of the web are very simple, being merely to convey the cut corn to right or left, and to deliver it upon the ground, which it does with a regularity perfectly sufficient for the purpose of being gathered into sheaves.

In the process of working this machine, Mr. Bell's practice is to employ *one* man driving and

* Engravings of Bell's machine appeared in the January number of the Farmer's Magazine.—Ed. F. Mag.

conducting the machine; eight women are required to collect the cut corn into sheaves, and to make bands for these sheaves; four men to close and bind the sheaves, and two men to set them up in stooks—being in all fourteen pair of hands, besides the driver of the horses, whose time reckons along with them; and the work performed averages twelve imperial acres per day. These data have been obtained from fourteen years' experience of the machine, and have therefore a strong claim upon the consideration of the farmer. The expense in money for reaping by such a machine will of course vary a little with the rate of wages; but, on an average, it may be taken at three shillings and sixpence an acre, including the expense of food to the workers. This, in round numbers, may be taken at a saving of one-half the usual expense of reaping by hand, at the lowest calculation; and the saving on a farm where there might be 100 acres of cereal and leguminous crop would do more than cover the price of a machine of the best quality in two years.

The importation of two reaping-machines from America has already been adverted to, as also their resemblance in principle to that of Bell's, leading, when coupled with other circumstances, to the conclusion, that not only those two imported, but all the reaping-machines now used in the union, are based upon the same principle which is the leading feature—the cutter—in Bell's. In the American machine, the framework is so constructed and arranged that the horses *draw* the machine, walking by the side of the standing corn, as in Mann's and others already referred to; but that change in the application of the power, as well as the construction of the whole framework, are mere matters of detail, without at all touching the principles recognized by the Highland and Agricultural Society in the award given in favour of Mr. Bell's machine. It must be observed, too, that the oldest of the American reapers—Hussey's—contains nothing beyond the cutters, and that is essentially Bell's, with this very unimportant difference, that the cutting-blades, instead of acting from centre-bolts, are fixed dead upon a vibrating bar, corresponding to the bar so named in the description of Bell's, and of course move along with that bar, producing that every-day form of shears—the parallel motion shears. The maker has stopt short at that point where all inventors in this field of mechanics have found their greatest difficulty—the collecting and delivering the corn after being cut; for in all attempts at machine-reaping, the cutting process seems to have presented little, if any, difficulty; but it was not until Bell's and Mann's machines came upon the field that anything appeared deserving the name of a collecting and delivering apparatus. Mr. Hussey, it would appear, had met the same difficulty; but, taking a short method of obviating it, he gives forth his machine with the cutter only, leaving all the after-details to be performed by manipulation. By thus leaving the machine in a half-completed state, he is obliged in most cases, it is understood, to employ, besides the driver, two men *upon* the machine, to collect and deliver. In consequence of these half-measures of construction, the framework and gearing of this and all the other American reapers are very simple, and, as a matter of course, very similar to the original, excepting such changes as are required to let the horse walk in front by the side of the standing corn.

M'Cormick's machine, which, on its first appearance in England, had the cutters nearly identical with the one above described, has latterly been fitted with one long straight-edged and finely-serrated cutter, giving apparently a new character to the machine, though in fact it is no more than engrafting a new idea upon the original—Bell's. Mr. M'Cormick has also gone a step beyond his neighbour, Mr. Hussey, by taking from our original also the revolving vanes in front for collecting and holding the corn to the cutter. By these means the machine is made more effective, and operates with the assistance of *one* man upon the machine besides the driver. In all other respects it is not sensibly different from the other. Of the other reapers incidentally alluded to as of American construction, and judging from the published figures of each, they stand—two with the revolving vanes, like M'Cormick's, and two without, like Hussey's. Of the actual performance of the two Transatlantic visitors little can yet be said, neither of them having yet performed a day's work in this country—and by that alone can their proper value be determined. The first is given out as capable of cutting 15 acres a-day, with two horses walking at the rate of $2\frac{3}{4}$ miles an hour. The second is warranted to the same extent, with the same power walking at the same rate. But these results, so far as this country is concerned, can only be of necessity the result of calculation, seeing they have not done a day's work; and as we have seen that Mr. Bell's well-tested machine should, by calculation, cut 18 acres a-day, with two horses walking $2\frac{1}{2}$ miles an hour, whereas in practice it can only accomplish 12 acres, it is not unreasonable to suppose a like shortcoming between calculation and practice, bringing the results, in the case of the Americans, down to 10 acres, or even less, as few farm-horses will be found to continue to walk even at $2\frac{1}{2}$ miles an hour. The price of Hussey's machine is quoted by the makers at £21; that of M'Cormick at £30. It is difficult to see how such

a difference of value can exist in two machines differing so little from each other in their general structure and performance.

A sketch has here been given of the progress, through half a century, of the attempts to establish an effective reaping-machine by British machinists; and it has been shown that the latest and most successful of them, though sanctioned and rewarded by the Highland and Agricultural Society, yet has, from some undefined cause, been suffered to be almost neglected by both agriculturists and machinists; fortunately, however, a successful practice of fourteen years has amply established its true and valuable character. In this interim our American brethren have been, in the usual western phrase, going ahead; and, amongst many subjects, with that also of the reaping-machine. Two of them, sent to the Exhibition, stirred up the whole agricultural body of Britain—aided greatly, no doubt, by the universal excitement under which the entire community then laboured. But however meritorious these reapers may have been, they still are but copies, and imperfect ones, of that machine which had previously acquired the highest degree of merit in this country. This claim is made, not with any view to disparage the exertions of the Americans, or to undervalue their mechanical productions—the importance of which, in all departments of the arts, is already known over the civilized world, but simply with the view of establishing a fact, and attributing priority of invention to the true author—a circumstance too often overlooked, especially in matters mechanical, where the original has not been covered by a patent.

Time alone can decide the question of ultimate success in this country. We have, on the one hand, the original form of our own countryman's invention satisfactorily surviving the test of fourteen years' practical operation, and, on the other, the general success which has attended the introduction of its imitation into the United States; but we cannot doubt that the operation of another harvest will go far to solve the point.—Journal of Agriculture.

WINCHESTER FARMERS' CLUB.

ON THE BREEDING, REARING, AND FATTENING OF STOCK.

The monthly meeting of the Club was held Saturday, Nov 29th, at the Black Swan Inn, Winchester.

Mr. W. Pain, the secretary, after some preliminary business had been disposed of, gave notice that the subject for discussion at the next meeting would be on the Cultivation of Turnips, by Mr. Smither, of Robert Winnal.

On the motion of Mr. W. Pain, seconded by Mr. T. Pern, Mr. E. Read and Mr. C. Lunn, proposed at the last meeting, were declared to be duly elected members of the club.

The CHAIRMAN (Mr. Robert Pile) observed that the subject for discussion on that evening was one of importance and very interesting to agriculturists He would, therefore, call upon Mr. William Pain to be kind enough to give them the benefit of his experience respecting the breeding, rearing, and fattening of stock.

Mr. W. PAIN said, Mr. Chairman and Gentlemen,—The subject of which I have given notice for this evening's discussion is the breeding, rearring, and fattening of stock; and, although as a farmer I have for years paid some attention to the breeding of stock, I am fearful I shall not be enabled to do justice to the subject this evening, but will, as far as my abilities allow, do my best to lay before you my ideas, in the hopes that by so doing I shall excite discussion, and that beneficial results may arise therefrom.

I class under the denomination of stock—sheep, horses, beasts, and pigs; and as the management of each is dissimilar to the other, I propose to consider them separately.

I think the sheep is the most profitable animal kept on a farm, as without them it would be impossible on a hill farm to make manure sufficient for the corn crops, and as they drop the manure in the place where it is required, it saves the expense of carting, which is a very serious item in the farming account. In considering the management of sheep, I shall commence with the tupping season. I consider it very essential that at this time the ewes should be kept as well as possible, for the better their condition, the more likely they are to produce twins; there is no better food for ewes at this period than rape. I think the best time to put the tup with the ewes, in this part of the county, is the latter end of August, as you then get the lambs strong to go on turnips in the spring. After the ewes are with lamb, it is highly necessary that they should be

kept as quiet as possible, and in regular condition; for if they are frightened, or are kept well at one time and badly at another, they are apt to slip their lambs. I have been in the habit of keeping my ewes, from the month of November till the time they lamb, entirely on hay and water, having had a great number of ewes slip their lambs when I have fed them on turnips and hay; but I think, from an experiment which I tried last year upon 100 ewes, and keeping them almost exclusively on turnips, that if the ewes had their fill of turnips that were ripe, and in a fit state to eat, they would do quite as well on turnips and a little hay, as they do on hay and water. The great evil, in my opinion, in giving ewes turnips previous to lambing is, that we do not give them sufficient (and oftentimes the turnips are not ripe), and the consequence is, that as soon as they are let into the fold, they eat as fast as they possibly can, and over-fill themselves with wind, which is the cause of their slipping their lambs; but if they had plenty to fall back upon, they would not eat so fast, and there would not be any danger of their being hoven; and I think in the end they would not consume more food, and certainly they would do better. One other great cause of ewes slipping is from lying on wet cold land. Previous to lambing time, I select a piece of ley ground, or wheat stubble, for my lambing field, and cover it with muckle, that the ewes may be enabled to lie down comfortably without being in the dirt; as I consider when they are heavy in lamb they lie down so much that they are apt to be chilled. I give them a fresh fold every day, and by so doing I prevent their being tainted, and get my land regularly manured. I very much disapprove of keeping the ewes in what is called a dead fold during the lambing time—it often proves to be a dead fold: I have known more ewes die from this plan than any other, as, after they have lambed, they are turned out of the fold, and are apt to take cold, which is often followed by inflammation, and terminates in death. I have a large number of hurdles thatched with straw, to put round the fold for shelter; and the shepherds have a covered cart to sleep in, in the field; and as I have two men with the sheep, they are never left night or day, as the men go to bed by turns. I have pens made in the fold, to put the ewes in as soon as they have lambed, and, as soon as the lambs are strong enough, they are removed to a large fold, well sheltered from the wind, and littered with wheat straw, where they remain till they are strong enough to go upon turnips, which if the weather is dry, will be in about a week or ten days. The ewes and lambs continue on turnips till April, and are supplied with a good allowance of hay; but if they have their fill of turnips, and the weather is dry, they will eat but little. I do not pen my sheep up close when feeding turnips, but let them have a large piece of ground to fall back upon, as by so doing I give them an opportunity to keep themselves out of the dirt, and they do not tread and waste the turnips as they would if penned close together. In the month of April they go into the water meadows in the day, and are penned on rye, or sometimes on swedes, at night. I generally keep some swedes for my dry sheep till the beginning of May. After the meadows are finished, which is generally from the 1st to the 12th of May, the ewes and lambs are fed on seed in the day, and penned on winter barley or tares at night, until the lambs are weaned; I have also given the lambs mangold wurzel with great success. I generally wean my lambs the beginning of June, previous to shearing the ewes, as they (the ewes) are apt to take cold in the udder if the lambs are weaned afterward. After the lambs are weaned, I keep them principally on tares, somtimes a little sainfoin or clover in addition; I last year kept my lambs entirely on tares, and never had them do better. I think driving them from one sort of food to another does them as much mischief as the food does them good; it is almost impossible to fat sheep without they are kept quiet. I sell my lambs and old ewes in the month of July.

I have described to you the plan I pursue in breeding and rearing of sheep. I will now make a few remarks on the fattening, which I think might be adopted in this neighbourhood with success. If a farmer were to keep less ewes, and, instead of selling his lambs, were to keep them till the following autumn, and bring them out fat, he would find that at the end of the year his sheep account would prove that fattening paid him, and of course his farm must be very much improved by the corn and cake eaten by the sheep. I have entered into some calculations on the subject, and they fully bear out the opinions I had formed. If you keep a flock of 600 ewes in stock order, you would want 235 lambs to keep up your stock, making together 835, as I calculate a loss of five ewes and two tegs to the 100 is about the average of this county, and I think if you breed 90 lambs to 100 ewes, it is quite as many as is generally bred in this neighbourhood; but if, instead of 600 ewes you were to keep 500, and keep all their lambs, and fat them as tegs, and also your sale ewes, you would then have 950 sheep in all to keep, which I think you may easily do, as you can keep two tegs on the same food required by one ewe, and I imagine nearly three, after the ewe has a lamb by her side.

Under this calculation,

600 ewes would breed	540	lambs
Required for stock	235	„
Leaving for sale	305	„

200 ewes for sale, at 28s. per head ..	£230	0	0
200 lambs ,, at 24s. ,, ..	240	0	0
105 ditto ,, at 20s. ,, ..	105	0	0
570 ewes' wool, at 4lb. each, at 25s. per tod	101	15	6
203 tegs' ditto, 5lb. ,, at 28s. ,,	57	10	0
Making a total from 600 ewes of	£784	5	6
500 ewes would breed ..... 450 lambs			
Required for stock ..... 195 ,,			
Leaving to fat ..... 255 ,,			
166 ewes for sale, at 35s. per head ..	£290	10	0
200 tegs ,, at 40s. ,, ..	400	0	0
50 ditto ,, at 32s. ,, ..	80	0	0
475 ewes' wool, at 4lb. each, at 25s per tod	84	16	0
441 tegs' ditto, at 5lb. ,, at 28s. ,,	110	5	0
Making a total from 500 ewes of	965	11	0
Deduct total from 600 ditto..... ...	784	5	6
Leaving a balance in favour of fatting of	£181	5	6

I know it will be said, that to fat this large number of sheep it will require a great outlay for oil cake, which certainly would be the case, as there would be 416 sheep to keep, on an average of five months each on cake, and they would consume at 1lb. pe head per day nearly 28 tons of cake, which, at £7 10s. per ton, would cost £210; then calculating that the land receives half the benefit of the cake eaten by the sheep, amounting to £105, it will leave still a balance in favour of fatting of £76 5s 6d. These calculations are made supposing the sheep to be fatted in the summer, but it is often the practice to fat the tegs in the winter, and sell them as soon as shorn; but if that were done, you must keep more ewes, or you would have a short stock of sheep in summer. There is another thing which must be thrown in the scale on the side of fatting, and certainly, in my mind, is of some moment, and that is the small quantity of hay that would be eaten by the tegs in the winter, as compared with that required by the ewes, consequently there would be a saving in haymaking; and a part of the seeds which are now cut for hay could be eaten in the summer by the sheep, instead of being obliged to go to the expense of sowing tares for feed, to the great injury of the succeeding turnip crop. In fattening sheep I have found oilcake the safest food I could use, and I certainly think it will make more weight of mutton in a given time than any other food, and must, therefore, necessarily be the cheapest. I consider 1lb. per day a full allowance for a sheep. In fattening lambs for the early part of the season I have adopted a plan which I find answers remarkably well: I put the ewes into a yard as fast as they lamb, and keep it well littered with wheat straw, which I find prevents the ewes having the lameness which is generally the case with sheep that are kept long on muckle. (I should say that I am not allowed by my lease to sell straw). I have found the ewes get lame when I have used barley or oat straw. I divide the yard with gates to allow the lambs to run into a shed, where their food is kept in the dry, and out of the reach of the ewes. I keep both ewes and lambs upon cut swedes and mangold wurzel, with clover and sainfoin chaff, and in addition 1lb. of oil cake, and rather more than a pint of oats per day per couple. I find by this plan I can get my lambs fit for the butcher at about 10 or 12 weeks old, and weighing 9lb. to 10lb. per quarter; in fact I had one last year that weighed 11lb. per quarter, at nine weeks old. The ewes are fit for the butcher as soon as the lambs have been taken from them a fortnight or three weeks. It is almost incredible how fast they put on flesh; I had one ewe weighed 15 stone with a lamb by her side. I think warmth and quiet have a great deal to do with fatting. By fatting sheep in the yards you convert your straw into manure of the very best quality. I have found cutting swedes with Gardner's machine a very excellent plan; and where tegs are fed on swedes that are cut, they will do quite as well as if they had corn and the swedes not cut; I have heard of ewes being fattened entirely on cut swedes.

The breeding of horses is little practised in this county, but where there is a fair proportion of pasture land on a farm it will pay. I breed 5 or 6 colts every year and I find they answer my purpose, having a large quantity of pasture, and in the winter I find them useful in making manure in the yards; I allow each colt one bushel of oats per week, and straw: the suckers have hay as well as corn. Cart colts, generally speaking, will pay best for breeding, as they are always saleable at 2½ years old, at from £25 to £30, whereas nags must be kept till they are 4 or 5 years old, and there is more risk with them, as they must be broken, except in the case of carriage horses for the London market; but there is no doubt that if you breed a good sort of nag, with plenty of size about him, if he has good action he will fetch a long price. I calculate my colts cost me £6 10s. a year each, and if I sell them at 2½ years old on an average of £27, they will pay me about £3 10s. a year, after reckoning the keep of colt, loss of mare's time, and charge for use of horse. I generally sell my nag colts at four years old, at about £50 each, and after reckoning expenses of colt's keep, breaking, and use of horse, and keep of mare for twelve months, I find they will pay about £4 a year; but with the exception of two fillies which were very small, and both had accidents, my nag colts average me for these last 9 years £59 each. I work my cart mares till within a week of their foaling, and put them to work

again when the colts are three weeks old. I never allow the colts to run with the mares when working, but shut them up in the stable, giving them grass and corn to eat, and send the mares home for one hour in the middle of the day to allow the colts to suck; by this plan I keep both mares and colts in good condition, and I have the benefit of the mare's work. The principal thing to look to in breeding nag horses is to have them a large size, because if they should be blemished, they can be put to work on the farm. In the breeding of beasts I have not had much experience; but some few years since I bred a few shorthorns, and found them answer the purpose, but was compelled to discontinue, as I had not room for them, as I keep 12 working oxen, and from 20 to 30 colts. The plan I adopted in the first place, was to buy calves in London, and wean them on milk and boiled linseed, till they were fit to provide for themselves on grass. In the winter I kept them on cut swedes and hay; and when nearly three weeks old, I put them to fat on swedes, hay, oilcake, and barley-meal; two of which I bred myself from cows which I purchased in London as calves, weighed 50 and 52 scores, at 3 years old. As far as I am a judge, there is no breed will come to maturity so soon as short horns. In the fattening of beasts the success greatly depends on the manner you purchase them, and their after-management. They require to be fed often, at regular hours, and very little food should be given at a time; for if they have more food given them than they can eat, they will blow upon it, and will refuse the next meal. Beasts require to be used very quietly when in the stall, and not to be disturbed between meal times, as no animal will fatten well without it can have plenty of rest. I have occasionally had beast hoven when fatting, and the best thing I ever could find to remove the wind was mint water, given in doses of one pint. I think it highly necessary that where store beasts are kept, they should be provided with open sheds, as they cannot bear exposure to wet and cold. I would advise the keeping of beasts on all farms where there are meadows and pastures, as when horses and beast are fed together, they both will do better than when fed alone, and the pastures will do much better, as each animal will eat that portion of grass refused by the other, and the sour spots of grass so often seen in pastures where only one description of stock is fed will be eaten, and the pasture much improved, as the herbage is always best where the grass is fed close. The success in breeding pigs greatly depends on cleanliness in the sties, for if the dung is allowed to accumulate, the young pigs will be certain to scour; wheat straw is the best thing for pigs to lay on. I consider January and July the best months for sows to farrow; you then get the second farrow to run the stubbles after harvest. I have a steaming apparatus for steaming potatoes and swedes, which I mix with grains and pollard, and a little meal made from the tailing wheat and barley. The potatoes or swedes, as soon as they are steamed and mashed up, are mixed in a brick cistern, and given to the pigs in a warm state. I keep from twenty to thirty breeding sows, and have been in the habit of selling the pigs from the sows, at eight weeks old, without weaning them, at about 10s. each; but the price of pigs is now so low that they are worth scarcely anything—in fact, you cannot dispose of them at that age; I therefore wean them, and sell them as soon as I can find a customer. My pigs are principally of the Sussex breed, but not quite so fine bred—I find them very prolific. The better young pigs are kept, the better they will pay; and, if well attended to, will make a large quantity of excellent manure. As regards the fattening of pigs for bacon, they should not be put to fat till twelve months old, or they will grow instead of fatten, and will not pay—barleymeal is the best thing to fatten them on.

I have now given you an outline of my system of managing stock, not with an idea that it attains to anything like perfection, but purely from a wish to learn from others who may favour us with a description of their plans and experience, as it is by rubbing our ideas together we must expect to benefit each other. I have often made the remark, that I was never in company half an hour but I gained some information; and I never had a servant live with me, but I could learn something from. There is one thing I wish to impress upon you, and that is, the necessity of keeping as much stock as possible (more especially at the present time, when the price of corn is so low), and of the best quality; for it will not take more food to keep a good animal than a bad one, and the better stock of all descriptions are kept, in reason, the better they will pay, and the more manure they will make. I will now, Mr. Chairman and Gentlemen, in conformity with the usage of our club, read to you a resolution, and then leave the subject in your hands, hoping that my remarks may be the means of exciting a full and fair discussion of the subject.

[The resolution, which was read, having undergone a slight verbal amendment, will be found at the close of the discussion.]

Mr. CUNDELL said he considered that the subject which had been introduced by Mr. Pain had been so ably handled as to leave very little room for comment; he would, however, ask him what quantity of swedes the sheep would eat per 100, in a day, and also the lambs, and whether part of the swedes were drawn from the land and folded off with the stock as usual afterwards.

Mr. W. PAIN replied that those which he had in the yard were 100 ewes, 100 lambs, and about 25 barreners; they consumed about 81 bushels of cut swedes per day, on an average—swedes and mangold wurtzel together. The whole of the field was regularly penned off.

Mr. GARRETT considered that from a wether teg he ought to have more than 5lbs. of wool. He found that if he fed his tegs on beans he had considerably more wool than if they were fed on hay and turnips. He could not get a sufficient supply of turnips all the winter to fall back upon. He had been the means of bringing a supply to Winchester cattle market, and he thought if more beasts were fattened in the neighbourhood, a greater number of butchers would frequent the market, which at present was nothing, except on the annual show day; for, if they looked at the 26 weeks in the year, it would be found that not more than 40 sheep were penned for sale on each market day. He had kept an account of what he had sold his sheep for, and found that they paid him better than keeping a breeding flock, although he must admit the lambs had been selling well this year.

Mr. R. SMITHER remarked that there was one item which Mr. Pain had omitted to notice, on which some considerable expense must be incurred, and that was pulling up and cutting the swedes, and drawing them into the yard.

Mr. T. PERN asked what would be the cost per acre for preparing swedes for cutting.

Mr. PAIN replied that he paid 4s. 6d. per acre, and in answer to a question from Mr. Reeves, said he gave his ewes rape when put to the tup.

Mr. JAMES REEVES said he thought the weight of wool which Mr. Pain had allowed for stock ewes was rather too high; and he therefore did not think that, in these times, it should go forth to the public that fleeces of that weight were generally obtained. Since he had been on his farm, during the last seven years he had kept his ewes in a dead fold, and had found it a good plan to litter them up with wheat straw.

Mr. T. PERN was of the same opinion with Mr. Reeves with regard to the weight of ewe wool, which was 3lb. a fleece or a little over; and, generally speaking, if they average nine to the tod, it was quite as much as they would do.

Mr. T. EARLE advocated the use of sainfoin and vetches for sheep feed, which he thought preferable to vetches alone.

Mr. BRIDGER said, if they all became graziers, he wished to know in what position they would be in the hands of the butchers.

Mr. R. SMITHER with due deference to Mr. Bridger, said there was no fear of farmers erring too much on that point.

Mr. T. PARFITT considered there was no necessity for so many lambs being bred.

Mr. T. PERN said that this was a county not calculated for fattening, but for breeding stock. Several of the members, no doubt, had had some experience in fattening oxen for the benefit of their manure, and this having been taken up of late by others, had caused a depression in the price of ox beef.

Mr. R. SMITHER suggested that sheep might be fattened quite as well without tasting either swedes or turnips, and said his brother had some which never had anything but hay in the winter and a pint of peas a day. The question was, therefore, whether old ewes could not be fattened by giving them a warm bed, good hay, and some artificial food. As turnips were very expensive, he considered it would be worth their while to try whether this plan would answer; for his own part he was satisfied it would, as he had made the experiment, having now some sheep which had never tasted any green food, and had been in the yard since February.

Mr. CUNDELL said they all knew that stock could be fattened on artificial food; but the question was, could it be done so at a profit? if not, it was of no use. Some might reckon the manure as a profit; but, in his opinion, that was not enough. He had tried the experiment with oxen, and it had turned out to be a failure. By feeding them on roots, in conjunction with other food, he could get a pretty fair profit.

Mr. EDWARD FITT said, he had been in the habit of keeping his lambs all the year, and never sold them till he had sheared them once. He corned them, and they were worth 1s. a head more in consequence. This year he had shorn 600 dry sheep, and had no doubt that he had cut 100 tods of wool. He had sold sheep at 40s. per head, for which he had given 32s. After the inclosure had been completed, he turned his attention to keeping of lambs, but found it would not do at all. In August he sold 100 ewes, and 90 more he kept till Winchester fair; still he had all the lambs which he had bred last year, and meant to corn them all the winter. He had found when he sold his lambs that he was obliged to sow a great deal of ground with vetches, and could not get turnips after them. He said he had some vetches sown now, and did not care if any one had half of them. He had obtained more than 40s. a head for 300 sheep at Winchester fair.

The CHAIRMAN expressed the gratification which he felt in seeing that the subject introduced by Mr. Pain had led to such an interesting discussion, which must be beneficial to them all. He did not understand the resolution to recommend

that they should fatten entirely, but to keep as much stock on their farms as they deem beneficial. With regard to the observation, that they should sell nothing from their farms but what was fat, he would say that farmers must be guided by circumstances. With respect to the best mode of feeding calves, he would read an extract from a little work by Mr. Milburn, who, in a chapter on the rearing of calves, said—

"The best mode, in ordinary calves, is to give new milk for at least fourteen days after the calving. There are two modes of doing this; either allowing them to suck the dam, or removing them as soon as calved, and training them up to drink in the first instance. For ourselves, we think the taking away of the calf both cruel and unnatural. The healthiness of the mother, we consider, depends upon it. After calving, it is only necessary to see the anxiety and care for her offspring, which makes her forget all her pain, and diverts her attention from her sufferings; whereas, if you subject her to the gloomy excitement of losing it, it is no wonder that milk fever and inflammation so often supervene. We invariably allow the presence of the calf for at least a fortnight. We allow the mother to lick over the whole of her offspring; and we think that a privation of this medicine of nature is the cause of many a valuable animal being lost. After the first fourteen days, we mix one half new and one half skimmed milk for fourteen days more; this skimmed milk is scalded nearly to the boiling point, set aside to cool, and given to the animal. One great secret in the successful rearing of calves is to give them frequently small quantities of food at a time. For the first fortnight it ought to be fed, at the very least, four times per day; and about a quart at a time will be necessary, to be increased afterwards as the animal's wants may require it. Soon after this theskim-milk time commences, when the animal, if properly trained, will begin to eat the solid food.

"Teaching them to eat is a less difficult matter than that of training them to drink. Nature presents to them first a sucking and then a drinking process; and, in general, in training them to drink it is necessary to use the finger, and introduce this into the mouth, plunging the whole into the milk; the calf sucks the finger, and thus imbibes the milk. By and bye the finger is withdrawn, and the calf drinks alone and unassisted. The eating process is somewhat differently taught. A piece of fine hay is tied together with a string, and suspended in the calf-crib: the calf begins to suck this bunch of hay, and part of it coming out from the string, the calf is gradually taught to eat.

"Some parties tie up the calves by the neck in stalls and other places; others keep them loose in houses. We prefer the latter course. The exercise the animals take is beneficial to their health; and, on the whole, we much prefer this partial freedom.

"We believe that food for calves may be prepared of a much more nutritious nature, and much more likely to be of advantage to the producers."

He concurred in the observation of Mr. Pain, that cleanliness and warmth in rearing are essential. Although Mr. Reeves had been successful in his plan of folding, it did not follow that it could be generally adopted, because that would depend on the situation, for they could not keep breeding calves in a damp yard, and expect to have good luck with them. What would do on one farm, would not do on another. In his opinion, the most successful plan was to let the lambs have plenty of muckle, and a fresh fold every day; for he quite agreed with Mr. Ellman, who approved of moving the fold daily; and this was the safest plan, and to see that the ewes were well muckled up. He quite agreed with Mr. Reeves and Mr. Pern respecting the weight of the fleece, which he thought had been overstated; but thought Mr. Pain might have safely put on a pound or two on fatting tegs, and taken off one pound on the ewes. He was much gratified with the able manner in which Mr. Pain had brought the subject forward, and with the useful information which it had elicited.

Mr. James Reeves said his farm was in rather an exposed situation; but the ewes he lambed down were placed in an upper yard, in a dry situation, and he did so for the purpose of converting the wheat straw into manure. He had kept them littered up well every day, which he considered was the best plan.

Mr. William Pain said it now became necessary for him to reply to the observations which had been made by different parties that evening; and he certainly was in hopes that he should have had many more questions to answer than had arisen out of the discussion; for it was with the idea of eliciting information that he had been induced to bring the subject forward. In answer to the observation on the subject of wool, he would say that it was not his desire to make an over-statement; his idea was that from a fat teg more wool could be cut than from a lean one; but as he had remarked, this was not a plan pursued in that immediate neighbourhood, and has he thought it would meet with many opponents, his object was not to make out too glaring a statement in favour of fatting. With regard to turnips, Mr. Garrett had stated that he could not get his land to bear such Daniel Lambert turnips as had been last week exhibited at the Winchester Root Show; but one great reason why he did not get such turnips from his farm was because he sowed so many after tares, and he should, instead of keeping so many ewes on them, fat them on the seed which he grew; then he would get better turnips than he did now, and save a wonderful expense in hay making. He quite agreed with Mr. Garrett, and should adopt his system if he took another farm or continued to occupy the one which he now held; but, consider-

ing that his term would expire in two years, he did not think it worth his while to go to the expense without compensation or without there was a clause in his lease securing to him remuneration for an additional outlay of capital. With respect to the question put by Mr. Pern as to the cost per acre for pulling and cleaning swedes, he had stated it to be 4s. 6d. an acre. With regard to what had been said respecting the weight and quality of wool, he had made a statement from his own clip, which he admitted was rather more than an average in general. His stock tegs cut 5½lbs., and his ewes 4lbs. each. He had once 300 tegs which cut 6lbs. each, and he thought a good sized ewe ought to cut 4lbs. of wool. He had at present one ewe which had been shorn ten times. His statement might be rather more than an average of the county, yet he conceived he could not go on better data than his own experience; but, as he had before remarked, his object was to excite a discussion by which they might all be more or less benefitted. Although he had stated that his ewes cut more than 4lbs. he admitted that it might be something over the average of the county; therefore, it would not go forth to the public, as had been supposed, that this was the weight throughout the county. He was pleased that the remark had been made, because it gave rise to this discussion with respect to the quantity of wool produced. He had stated too much for stock sheep and not enough for the fatted sheep. His reason for so doing was to make it appear as good as possible for the breeding stock, and not to overrate it for the fatting stock; perhaps he might have overrated it in one instance, and underrated it in the other. This carried out his idea that the fatting system would pay better than he had calculated on. An observation had fallen from Mr. Earle, that he thought it was not good policy to keep lambs entirely on vetches, and he quite agreed with him, for though a change of food might not be absolutely required, it might be of advantage. As breeders of lambs in this county, he considered they were second to none; still he thought that the system might be improved on. He recollected that some years ago his father used to say "Keep them on their legs, boy;" and he was never content but when they were feeding. Now this, he was satisfied, was a bad system, and he gave them what they liked. He had known sheep and lambs which were fed highly on green food besides oil cake, to be taken to fairs, and fetch no more than those which had been kept short of food and had rest, because by driving them in the field they did more harm than good. With regard to what had fallen from Mr. Smither with respect to prices, he would observe that he had stated that he had sold 200 lambs at 24s., and 105 at 20s. each; and here again he must remark, that he had confined his statement to what he had done himself. This year he had sold all his stock lambs—200 on the 10th of July, and the others in the month of August. Alluding to Mr Bridger's observation, that if they all adopted the fatting system they would get meat lower and stock high, he in some measure agreed; still he would say that they could back their own opinions; for where a person had convenience, he could fat; and if otherwise, he could breed. It certainly would be better for the breeder if more were to fat. There was a great deal of truth in the remarks made by Mr. Pern as to this being a breeding county; but in these times it behoved them to look to themselves, and if they found that the fatting system would pay best, it would be their interest to adopt it. In respect to fatting beasts he had tried it very much lately, and found that they paid him 50s. a head; but this was in an extraordinary year when prices were high, otherwise they were not profitable. In Mr. Garrett's opinion he perfectly concurred, that any land would fat sheep with cake; but this of course must cause more expense. He thought if a man occupied a poor farm, his best plan would be to nourish the land by fatting sheep. Mr. Smither had made some remarks about having sheep in the yards; he admitted that warmth did a great deal for fatting sheep, and they would thrive better with less food if kept in yards. Perhaps it would be as well if he read a paper to shew the number of sheep to be kept on the system which he advocated. Under the fatting system there would be 115 more sheep to keep in the winter than under the breeding system, and in the summer 25 more; but if the fat tegs were sold in spring there would be 230 more to keep in summer under the breeding than under the fatting system. Since he had turned his attention to the subject he had had a conversation with several large breeders in the county, and their opinion was that during the summer months it was almost impossible to keep a large number of sheep on a given quantity of land. He found that he could keep the whole of the tegs during the summer, and sell them in the autumn. In answer to the Chairman's remarks on the resolution which he had proposed he would say that his object was to impress on their minds the necessity of keeping as much stock as they possibly could do. He had merely thrown out the observation for the purpose of hearing their opinions on the subject; but he thought if they were near a good market the fatting system would pay; on the contrary the breeding system would answer. With regard to Mr. Pile's observations on keeping ewes in a dead fold, he certainly disapproved of it; for if the muckle got wet and tainted, the sheep would get disease among them without the chance of stop-

ping it, and he had known from 60 to 70 to die in a season. No reason had been assigned for it, but in his opinion it rose from infection. He had known the spot where the ewes had lambed to produce infection among others who laid down on it. He had known instances of lambs having mortification of the navel, and others being affected from lying in the same place.

Mr. E. Fitt recommended a mixture of three pennyworth of wound stone in a pint of water as a sure remedy for this particular disease.

Mr. Pain, in conclusion, said that having endeavoured, to the best of his ability, to reply to the observations made by different parties, he would now move the following resolution:

"Resolved, by the Winchester Farmers' Club, that it is expedient on all farms to keep as much stock as can be kept with advantage, and of a mixed description. And after a careful selection of the best breeds, four things are necessary to ensure the most profitable return—viz. cleanliness, quiet, warmth, and a proper supply of food, given at regular intervals."

Mr. Cundell seconded the resolution, which was put by the Chairman, and agreed to.

On the motion of Mr. James Reeves, a vote of thanks was passed to Mr. W. Pain for the very able manner in which he had brought the subject forward.

Mr. W. Pain thanked the members for the compliment, and for the very patient hearing they had given to the observations which he had thrown out that evening, and for the remarks which had been made by several members, which had given him an opportunity of replying to them, and perhaps of explaining his ideas more explicitly than he had done in the address which he first delivered. He wished that there were more speakers in attendance at the club than they had at present, as much good might arise from the expression and interchange of opinion on subjects which from time to time came under discussion. He hoped, as the club progressed, it would advance in utility not only to themselves, but to the country at large.

Mr. T. Pern felt great pleasure in proposing a vote of thanks to the Chairman for his attendance on that day.

Mr. Cundell seconded the motion, observing that, although the Chairman had to travel several miles, he was constant in his attendance at the club.—Carried unanimously.

The Chairman said, he felt much obliged by the compliment which the members had been pleased to pay him, and assured them that it would always give him great pleasure if he could render the least, assistance to his brother farmers.

The business of the evening was then concluded.

WENLOCK FARMERS' CLUB.

The annual meeting of the members of this club took place on Monday, November 3rd, at Wenlock, when the proce dings commenced as usual with the ploughing matches. There were twenty-three competitors (nineteen men and four boys) for the ploughing matches, for which there were offered six prizes. The field selected for the contest was one on the Bridgnorth road, in the occupation of Mr. Crowther, of Wenlock, and was very well adapted for the purpose. The conditions were that each ploughman should break up half an acre of land within four hours, not less than four inches deep, without a driver. The whole of the work was done in a most satisfactory manner; and an interesting sight it was to see so many honest sons of the soil sent to compete well-earned rewards of worth by their employers. The competitors for the hedgers' prizes, eleven in number, were at work in a field adjoining, there being two prizes offered for the labourer or servant who should ditch and plash one rood of hedging in the best manner within four hours. The work here was done in a very neat and workmanlike style. About one o'clock, the work having been completed, the judges, Charles Emery, Esq., and Mr. Edward Davies, of Harley, went over the work to make the awards, which occupied some time.

THE DINNER

took place at the Raven Inn, at three o'clock, where an excellent repast was provided by the host, Mr. Hartland. John Pritchard, Esq., presided, and he was supported on his right and left by Colonel the Hon. G. C. W. Forester, M. P. for Wenlock, Sir G. Harnage, Bart., George Pritchard, Esq., and T. Mytton, Esq., Shipton. The vice chair was occupied by Edward Hinton, Esq. The attendance was not so numerous as in former years.

The Rev. S. Minton said grace before and after meat; and after the cloths had been drawn, the usual loyal toasts having been given and responded to,

The Chairman said the next toast he had to

propose was "Success to the Wenlock Farmers' Club." When they last met he entertained some hope that this year he should have had it in his power to address them on the improved prospects of agriculture, but he was sorry to say he was unable to do so. He was not one of those who were inclined to despair, because he thought—although they were then in difficulties—before very long, by the adjustment of rents and other payments which affected the farmer, and by a judicious management of their land, they should be enabled to get their living, though he never looked forward to a very great profit. He thought the capital employed in agriculture would afford a less profit than if it were embarked in manufactures and so forth; and he was led to this conclusion by the fact that agriculture was an occupation more healthy and pleasurable than any other, and because many persons were willing to rent land at such at price as to render a high degree of profit impossible. He was glad to perceive that their numbers had been increased during the past year, and this prosperity could only be attributed to the conviction which must exist in the neighbourhood of the utility of the club, and he trusted that the discussions which had taken place at their meetings had caused it to spread, and had excited a great degree of emulation. He hoped that its usefulness would still continue, and that by its efforts, and by the efforts of institutions of a kindred nature, their land would be prevented from going out of cultivation, and that they might live to see better times.

Sir GEORGE HARNAGE, Bart., proposed that the toast be received with three hearty cheers, which was most cordially responded to.

Mr. EVAN DAVIES said the duty now devolved upon him to read the report of the proceedings of the past year; and, in doing so, he would not occupy more than a very few minutes. He then read the following

REPORT.

Your committee have but few general remarks to make on this occasion. The same uncertainty still continues as to the future prospect of agriculture, and, notwithstanding the efforts of the Wenlock Farmers' Club to stimulate to greater exertions, and to introduce all approved improvements in the cultivation of the soil, your committee view with serious apprehension the abandonment of farms within the club district. Instead of having, as formerly, to congratulate you on the successful progress of agricultural improvements within our district, we have now to report, in too many instances, the neglected root crops, and, instead of well-prepared fallows, ample crops of thistles, scutch, and other noxious weeds; and whatever political economists may say to the contrary, your committee cannot help feeling that the plague spot is upon us, and, unless some timely and efficient aid is afforded, the once flourishing agriculture of England will become a bye-word and a sneer. Your committee have to report a donation of £10 from W. W. Hull, Esq., as a life member of the club, being the first and only one in that class of contributors. Your committee express not an opinion, but they conceive if a permanent fund could be established, the interest of which may be applied to secure a lecture occasionally on the sciences connected with agriculture, it may tend to give a zest to our proceedings, and rally the drooping spirits of our members. With these few remarks, we proceed to review the discussions of the past year.

The first meeting was held in December; subject for discussion, on "the properties and application of artificial manures." There was a large attendance, and the question was well gone into, and considerably enlightened by the report of the proceedings of a farm attached to a large manufactory in the neighbourhood; but as the manure employed was chiefly obtained from the refuse of the manufactory, the advantages were not available to the general body of farmers. The successful application of gypsum to the clover crop, and also as an absorbent of ammonia, was strongly pressed upon the consideration of the members present; but as the gentleman who strongly advocated the application also employed Crosskill's clod-crusher to his clover, it is questionable as to which the flourishing state of his crop is indebted, for as gypsum is nearly insoluble, its use as a manure or deodoriser is very problematical. A very animated discussion took place, the members freely relating their several experiments with the artificial manures; but it was the general opinion of the members present that the Peruvian guano stood first of all purchased manures, and the best mode of applying it was to sow it broadcast, with or without being mixed with other substances, then ridge up.

The next meeting was held in March; subject for discussion, on "the cultivation of the natural grasses as a substitute for clover and rye grass, and as to the best mixture for permanent pastures." There was a full attendance of members; but as the cultivation of the natural grasses has made but little progress within the circuit of our club, the subject rested a good deal with the member bringing it forward. He produced several tables of mixtures which had been tried with more or less success on his farm. Several of the members engaged to try the mixtures on their respective farms, and report the results to the next club, by which means it is recommended for general adoption, and thereby obviate the great loss sustained by the failure of the clover crop. The meeting declined to pass any resolution on the subject.

The next and last meeting was held in April; subject for discussion, on "the breeding, rearing, and management of sheep." As the introduction of the subject was undertaken by one of the members justly celebrated for his southdown flock, the meeting was looked forward to with considerable interest. There was a good gathering of the members, and considerable information was elicited; and it was resolved that in selecting male animals, the very best of his kind, if possible, should be obtained; that all objectionable ewes should be

drafted: ewes when half gone with lamb should have a little corn and other dry food; lambs to be dipped in a wash composed of two pounds of arsenic, five pounds of soft soap, fifty gallons of water, for 100 lambs; lambs when weaned to be put into aftermath clover, then cabbage or common turnips, then swedes. The southdown or Shropshire down are the best for this neighbourhood.

Your committee met on the first Monday in October to audit the accounts and award the several prizes, a list of which will be laid before you. We find a balance only of 3s. 5½d. in the hands of the treasurer to meet the payment of the prizes, &c.

Your committee cannot close this report without referring to the loss the club has sustained during the last twelve months by the death of two of its steadiest patrons, Sir Francis Lawley and the Rev. Benjamin Howells. To the countenance afforded by the former the club is indebted for a considerable accession of members, and also by his munificence your committee were enabled to enhance considerably the value of some of the prizes; and they who have regularly attended our monthly discussions can best appreciate the zeal with which the Rev. B. Howells entered into the subject under consideration, and the eloquent manner in which he invariably expressed himself at our annual gathering must be fresh in the memory of all of us, and make us deeply regret the loss of so valuable a member. Your committee trust they have not exceeded their province by giving vent to the feelings which they conceive will find a corresponding vibration amongst most of the members present. Your committee have to report the kindness of Lord Wenlock in offering to continue the augmentation of the plough prizes as was heretofore done by the late Sir Francis Lawley. Your committee conclude this brief report of your proceedings with every good wish for your successful career.

Mr. Mytton moved, and Mr. George Pritchard seconded, that the Report now read be adopted, which was carried with acclamation.

Mr. Mytton said he had been entrusted with the next toast, which was the health of a nobleman who had long been connected with the borough of Wenlock. He would give them, "the health of Lord Forester, Patron of the Wenlock Farmers' Club," which was toasted in true Salopian style.

Colonel Forester briefly returned thanks on behalf of his brother.

Mr. Evan Davies proposed "the health of Lord Wenlock," and intimated that his lordship had kindly offered to double the plough prizes given by the late Sir Francis Lawley. The toast was duly honoured.

Mr. George Pritchard said he had great pleasure in proposing the next toast, "the health of Earl Granville," which was received with loud demonstration of applause.

The Rev. S. Minton, in giving "the health of Sir George Harnage, Bart.," observed that he had taken a very great interest in trying to get a corn market for Wenlock, which all the farmers were unanimous in saying was very much wanted; and for the agricultural interest, which he (Mr. Minton) was sorry to see so much depressed, he had manifested the deepest concern.

The toast was received with three times three.

Sir George Harnage, Bart., briefly returned thanks.

Mr. R. C. Blakeway said the toast which had been placed in his hands was "the health of their worthy and estimable president, John Pritchard, Esq." There were many things, illustrative of his admirable and amiable character, which he might state, but in his presence it would not be fitting to do so. It might perhaps be in their recollection what he stated last year, that he considered good farming was profitable, but that high farming would not do in this country. A tenant of Mr. Pritchard's, before he adopted high farming, had obtained 21 bushels per acre, and since he had adopted it had only 23 bushels per acre, thus only giving an increase of two bushels for an increase in the expenditure at the rate of £5 per acre. He thought this result must be a most convincing argument that high farming would not do, and that good might.

At the request of Mr. Evan Davies, the toast was drunk with three times three.

The Chairman said he was very much obliged to Mr. Blakeway for the kind manner in which he had introduced the toast, and to the company for the cordial reception they had given to it. This mark of their approval would give him some encouragement to continue in the position which he then held—a position which, in times of deep distress, could not be a very enviable one; but so long as he had their countenance and support, he would endeavour to discharge its duties faithfully. For some months past he had been an absentee from this county, and had not been able to make himself thoroughly acquainted with the state of the neighbourhood; but the time had been sufficient to ascertain that the year ending March 25th, 1851, had been a most disastrous one. He did not find that high farming answered, and that after laying out his money he got a less profit than before; for in the harvest of 1850, instead of his having 22 or 23 bushels per acre, the average produce was under 20. Some persons said only farm your land well, and all things will go right; he said that in farming well they did not get that return that would compensate them for the increased outlay. He had already alluded to his having been absent, and during that absence he had had the opportunity of looking to the agriculture of a neighbouring country, to which he had given more than ordinary at-

tention, in consequence of a letter which appeared in the *Times* in the early part of the present year, in which was stated that in some part of Normandy, in France, land was cultivated in such a superior manner that unless the farmers of this country looked sharper after their own interest they would be unable to compete with them. He had not been in Normandy, but he had travelled from Calais, in the north, to near Marseilles, in the south, and also through the middle of France, and he thought the country was in a very bad state of cultivation. The land was not well cleaned, and the implements of husbandry which the natives used were of the same kind that had been employed for ages and ages. And in going very little farther south, he had seen wheat trodden out by oxen, just in the same way that he believed it was done in the days of the Apostles, which would very clearly show that they had nothing to fear from competition as regarded the talent and ability which was directed to the cultivation of land. They had apprehension on one score; he was afraid that France was getting poorer and poorer, and that the inhabitants were becoming unable to consume their own produce, and that a much greater quantity of their produce would ultimately find its way into this country. He wished every one of those present had had the same opportunity of seeing farming and the condition of farmers in France, and he was sure that they would have returned home thankful that their lot had been cast in a country where the good feeling between landlord and tenant, and master and servant, was cultivated to the extent that it is in our own beloved country.

The Chairman then read the list of prizes to farm labourers.

After the candidates had received their prizes and partaken of a glass of good ale, they were admonished by the Chairman as to their future conduct. He said he was very glad to see them, and he hoped that they would do all they could to improve on their present proficiency, and take care that those who were placed under them conducted themselves properly.

The candidates then left the room.

The CHAIRMAN said, he was quite sure that they all felt very much indebted to the judges for their services, and he believed they had discharged their duty with great judgment and impartiality. He had great pleasure in giving "the healths of Charles Emery, Esq., of Burcott, and Mr. Edward Davies, of Harley," which was toasted in a bumper.

Mr. EDWARD DAVIES briefly returned thanks on behalf of himself and Mr. Emery.

The VICE-CHAIRMAN gave "the Members for the County," which was drunk with a hearty hip, hip, hurrah.

Sir GEORGE HARNAGE, Bart., proposed "Good health, long life, and prosperity, to the Members for the Borough of Wenlock."

The toast was drunk with three times three and one cheer more.

Colonel FORESTER returned thanks, and gave "The health and happiness of the Mayor and the Corporation of Wenlock," which contained one of the oldest corporations and the best bench of magistrates in that neighbourhood.

Mr. W. P. BROOKES returned thanks on behalf of the magistrates.

Mr. MYTTON and Mr. GEORGE PRITCHARD returned thanks on behalf of the corporation.

Mr. EDWARD DAVIES proposed "The health of Thomas Mytton, Esq., of Shipton," which was cordially responded to.

Mr. MYTTON briefly returned thanks.

Mr. EVAN DAVIES proposed the Hon. Beilby Lawley as a member of the club, and he was admitted.

Mr. JEFFREYS proposed Mr. Peake, of Arlescott, as a member of the club, and he was admitted.

Mr. NOCK gave "the health of George Pritchard, Esq.," whom he characterised as a good landlord and an upright and kind magistrate.

The toast was responded to with three cheers.

Mr. GEORGE PRITCHARD returned thanks.

Mr. W. P. BROOKES said, as far as his experience went, in conducting that and similar institutions, a great deal depended upon their financial management; and, therefore, when they saw an institution like the Wenlock Farmers' Club in so flourishing a condition as it was, they must attribute it to the judicious management of the committee; and he thought they could not have elected any body of gentlemen better fitted to discharge the onerous duties which devolved upon them than those who had been honoured with their suffrages. And with regard to Mr. Evan Davies, its president, he could not help thinking that he was the founder of the club; and every one, from the nobleman down to the farmer and the labourer, reposed the greatest confidence in him, and he (Mr. Brookes) was sure that so long as he gave the club that attention which he had hitherto devoted to it, it would prosper. He would give "the Health of Mr. Evan Davies, of Patten, and the Committee of the Wenlock Farmers' Club." He was always glad to meet the members of that club; for whatever might be their difference in politics, they all had the prosperity of agriculture at heart.

The toast was drunk with three times three and one cheer more.

Mr. EVAN DAVIES said, on behalf of the Com-

mittee of the Wenlock Farmers' Club, he begged to return them his sincere thanks for the very kind manner in which they had been pleased to receive the toast which had just been introduced to them in a flattering and highly complimentary address by Mr. Brookes. It was an extreme gratification to them to find that the manner in which they had endeavoured to conduct the business of the Wenlock Farmers' Club had met with their approval. Happy should they have been had it been in their power of congratulate the meeting on the slightest prospect of returning prosperity, but they saw no appearance of the good times which they had been told were coming; they saw nothing but the dark clouds of ruin thickening in the horizon, which must soon arrive at the zenith, and overwhelm in one fell swoop of destruction the whole of the agricultural interest. It was in vain for the committee to put questions, or to recommend the discussions of questions, tending fortunately to greater exertions, or to increased outlay in the improvement of the soil; for it was then pretty generally acknowledged that any approach to high farming was, with present prices, only a nearer approach to ruin. He believed, if not all, most assuredly a very considerable portion of the land and money owners who were around him, would bear him out when he said that the least loss was to let land lie in one wild waste, or merely to obtain from it what it would produce with the least possible outlay. Two or three years ago he should have been called a madman to make such an assertion as that. The panacea for all their evils was high farming; but he would be a bold man who would make the assertion then. Then again he might be told, "Oh! but you have your rents to pay whether you get half a crop or a good one." True; but how long would rents be paid? Then the modern, and perhaps the right definition of the word *rent* was that sum of money which a tenant agreed to give the landlord for the use of his land, or, as Mr. Disraeli called it, his raw material. But if the raw material would not return a profit for the manufacturer, how long did they think it would continue to be employed? Let him tell them, nothing but the want of a fair and equitable adjustment had prevented the great body of the farmers of England ceasing to be manufacturers of raw material. If the direful policy of 1846 had been as it ought to have been, accompanied by a law giving to the tenant-farmers of England a power to claim and obtain a full and fair compensation for all unexhausted improvements on their respective farms, he pledged his word that in another year the landlords of England would have had a far greater scope for the exercise of their ingenuity as cultivators of the soil than they hitherto had had; and he thought the little experience they had already had, had been sufficient to prove to them that any increase of acres to cultivate would not be the means of increasing the amount of their rent roll; and let him, as an honest man, tell them that they did not, nor could sympathise with them in the difficulties they were placed in, or about to be placed in. No, they believed, and therefore were bound to speak, that they showed the white feather in 1846; and they felt and were bound to say, that they had not come forward as they ought to have done since the passing of that practical measure. They had been again and again appealed to, to come forward to assist in obtaining a reversal of that measure. Had they ever responded to those appeals? Let the low ebb of the exchequer of the National Association testify—let the subscription list of all the protection societies bear witness. Well, if they refused to assist in obtaining a reversal of the present unjust policy—if they consider the present measure could not be reversed, then they were in duty, in justice, nay, he would say in honour bound to come forward manfully and offer their shoulders to bear a fair proportion of the evils attendant upon this fatal measure. But pardon him, in all humility, had they done so?—had their abatement of rent been in any proportion to the reduction in the farm produce?—nay, had they, who had been able to retain their tenants, felt all the evil effects of the present imperial policy?—had not the reduction in price of their consumed articles more than compensated them for the paltry reduction they had made in their rent roll? It grieved him much to address them in those terms; respect for his superiors had heretofore been his untiring principle. He felt that they had been deserted by their national leaders. This respect was fast oozing out at his finger ends. When he placed his wife and family with the ruin that appeared to await them in one scale, and his regard for his superiors in the other, respect quickly kicked the beam. He knew there were a few noble exceptions? he knew that there were those among the great of the land who had sympathised with the suffering tenantry of England, and through evil report and good report had nobly stood forward in condemnation of the present law, and with purse and heart had entered fully into the conflict, but these exceptions were few—very few indeed. The greater bulk of them had stood aloof from their sufferings, and unheeded their cry of distress. Whether they had done so from fear or indifference he would not pretend to say. The fact was all he could testify of: let others explain the cause. And what was the great boon that was then offered to them—the great panacea that was to dispel the gloom that surrounded them, and to crown them with the cap of prosperity? Why a reduction of taxation, and

an equalisation of local burdens, was the bait which had been thrown out to catch a whale, and had in some degree taken effect on the minds of his brother farmers, and withdrawn their attention from the one thing needful. Perhaps he might be allowed to call their attention to a few figures, to show them that with all the possible help that could be obtained from that source, they would be still unable to compete with the slaves and serfs of Poland and Russia. They were told by Sir Robert Peel in 1846 that free trade would maintain an average price of 56s. per quarter for wheat; he asserting at the same time that that was the lowest price which it could be grown at in England. Well at that price the gross annual value of agricultural produce was estimated at £300,000,000. Mr. Davies then entered into a statistical statement to prove that by a reduction in prices there had been an annual loss to the farming interest of £100,000,000, which, with the reduction of rents, local burdens, taxes, &c., could not but be reduced by £25,000,000, still leaving an annual loss of £75,000,000. Away then with the idea that these things were to compensate them for the effects of free trade. Their rallying cry must be, Protection, and nothing but protection, against an unjust competition with the unrented and untaxed land of the continent. Tell them they could not afford to grow cheap bread in England as long as the land of England was burdened with a national debt of £800,000,000; tell them they could not afford to grow cheap bread as long as they were called upon to pay a rent consequent upon the national debt; tell them they could not afford to grow cheap bread by the price of labour, consequent upon that national debt; tell them they could not, as long as they were called upon to supply their labourers with a large quantity of highly taxed beer, compete with those farmers who paid their labourers 3s. per week, and supplied them with untaxed beer; tell them they could not compete with the farmers of Russia and Poland, where labour was performed by slaves and serfs. They were all pretty well satisfied that time last year with the great difficulties the farmers then had to contend with; if so last year, how was it this? He found by the Mark Lane returns, that the price of wheat for October 1851 was 6s. and a fraction less than October 1850. Now he calculated the average growth of wheat in Shropshire to be three imperial quarters per acre, which made 18s. per acre less in the crop of wheat since last year; then mutton, he found, was 2d. per stone less this year than last; an acre of turnips was calculated to produce 40 stones of mutton, which, at a reduction of 2d. per stone was 6s. 8d per acre; and an acre of seeds was calculated to produce 20 stones of mutton, which, at 2d. less, was 3s. 4d. per acre. So that the loss of this year over last, per acre, was

	s.	d.
Wheat crop	18	0
Turnip crop	6	8
Seeds	3	4
Or on the four-course shift ..	4)28	0

Which gives an annual loss, per acre, of 7 0

So that, supposing their rents were fairly adjusted last year, which he denied, in order to put the tenant in the same position this year as last, it would require a further reduction of 7s. per acre. Were they prepared to maket his reduction? He trowed not, nor would they do it until one half of their property was thrown upon their hands; and were it not from the circumstance that such an event would plunge hundreds of families in ruin, he for one would say the sooner the better. It had been his endeavour, as well as the endeavour of every tenant who had publicly addressed them the last four years, to show an identity of interest between landlord and tenant; but this identity of interest had only been acknowledged by the tenant. The landlords had shown no disposition to identify themselves with their sufferings. Away, then, with the idea of swimming in the same boat. They must then, as far as in them lay, endeavour to protect their own interest, and let the landlords make the best bargain they could with their Manchester friends. With these observations he concluded his address by again thanking them for drinking the health of the committee, and resumed his seat amid loud applause.

Mr. JEFFREYS gave "the health of the Vice-Chairman," which was received with a hearty round of applause.

The VICE-CHAIRMAN briefly returned thanks.

Mr. GEORGE PRITCHARD proposed "the health of Mr. Richard Davies, of Little Wenlock," which was drunk with three times three.

Mr. RICHARD DAVIES returned thanks.

Mr. MYTTON gave "the New Members of the Club, the Hon. Beiley Lawley and Mr. Peak, of Arlescott," which was received with loud cheers.

Mr. PEAK returned thanks.

The CHAIRMAN said they had gone through the list of toasts, and he had nothing more to say: They had had the pleasure of meeting each other that day, and he hoped if they were spared to another year that they would meet in greater numbers. He thought times could not be worse than they were then, and he hoped next year that things would be something better, though he did not expect them greatly better.

The Chairman then vacated the chair, and the company were about to leave the room, when

Mr. EVAN DAVIES rose, and proposed as a toast "the Press." He apologised for not having

given it sooner, and said the omission was entirely owing to the number of other matters pressing on his mind.

The toast was very cordially received and suitably acknowledged.

The meeting then broke up.

HADLEIGH FARMERS' CLUB.

The 12th annual root show of the above club and agricultural association was held at the Corn Exchange, Hadleigh, on Friday, Nov. 14. As usual, the exhibition of roots was very superior.

Robert Kersey, Esq., the President, took the chair. He said that whatever might be their position as agriculturists, he hoped they would never be brought to so low an ebb as to be unable to keep up the club (applause.)

The following awards of prizes were made :—

Best six globe mangel wurzel (82 lbs.), Mr. H. Partridge, Shelly, 5s. Best six long mangel (66¾ lbs.), Mr. Robert Kersey, Hadleigh, 5s. Best six Swede turnips (36 lbs.), Mr. Isaac Everett, Capel, 5s. Best six white turnips (71½ lbs.), Messrs. R. and J. Rand, Hadleigh, 5s. Best six Scotch turnips (34½ lbs.), Mr. Isaac Everett, 5s. Best six white carrots (20½ lbs.), Mr. Thomas Partridge, Aldham Hall, 5s. Best peck of cattle potatoes (14¾ lbs. to the peck,) Mr. Postans, of Shelly, 5s.

The Chairman called on Mr. Matthews (one of the judges) to state what he thought of the roots exhibited.

Mr. Matthews—The mangel wurzels were excellent. The long reds seemed to be rather out of growth, as there were not so many as on former occasions. The short ones (the globes) seemed to obtain the most weight, but the heaviest were not so perfect inside as generally. When they got so large they would attain a roughness, be out of shape, and somewhat hollow. Of those they examined, it was found that the quality of the red globe was rather the best. The Swede turnips were good in quality, and the size very respectable; but he thought he had seen some quite as large on former occasions. Amongst the white turnips the largest had stood rather too long, were somewhat over-dated, and very pokey inside: but the prize ones, though of very large weight, held their quality and were very prime. The prize Scotch turnips were excellent, but the selection happened to fall upon one not so good as it should have been; still the weight of the remainder was sufficient to carry off the prizes, the five being equal in weight to the six next in merit. The judges saw some turnips which they were told were to be the regular old-fashioned Scotch, and they expected when cutting them that they would have answered to the knife: but they seemed deficient in the quality which in the flat old Scotch they had been accustomed to see. It appeared to him that they could not be of that stock, but were of some hybrid description, or grown under disadvantageous circumstances. The carrots generally were very good; the prize ones attained great weight and were of superior quality, and those which were not so heavy were of good shape. Of potatoes only two samples were shewn, one being rather inferior, the other pretty decent, but not so large as had been shewn before. There were several descriptions of late turnips, grown after something else, which were very respectable, but they were not considered good enough to have an extra prize awarded to them. He did not think the show altogether equal to some they had had, but the season had not been favourable for the root crops. He could not say anything as to the cultivation, not having had the opportunity of seeing how the crops were managed, which was a matter of importance; for, in a general way, those roots that were exhibited did not proceed from the best farming—very frequently a thin crop would bring the largest plants; whereas, when the decision was upon the average, good farming would be everything.

The Chairman called on Mr. Everett, as having obtained two prizes, to give the club a statement as to his method of cultivation, particularly as to swedes, which he himself had certainly anticipated surpassing that gentleman in. The specimens he had shewn were admirable.

Mr. Everett did not know that there was any secret to reveal. What he was most pleased with were his Scotch turnips, which he fancied he had raised to greater perfection than any thing else. Both of his lots were grown after oats and tares—he had entered them for an extra prize, but had consented to withdraw that entry. They were both off the same piece, and the tares and oats had been a very heavy crop; they were mown off, and he then put on a coat of muck, and the turnip seed was drilled in. He drilled a quantity first, and then sowed broadcast, and this was a plan which he should recommend for adoption, not because of his being a seed grower--(a laugh)--but because the

system was, in his opinion, the proper one. They could not sow too close. Sometimes the flies required a good many of the plants, and he thought by pursuing this system he managed to supply the flies and himself too; and after all, it did not cost much, as the seed was cheap enough. He found there had been sufficient moisture to bring up the drilled turnips; the sown ones did not come up till after rain, but he got sufficient for a very good plant. He hoed his Scotch turnips freely; then he singled them out as well as he could, in the first instance giving them a good start. He found if he had not done so that he would not have had the opportunity, the weather not permitting. He would observe that though they put manure to their crops, they could not put in moisture, unless they used a liquid manure drill, which they were not prepared with at the present time; and if they had that, they could not put in sufficient moisture. He really thought if they would have a liquid manure drill in that neighbourhood—and if they were not strong enough to keep a drill singly they might do so amongst them—that it would answer the purpose of the neighbourhood, if not of a single individual. (Hear, hear.) His system of cultivating swedes had been that which was common, except that he had ploughed his land as little as possible, but he cleaned it as much as he could, taking care that the last two ploughings were very near each other. He set his plants out at proper distances, calculating that there should be so many roots per rod. He fixed in his own mind how many roots there should be per rod to make a good produce, and after they were dropped in with the hoe in the first instance, they were singled out by hand. He would state that in the course of his life he had been at many shows, and he had never seen roots equal to those exhibited at the Hadleigh Farmers' Club; he had gone over districts where the land was richer, and the farmers had, he was going to say, more pride, and where they fancied they knew more than all the world besides; but still they had not been able to produce roots such as had that day been exhibited. It was a remarkable thing that at the Hadleigh Farmers' Club, though they had not the right description of land for the purpose, yet from some stimulus that was given, or from something else, they were able to exhibit roots of larger size and of better quality than those shewn elsewhere. He might challenge any neighbourhood to say that there had been such weight of roots produced as at Hadleigh. Perhaps some of this success might be owing to the stimulus given to the members by the excellent chairman they had had for the last twelve years—(cheers)—who had a happy facility in bringing out the opinions not only of the successful, but also of the unsuccessful candidates (cheers.)

Mr. MATTHEWS asked to what depth Mr. Everett horse-hoed?

Mr. EVERETT replied that he liked to horse-hoe as deep as he could, the second time especially. The first time depended very much on the age of the plants; they must take notice of that, for the deeper they went the further they must go from them. He did not know they would do any harm by going any depth they could, and he thought the more they pulverised the land the better. If a little fibre struck out where the hoe went, it made the roots shoot more, and the faster the plant grew. He would here remark that it did not matter where they put the manure, as if they had a turnip on the stetch it would find the manure wherever it was.

Mr. MATTHEWS asked in what manner Mr. Everett kept his land clean?

Mr. EVERETT employed the horse-hoe, or rather the scarifier, in the first instance, to bring the land into nice order; and having got it into that condition, by good cultivation on the four-course or other system he kept it so. In his Swede turnip field he broke his wheat stubble up in the autumn, and it had but two ploughings in the spring. He cleansed his land in the autumn, and it had a good scarifying and cleansing about.

Mr. MATTHEWS enquired if the drilling of a double quantity of seed between the rows intended to be left was not a better plan than broadcasting?

Mr. EVERETT thought this a very good question to ask, and he liked the idea; but he thought his own system pretty near the mark, inasmuch as if he thought he had not drilled enough for the flies to eat off the drilled turnips he would have drilled more, but there were only sufficient for them to eat. There was his advantage in sowing after drilling; in drilling the flies were able to master the drilled turnips, the broad-cast coming up a little after, the flies were not able to master them; and he found they came just in the place where he wanted them.

The CHAIRMAN said he had not had any Swede turnips at Hadleigh to shew in competition with Mr. Everett or any other member, and he had had recourse to a field at Ipswich—perhaps too poor a field and too poor a soil, for it lay next Rushmere heath. He thought one of the great reasons why they did not produce better roots was in consequence of the bad quality of seed. If they could by any means encourage any members of their club to take particular pains in the growth of a certain quality of seed it would answer the purpose of the farmers of the district, even if they paid double the price for the seed. He himself attributed the want of good quality to the seed, and had lost several acres of Swede turnips this year thereby. The turnips he had this year exhibited he had felt rather

an interest in. He sent a young friend over to Rose Hill farm yesterday for a dozen turnips—they were grown upon a very inferior quality of land, such as he did not believe was worth at this time 10s. an acre. The seed was drilled with mangel wurzle, but the fly came and took off nearly every mangel. The Swede turnips were drilled the last week in April or the first week in May, and there certainly was as fine a crop as in any other part of this district perhaps. He was led to believe that if the farmers were to plant their Swede turnip seed at the same time, or very shortly after, and with the same preparation as they prepared the soil for the growth of mangel wurzel, they would be able to grow and exhibit swedes much larger than at the present time; he thought the swedes he had exhibited that day grown on a poor soil were a proof of this.

Mr. Matthews enquired how Mr. Kersey manured for those swedes?

The Chairman—without any guano, but with about 20 common loads per acre. He fancied the farmers were too late, on a certain description of land, in sowing.

Mr. Rand—Is the land heavy or light?

The Chairman—Quite light; they could not have an idea of what a poverty-stricken sort of land it was. On a soil of that kind, or almost any soil where he wished to produce a heavy crop of swedes, he would pursue the same system as for a crop of beet root.

Mr. Warren thought that Mr. Everett's turnips would make two stones of beef, where Mr. Kersey's would make but one stone and a half; he thought that Mr. Kersey's lost in quality by being sown too early.

Mr. Kersey thought the quality of the land ought to be taken into consideration.

Mr. Everett thought this rather an important subject. If they ought to plant early on any soil, it should be on that soil which had a very cold bottom, for this reason—that it took longer to produce a plant fit for the hoe on a cold heavy soil; therefore it ought to be in so much the sooner. But if they advocated early sowing without respect to the soil, they committed the same fault as Mr. Mechi had done in recommending them to plant very thinly, irrespective of time. If they put in their turnips very early on light land, at the same time as mangel, they must then expect, if they did not consume them before Christmas, that they would be worth very little. They would get their growth up, and they would be ripe after a certain time, and, like pears, would not keep. No turnip would keep so well if it had its growth up as if it had not; decay was much quicker in the fully ripe than in the partially ripe.

The Chairman thought that quality depended much on the soil. If they could, by early planting, grow, as he had grown, anything like 20 or 25 tons per acre, when by late planting only 15 tons would have been grown, that was a good argument in favour of early planting. His opinion was that at the exhibitions of that club they had all produced a greater weight of roots by early than by late sowing. He thought the earlier they planted—he was not speaking of white turnips especially, but of swedes and mangels—the more they would draw off for the stock in their yards.

The Chairman called on Mr. Partridge, a successful competitor for carrots, to explain his system of cultivation.

Mr. Partridge said he was fortunate in having a nice piece of land favourable for carrots. It was formerly an old pasture which he broke up last year. He had intended to take the flag off, and did begin it, ploughing it and taking it off three inches deep; but he found there would be too much labour belonging to it, and he left off, and was glad he had done so. Where he took the flag off, there was not above half the weight of carrots as on the parts he left. That flag was a great deal of trouble to him—he ploughed it in the autumn and turned it in; in the spring he began to sow it; but he did not think he should have been able to get his carrots in. He harrowed it, ploughed it, chopped it, and double ploughed it; he got a strong iron plough, and he took the breast off, and followed the other plough with it, and he ploughed the entire depth. Certainly he got a great weight of carrots; but, no doubt, old pasture land was better able to grow carrots than any other sort of land. He thought he had produced at the rate of 18 tons per acre. He sowed the seed broad-cast. He did not scarify after the last ploughing—he merely harrowed.

The Chairman called on Mr. Postans to explain his system of cultivating potatoes.

Mr. Postans said it was hardly worth while to say anything on this subject, for potato cultivation was so common that all knew how to grow them. He planted 2 or 3 inches apart on the ridge, and manured with about 15 loads per acre of farm-yard manure. Mr. Strutt had challenged the members of the club in respect of potatoes, having felt rather lonely, there being no one to compete with him; and he was kind enough to give him some of his seed, which had enabled him to beat that gentleman. His potatoes were, he believed, about 18 to the peck. Mr. Matthews seemed to think they were not so large as usual, but he did not recollect ever having seen larger ones at their Root Show. They were very sound; he had cooked two or three of them for the house, but thought they would not do for culinary purposes, having too much water in

them, (Mr. Strutt said they would do in May, when they were very mealy.) He had some from Mr. Jacob, of Pakenham, superior in size; but he questioned if they came under the denomination of cattle potatoes, but they were superior to the others for cooking purposes.

[A discussion here ensued as to what could be called cattle potatoes; and it was determined that any producing a great quantity should come under that term. It was subsequently decided also that the produce of gardens should be admitted into the competition for the half-dozens.]

Mr. POSTANS said he did not know that he ought to speak upon any other root, but he had just visited a friend in Essex, Mr. Thompson, whom he saw clamping up an excellent plant of beet root. He asked with what manure that gentleman had cultivated the field, and he replied that there was not a bit of muck on it. He was perfectly astonished, and asked what was the previous crop? It was a crop of wheat. Mr. T. had ploughed the land several times, and got it into good condition, but had not put any kind of manure upon it till the mangel was all up, and the reason he gave was that the weather was too dry; but after the plants were up, he gave them a pinch of guano each (which he should have thought would have killed them), and they made rapid growth. He mentioned this as a hint to those who might like to try the plan.

Mr. STRUTT, explaining why he had been beaten by Mr. Postans, said he believed that his potatoes required a change of soil, and this accounted for Mr. Postan's success.

The CHAIRMAN was glad to see Mr. Philbrick, of Colchester, present. He was an amateur farmer. He (Mr. K) and his brother had had the pleasure of looking over this gentleman's farm, and it did him an infinite deal of credit. He had roots of a quality and size that would be an ornament to any farm, and he had asked him to exhibit; still he congratulated himself on beating him. He liked to see Mr. Philbrick entering into the lists, but he trusted the members of the Hadleigh Farmers' Club would not allow any agriculturist from Essex, or solicitor from Colchester, to carry away the prizes.

Mr. PHILBRICK said, however much Mr. Kersey might felicitate himself on having beaten the Colchester lawyer and amateur agriculturist from Essex, he (Mr. Philbrick) hoped he might have the good fortune still to be a member of the Hadleigh Farmers' Club, and to be enabled to compete again, and endeavour to beat him on the next occasion. From his experience he should say that the early sowing of swedes was not attended with danger, but was better than sowing late, though that was contrary to the usual opinion.

Mr. EVERETT proposed the cordial thanks of the meeting to Mr. Kersey, and that he be requested to continue to act as their Chairman.

Mr. PHILBRICK seconded the motion, which was carried unanimously.

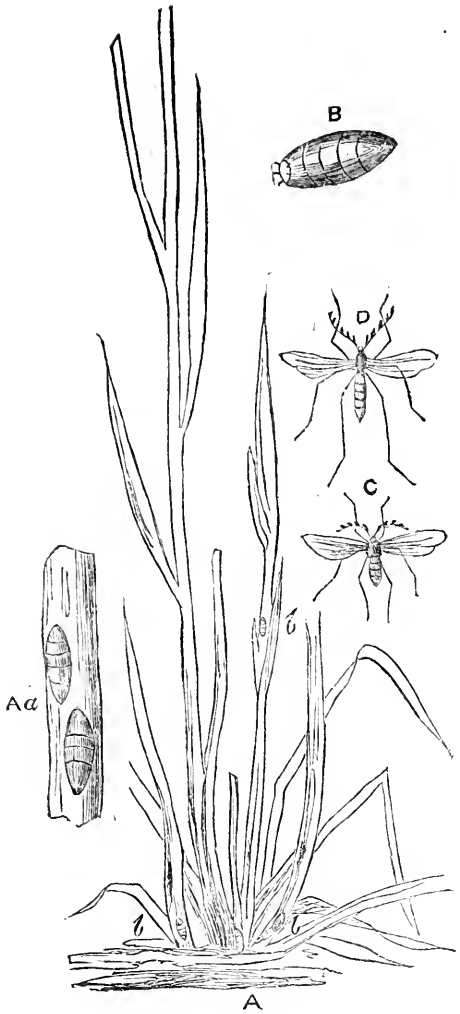
The Vice-President, Secretary, Treasurer, and Committee were next re-elected; after which a social evening was spent.

THE HESSIAN FLY.

We cannot, on the commencement of a new year, avoid the conclusion, that while man often arranges and contrives, Divine Providence, above all, defeats and disposes of events. While man is debating and contesting whether wheat shall be 32s. or 40s. per quarter, an unseen hand is ordering and directing all to a tendency which may result in a price double that amount. We are not now speculating on any European war, or any French invasion of England; ominous as are the aspects of Europe, and possible as a blockade and prevention of foreign supplies may be at some not very remote period, this does not at present occupy our attention.

But while we are looking for unlimited supplies of wheat from the virgin soil of the valleys of the Ohio and the Mississippi, we must bear in mind that a Power far above our limited comprehensions has said, in reference to more things than the ocean, "Hitherto shall thou come, and no further." The vast extension of the wheat crop brings with it a counteracting check, to remind man that the limits of his powers are under the control of the Almighty's will, and hence consternation is shewn in America by the vast ravages of the Hessian fly, or rather of its larvæ (the *cecidomya destructor*), called so by the Americans from the supposition that it was introduced into that continent by some straw brought with the Hessian troops during the American war. Now, though its importation is a question of debate amongst naturalists, still it is certain its ravages began about that period, and in Austria it was hardly observed till 1833, when some edicts were passed concerning it by the Archduke Charles.

The Hessian fly, of which the accompanying wood-cut will give some idea, as well as of the mode in which it attacks the wheat-plant, is not



A. A stalk of wheat infested with the larvæ of the Hessian fly, *b b b*.
A *a*. The same magnified.
B. The larvæ magnified.
C. The male Hessian fly.
D. The female.

unlike our midge, or a small gnat. It deposits its eggs between the stalk and the leaves of the wheat; maggots immediately follow, and these consume the juices of the stalk, so that a field of apparently sound and healthy wheat will at harvest time be found scarcely worth reaping. The *British American Cultivator*, a respectable periodical paper, published at Toronto, gave the following painful advice respecting this pest: "Judging from the history and habits of the Hessian and wheat-fly in other countries, and especially in the eastern part of our own, the inference may be fairly drawn that the loss that may be sustained as to the wheat crop may be so considerable that all intelligent and observing cultivators will find it to be to their interest to *discontinue sowing wheat for a few seasons* until the fly has passed away." The same authority goes on to say that, for "ten consecutive harvests, the farmers in Eastern Canada lost their entire wheat crop, and the same catastrophe took place in the eastern portions of the states of New York and Pennsylvania."

The *American Cultivator* for October, 1851, speaks of another serious pest which seems to have attacked the wheat, and which is distinct from the Hessian fly, though of the same family (the *tipulæ*), and which, in its larvæ state, is called in America the joint worm, because it attacks the joints of the growing grain at various periods of its growth, a swelling and excrescence appear, and so the juices of the grain are exhausted, and it withers and dies. At some earlier period, however, it attacks the plant nearer the ground, and a swelling and knot are instantly formed, and the head of the corn falls down at various angles. "In every case," says the authority above quoted, "it operates by a species of strangulation of the plant, and finally starves it out, so that the juices no longer circulate, and the feeble heads dry up and perish. In this way, a wheat field that is thus preyed upon, presents the appearance of a stunted, pale, decaying sedge, with here and there a few straggling heads of wheat that, in case of their escape from the rust, would not reward the husbandman for the labour of gathering them." Nay, further, speaking more generally of the American crops, a writer in this periodical—Mr. Alexander Rives—says, "It is difficult to convey to you a faithful picture of the complete destruction of the wheat crop, in many instances, by this insect. It is *vain to think of reaping at all* in many fields. The farmer is esteemed fortunate, where this insect has been three years, *if he makes his seed and bread*" (p. 321).

The editor of the *Cultivator* forwarded specimens to the celebrated naturalist, Dr. Fitch; and he gave it as his opinion, from the differences of habit which it manifests from the larvæ of the Hessian fly, that it is not identical with it, but another species, perhaps, of the *tipulæ*.

Now, though we have no absolute fear of a total destruction of any vegetable, yet the great losses we have so many years suffered from the potato show that it may be very considerably reduced in its quantity, and that those who depend upon it may suffer great privation and loss, and even the death of many may be the unhappy result.

We should not be surprised if the prices of corn may be such as to defeat the objects, and falsify the opinions, of all classes of political economists.—Gardeners' and Farmers' Journal.

LECTURE ON AGRICULTURAL CHEMISTRY AND THE NATURE OF MANURES.

BY J. C. NESBIT, F.G.S., F.C.S.;

CORRESPONDING MEMBER OF THE NATIONAL AND CENTRAL SOCIETY OF AGRICULTURE OF FRANCE, AND PRINCIPAL OF THE AGRICULTURAL AND SCIENTIFIC ACADEMY, KENNINGTON, LONDON.

A lecture was delivered on Saturday, the 27th Jan., by Mr. J. C. Nesbit, in the Town Hall, Dorchester. It originated in an invitation given to the lecturer while on a visit to Mr. Saunders and Mr. Homer (farmers of considerable eminence in the locality); and although the attendance was perhaps diminished by the circumstance of the lecture happening only two days after Christmas, it was still so large that the Town Hall (a handsome and spacious room) was completely crowded. The following gentlemen were some of those present: John Floyer, Esq., M.P. (one of the members for the county); W. Henning, Esq.; W. Manfield, Esq.; W. Dunning, Esq.; Messrs. Saunders, J. Homer, Hawkins, Bridge, Watts, Birt, T. Dowden, J. Kent, S. T. Harding, Cull, Cowper, Cains, Atkinson, S. T. Kelloway, Mayo, Wood, Luckham, Tizzard, &c., &c.

At four o'clock Mr. FLOYER, addressing the assembly, said he had no doubt they would hear a very interesting lecture from the gentleman who had kindly undertaken to address them, and that in the result it would be very useful to all of them. As, however, it was necessary that they should have a chairman, he begged to propose for that office a gentleman who, to some extent, had himself combined science with practice, and who was on that account fitted to fill the office on such an occasion. He moved that Mr. James Harding should take the chair (cheers).

Mr. T. SAUNDERS, of Watercome, seconded the motion, which was adopted unanimously.

Mr. Harding then took the chair.

The CHAIRMAN said: As they had paid him the compliment of placing him in the chair, he would, before he introduced Mr. Nesbit, mention that if, after the lecture any gentleman wished to question Mr. Nesbit on any point which had occurred to him, Mr. Nesbit would be happy to reply, whether the question related to the nature of manures or to any other matter connected with the subject of the lecture. He begged now to introduce Mr. Nesbit to the meeting.

Mr. J. C. NESBIT then came forward and said: Mr. Chairman and gentlemen, when I consider the counter attractions of Christmas, I really feel highly honoured by having before me so large an assembly; and it shall be my endeavour to add as much as possible to your stock of information on agricultural subjects. I do not come before you to oppose science to practice; to set up the dogmas of the chemist in lieu of the practice of the farmer. I shall simply attempt, to the best of my ability, to graft upon the practice which I know the men of Dorsetshire possess, a little of the science of the laboratory, and perhaps we shall find that practice with science will do better than either of them separately. At the close of the lecture I shall be exceedingly happy to answer any questions or remarks which may fall from any gentleman present in relation to this subject. I dare say many things will drop from my lips which will appear at variance with the practice and the observation of many of my audience; but, gentlemen, a time of settlement will come for all such variations in opinion. At the end of the lecture I shall be ready to meet any attacks which may be made on my remarks, with the view of proving that I am wrong, or to give any information which I may not have furnished in the lecture itself. I will now proceed at once to consider the general habits and properties of plants. You know, gentlemen, that plants send their roots downwards and their leaves upwards. Both roots and leaves have certain functions to perform. The roots penetrate the ground in search of moisture, and of mineral ingredients dissolved by the moisture and essential to the plant; and the materials which they collect there are taken up by the sap of the plants and passed into the leaves. By means of experiments made by various chemists it has been clearly ascertained that when the light of the sun, or the diffused light of day, shines on the leaves of plants, those plants then acquire the power of acting on various gases contained in the air, of absorbing them, and of converting them into materials adapted to the growth of plants. Now, without the mineral ingredients of the soil you cannot get plants to obtain organic materials from the air. These terms, "mineral" and "organic," I will explain. If any plant be burnt, the ashes represent the mineral matter taken from the soil; the part burnt off is the organic matter taken from the air. Now, if we consider the nature of plants, in their wild state especially, we shall find that if they be supplied with an adequate quantity of mineral matter, according to their varieties, and according to their circumstances, they will obtain all the rest from the air without any assistance. Let me instance a few cases. Take the case of the lavas of Etna, Vesuvius, or any other volcanic mountain. It is well-known that when the red hot lavas, ejected by various eruptions, have to a certain extent cooled down, that the wild fig-tree and other plants take

root and penetrate the fissures of the lava, obtain thence mineral matter, and as the lava contains no vegetable or organic matter, evidently must obtain from the air the other material of their growth. Let us take the case, again, of some of the wild lands in Scotland. A few years ago certain parts of Scotland were planted, by enterprising individuals, with forests of larch and fir; and, although previously little or no organic matter was found in the soil, yet the consequence has been, that since that period thousands of tons of timber have been removed, and the soil is still richer in vegetable matter than it was before the trees were planted. From these facts, then, and from a thousand others that might be adduced, it is perfectly clear that vegetables have the power of acting on the air, and of taking therefrom the great bulk of the materials which they require. Now this natural growth of plants is going on continually on the varied surface of the soil; Nature clothing the land with plants adapted to the different soils. You have the same kind of process going forward in Dorsetshire. You have the heath on the sand; you have the oak on the clay; and, according to the nature of the soil, whether it be chalk, limestone, or sand, or anything else, according to the nature and texture of the soil, will the land be found adapted to sustain particular kinds of plants. But now our friends the farmers come upon the scene: they have to alter this state of things. You, gentlemen, do not want merely the grasses which would naturally cover the surface of the soil; you wish to change them for others, and therefore you employ certain methods adapted to the growth of the vegetables you wish to produce. It is too often supposed that farming is a natural course of operations. Farming is, in truth, almost wholly artificial; as much so, I may say, as any pursuit of our manufacturers. You, gentlemen, are called in, not to work against nature, but to assist her—to make use of certain methods which are the best adapted to your own purposes, and to study carefully the nature and habits of the several tribes of plants which you have to grow: you have, in short, to provide everything that is required for the successful growth of those plants, which would not naturally grow upon your land. It is unnecessary for me to reiterate that the plants which you are occupied in cultivating would not grow naturally on the lands on which you grow them. Gentlemen, if you were to try to grow wheat on your lands without any preparation, and to do so consecutively, crop after crop without cessation, you would very soon find a limit to your growth: probably from one to two quarters of wheat per acre may be taken as the limit of the quantity of wheat which could be produced under such a state of things. Then what are the means which you use for the purpose of assisting the growth of wheat or of any other plant on your lands? These means, gentlemen, are various; they seem, at least, very various; and I have no doubt they are so considered by many practical farmers who, not having compared the different systems, have failed to detect the connecting link between them. I think I shall be able, however, to show you that whatever means you may make use of for the purpose of assisting or increasing the fertility of your soils, there is one principle running through the whole. Let us take the case of the ploughing and stirring of land. You are no doubt all aware that porous materials have the power of absorbing gases and other substances from the air. You are aware, for example, that charcoal recently made, when exposed to air, sometimes absorbs so much as to become red hot and ignite. You are aware, too, that dung-heaps if exposed to the air, have a similar tendency to acquire heat under the action of the atmosphere. I have known instances in which dung-heaps have been set on fire by this cause. Soils are similarly porous as charcoal, and operations which increase the surface exposed, increase the absorptive power. Such is the effect produced by the ploughing and stirring of the land. Every ploughing, every moving of the soil causes a greater surface to be acted upon by the air, eliminates a large amount of mineral ingredients from the soil, and at the same time causes the soil to absorb a considerable amount of ammonia and other valuable matters from the atmosphere. Now when I say this I do not forget the effects of pressure upon land, because I know very well that, after ploughing, pressure, either by means of sheep or otherwise, upon light soils is quite necessary. To go on, however, to speak of the effects of exposure—this exposure, whether by turning or by ploughing, causes the soil to act upon the air, and to absorb a quantity of ammoniacal and other substances. The air also acts on the mineral ingredients of the soil; makes those soluble which were previously insoluble; while the soil absorbs an extra quantity of that organic matter from the air which ordinarily plants only obtain by their leaves. The mineral matter and extra organic matter absorbed by the roots pass into the vegetable, and by the action of light upon the leaves are formed into a nourishing sap of the plant. Fallowing is merely an extension of the ordinary means of ploughing and stirring. In fallowing upon the old system, you had two years' atmospheric action on the soil, while you took only one year's crop. The system of fallowing is neither more nor less than another of those practical plans by which you place in the soil an additional quantity of those materials which are essential for an increased growth of vegetables. It is, in fact, a system of *manuring from the air*. And when the wheat plant follows the fallow, the additional materials accumulated from the air increase the crop perhaps by two or three quarters per acre. Now, gentlemen, let us take another of the more important farming operations. Amongst the operations which are essential to good cultivation, I take draining to be one of the principal. On lands not drained naturally, it is absolutely essential that we should resort to artificial draining. I shall not now dilate on this subject: I will not speak to you of the coldness produced by wet: I will not enlarge on that state of things which is produced by the constant evaporation of water from the surface. But let me just point out to you, that so long as lands are not pro-

perly drained, so long as stagnant water fills up the pores of the soil, it is impossible that lands can be properly acted upon by atmospheric influences; so that, putting aside all the other bad effects of leaving superfluous water in the land, let us bear in mind that under such circumstances the land can never absorb organic matter from the air, for the use of crops. In reference to draining I would remark that, wherever it is practicable, it would be well to provide for the circulation of air through the drains; because in that case the drains are not confined in their operation to the conveying away of the water, but they also convey air to the plants for their use and nourishment. Now I can trace all your plans and operations, gentlemen, for the benefit of the land, to one and the same principle. All your beneficial farming operations tend to accumulate in the soil an excess of those organic elements which most plants in a state of nature obtain in more limited quantities from the air. And this increased amount of manure in the soil causes a corresponding increase of the crop above that which naturally would grow upon the land. Let us consider another important operation—the ploughing in of the green crops. I do not know whether or not that is much practised here. This is a stock-producing district; and what is suitable in other districts may here be unsuitable; but in America, where stock is of little or no value, clover, instead of being eaten off the land, is ploughed in, and they require no other manuring to carry on the growth of wheat, the rotation being clover ploughed in, wheat, and fallow. Now your rotation of crops, gentlemen, is founded on the same principle; so also is your system of manuring. But before I speak of the rotation of crops, let me make a few observations with regard to farm-yard dung. Farm-yard dung is, as we all know, the *sine quâ non* of agriculture. We all know that it is *the manure*: we have all heard our practical friends declare that all other things put together are not to be compared to farm-yard dung. Now it is not my object this evening to endeavour to lead you away from the use of farm-yard dung, so far as you have found it beneficial, but rather to induce you to graft something upon it; and to show you, that though farm-yard dung may be a very good thing, it is not the only thing useful to the land. I can show you clearly that fifty other things may be made use of that are equally good, and many of them a great deal better, though I repeat it is not my design to lead you to abandon the use of it, for of course as much manure as possible ought to be made on each farm. But as we know that even when we have produced a large stock of farm-yard dung, that we still require to import manure in some shape or other, I shall endeavour to point out the most useful to the farmer. Now what is farm-yard dung? Gentlemen, according to the circumstances in which you may happen to be placed, you make farm-yard dung in various ways out of *vegetable matter*. Some persons put a quantity of straw in a yard; they turn a number of cattle into the yard, and there supply them with food; the cattle tread the straw about, and the straw after it has become a little decomposed is called farm-yard dung. Others feed their cattle with oil-cake, and we then have another variety of dung. But, whatever be the process, you will find that the dung is nothing more nor less than materials which once grew on the land, once had vegetable life, which materials are put on the ground again to reproduce vegetable life. It is a simple fact, that what once formed part of a vegetable can become part of a vegetable again. If you use straw alone, you will have very few of the materials which are requisite to produce seed; but if you use seed as well, you will have the materials which are requisite to produce seed and straw. Now is there any real difference between making a mixture from straw and other materials in the farm-yard, and passing materials through the bodies of animals? This is a great question for practical men; and I wish to be clearly understood on the point. Many persons believe that the animal system of sheep, bullocks, and so on, acts in a particular manner on food, and alters its nature and properties. Now I maintain that nothing of the kind really takes place. Observe the action of air upon coal in a grate. Coals, as you are well aware, are merely remains of an ancient vegetable world. All our great coal-fields were once primæval forests, which have assumed their present appearance owing to great pressure, and to various chemical changes; and even now the microscope enables us to detect in coal the forms or outline of the woody fibres of the trees. As these ancient vegetables are consumed by the air in the grate, so a similar but slower effect is produced in the case of the decomposition of ordinary vegetable manure. The air acting on the dung-heap slowly burns away the charcoal, or carbon evolving carbonic acid gas, and producing heat; the hydrogen also is consumed, producing water and liberating heat; and the mineral matter originally contained in the vegetable substance, together with some of the organic elements, is left behind in the form of ash. When a farmer places a quantity of straw, or other vegetable matter, in heaps, the air does not act upon the whole mass, it is true, as powerfully as it would if it were set on fire; but still it does act upon it. Every pound of charcoal you consume in the form of coal produces a certain amount of heat, whether the fire burn quickly or slowly. So, also, in the case of your heaps of dung, a certain amount of heat is produced by the slow action of the air upon the charcoal therein contained. It follows that the more you decompose manure, the more you lose. If 100 tons of fresh dung be ploughed directly into the soil, or applied at once upon clover or seeds, it will produce more effect than 100 loads reduced by decomposition to 50 loads, and then put into the land. But it is quite possible that for many crops *one ton* of the latter may be much more efficient than one ton of the former. Whether or not you should allow dung to decompose, or to what extent you should allow it to do so, depends upon whether the land is strong or light; I mention the fact, however, that the more

dung is decomposed, the greater will be the loss. Now let us take the action of the animal system upon a quantity of food. I showed you just now that the whole action of the open air upon vegetable matter was to effect a slow combustion of a portion of it. Now does the animal system do anything else? Let me take a full-grown well-proportioned man—I might take a Dorsetshire farmer as an example—who eats from eight hundred to a thousand pounds of food every year, and who is just as heavy at the end of the year as he was at the beginning. The fact is, that a great proportion of the food taken is burnt in the system by the air taken in by the lungs; animal heat is thus produced, and the air expired by the lungs contains the products of the combustion of the food, as the air in the chimney contains the products of the combustion of the coal in the grate. When I analyze the gaseous matters given off from burning vegetable matter, and the air given out from our lungs, I find them the same. I find carbonic acid—the gas produced by burning charcoal—always present. This gas is that so often found in brewers' vats, and at the bottom of wells; and it is also identical with that choke-damp which proves so fatal to miners. There is also given out from our lungs a large quantity of moisture produced by the combustion of the hydrogen of our food; and this burning of the hydrogen likewise evolves a certain amount of heat. In health our bodies are at all times at a higher temperature than the surrounding atmosphere, and we take food into our systems for the purpose of producing and sustaining animal heat. We are, in fact, like so many steam-engines—we are obliged to have our air, and our fuel or food, to maintain our operations; and that which is unconsumed is cast out, as so many ashes from the fire-grate. Well, then, you perceive that the passing of food through an animal causes it to decompose, and as in the case of the dung-heap, the effect is a loss. I have hitherto spoken only of a full-grown man or animal; but it is evident that in the case of young stock, and of animals giving milk to their offspring, the loss must be still greater. If I give a full-grown bullock a certain quantity of food, he will take, perhaps, a trifling amount for his own subsistence, and having done so will pass the rest out of his system. On the other hand, a young animal requires a constant supply of bone-earth or phosphate of lime to assist its growth, and a quantity of nitrogenous matter for its flesh. Take the case of a cow. If a cow is giving milk, the dung (from the same amount of food) will be much worse than that of a fattening bullock; the bone-earth and the nitrogenous matter passing away in the form of milk. You see therefore, gentlemen, that dung will differ, not only according to the kind of food which is given to animals, but also according to the difference in the animals themselves, whether they are nearly fatted or only half fatted; whether they are young feeding stock, or whether they are giving milk. If, therefore, vegetable matter passed through animals suffers a loss, and if—as is the fact—the ultimate decomposition of vegetable and animal matter in the soil, the dung-heap, and the animal system is the same, the faeces or dung of animals will always contain less of the principles of manure than the food did upon which the animals were fed. This is a proposition which I put before you, and I will endeavour to make it as simple as possible. Twenty tons of turnips on an acre of land, fed off by sheep, with the addition of no other food whatever, would give far less manure to the land than twenty tons of turnips chopped up and ploughed into the land, and then properly decomposed. Now, gentlemen, I admit that the mechanical action of the treading of sheep is often of essential use, and in the case of very light land may produce a better crop than any other method of proceeding. But I will put the case of land which especially requires such treading out of the question, and I repeat that twenty tons of turnips on an acre of land fed off by sheep will prove less beneficial than the same quantity ploughed in the land. Well, now for the practical proof of my argument. I have had this matter tested, not merely in one county, but in several; and in every case where there has been the ploughing-in of a certain quantity of turnips, as against the feeding-off of the same quantity by sheep, the result has been, on the succeeding crops, in favour of ploughing-in. Bear in mind I am proving a principle. I do not recommend you practically to carry it into effect; for, in my opinion, at present the feeding of stock, particularly of sheep, is the sheet-anchor of agriculture; but I want to impress this thoroughly upon your minds, that the sheep add nothing to the turnips, but the turnips give everything to the sheep. It has been tried in Kent, in Suffolk, in Northamptonshire, and in every case with the same result. The following letters from different gentlemen will perhaps be interesting:—

LETTER I.

MY DEAR SIR,—In reply to your letter, I am instructed to say that the members of the Farmers' Moon Club, in the neighbourhood of Rochester, Kent, unanimously agree that vegetable manures are peculiarly fructifying, and that, taking the case of a fallow or other field, being all previously of the same tilth, and sown with rape for feeding, and divided into three divisions, one of which shall be fed off with sheep without any extra food to the rape, the second division ploughed in, and the third division fed off with oilcake or corn; that the worst corn succeeding the rape will be on the first division, the next best on the second, and the best on the third. Thus all speak in favour of green crop for manure.

Yours truly,
JOHN OAKLEY, Old Broad-street.

August 10, 1849.

J. C. Nesbit, Esq.

Members of the Club:—

Jno. Stunt, Gillingham	Jno. Walter, Upchurch
Ambrose Spong, Frindsbury	W. Walter, Rainham
Jno. Baker, Cooling	Cs. Smart, Gravesend
J. H. Soloman, Sherne	R. Cobb, Higham
W. Eley, Frindsbury	Jno. Oakley, Darland
W. Lake, Chalk	

Naseby, May 15, 1849.

MY DEAR SIR,—I regret I was not at home to answer your inquiry sooner, having been in Yorkshire the last fortnight; however, I hasten to send you the required information. In the spring of 1846 I had more turnips than my stock could

consume; I therefore thought that it was reasonable that, if the crop was broken to pieces and ploughed in, the grain crop that followed would derive as much benefit as if eaten by sheep. I therefore did so with one acre on the first week in February, and with another upon the fourth week in March. Part of the rest of the field was eaten on the land, and part being newly ploughed up land, the whole crop was drawn off.

On the land where the turnips (white rounds) were broken and ploughed in on the last week in February, the produce was 84 bushels per acre of Hopetoun oats.

Where the turnips were broken and ploughed in on the fourth week in March, the produce was 74½ bushs. per acre.

Where eaten on the land by sheep, 70¾ bushs. per acre.

And on the newly-ploughed up land, the whole of the crop drawn off 41 bushels of wheat. I am, yours faithfully,

J. C. Nesbit, Esq. PETER LOVE.

LETTER III.

Assington Moors, June 15, 1849.

DEAR SIR,—I have just seen Mr. Underwood, who was a neighbour of mine eighteen years ago, but is removed to a distance. He says he has practised ploughing in a few acres of turnips almost every year for upwards of twenty years, and considers three sacks of barley per acre quite within bounds, as the increase from ploughing-in over feeding-off. The clover is much better; but he has not observed the wheat sufficiently to say what the difference is. He estimates an average acre of white turnips to be worth 30s. more to chop and plough-in, any time before they begin to run to seed (say February out), than to feed off.

I inspected a field of wheat this week belonging to John Gurdon, Esq., which was white turnips three years back; a part was ploughed in, and the rest fed off with sheep, and half-a-pound of oilcake per day each given to them. The wheat, where the turnips were ploughed in, is decidedly better than the rest; I think three bushels per acre. Mr. Hudson, the steward, told me the barley was quite a foot higher than the rest of the field, and three sacks per acre, if not more, better. The clover was all fed off, and no notice taken; nor would anything more have been thought about it had not the wheat looked so much better than the rest all the spring. The turnips were about three quarters of a plant, but regular; the sheep went down with the epidemic, and were sold, leaving about two acres of turnips to feed; and rather than purchase any more stock they were ploughed in.

As I told you at the club, I am generally a buyer of turnips; but the obstinacy of my neighbour, Mr. Underwood, who refused to take 20s. per acre for his to feed off (for the sake of convenience to me) when almost everybody else were giving theirs away, attracted my attention to the after crop; and I can, in two instances, confirm his statements. Notwithstanding, if 1½ cwt. of swedes (I think a ton of Swede turnips will make 14lbs. of mutton, from experiments I have tried) or 2 cwt. of white turnips will make 1 lb. of mutton, and we can grow 21 tons of the former and 26 or 28 of the latter, it must be more profitable to feed at 5d. per lb. for the mutton than to plough in to gain 30s. or 40s. per acre in the corn crop.

I have been unwell, and could not see the parties, or I should have answered your note before.

I am, dear sir, very sincerely yours,

Mr. J. C. Nesbit. THOS. HAWKINS.

Well, now, the truth which we may learn from this is one which I find not sufficiently appreciated by practical men, namely, that the real source of manure for your land is the vegetable food which you use to feed stock with, and not the stock itself. Many persons think it quite clear, that the more stock they feed upon their land the better the land will be; but this is by no means proved. Many of you gentlemen keep a large amount of stock; but this is because you produce vegetables which enable you to do so, and it is the quantity of vegetable matter you grow or import upon the farm, and not merely upon the stock itself, that the amount of manure you produce must inevitably depend. Let me now speak of the rotation of crops. Gentlemen, worthy practical men engaged in agriculture discovered the system of rotation: it was not discovered by scientific men in their laboratories. Farmers themselves found that by periodically changing the crop they secured a better result than was otherwise attainable. Let us take, for example, the four-course shift. You have, we will say, turnips, barley, clover, and wheat, or other grain. The truth is, gentlemen, that there is an essential difference in the habits of these plants, and in their powers of acting on the soil and on the air. Other things being equal, those plants which have the broadest development of leaf, the largest foliage, must have the greatest power of acting upon the air. Now what does the turnip crop do? Turnips, when provided with proper mineral ingredients, as bone-dust and phosphate of lime, send their leaves into the air; these leaves, being acted upon by the light, absorb a large quantity of carbon and ammonia from the air, and accumulate them in their bulbs; and the bulbs are adapted by nature to grow turnip seed in the ensuing spring. But you come in and say, No, we don't want turnip seed, we want barley. You either plough in the turnips, or, by feeding them with sheep, retain suppose one-fifth for the mutton, while the rest goes into the land. You make a certain portion of mutton out of the roots, and the rest you leave upon the land. The barley is then sown. This barley might, by ordinary action, have produced two quarters per acre; but by the aid of the turnips you have accumulated in the soil a quantity of materials from the air; these entering into the land pass thence into the crop, and the result of the whole is that, instead of two quarters of barley, you have five, six, or seven. You have allowed the large leaves of the turnip to act upon the air, and to provide for the barley that which naturally it could not obtain from the same source. Similarly the clover crop is used to obtain organic matter for the wheat. The clover, with smaller-sized leaves than the turnip, possesses a large amount of foliage, and each leaf as it grows upwards sends a little radicle or rootlet downwards, so that in exact proportion to the upward growth of the clover is the development of the roots in the soil. These by their decomposition afford such extra nutriment to the wheat crop which follows as gives an additional product, far above that which, unassisted by the farmer's art, it would be possible to obtain. A curious circumstance connected with the growth of clover is, that by cutting the clover twice, and removing all the hay, a much better wheat crop is obtained than by feeding it off with sheep, even if some artificial food be used. This is owing to the fact that the growth of the roots of the clover in the land is in exact proportion to the growth of the leaves in the air. Each leaflet that shoots upward sends a radicle or rootlet downwards. If the leaflet be bitten off or destroyed its radicle ceases to grow. It therefore follows that grazing clover by sheep materially diminishes the amount of vegetable matter accumu-

lated in the soil by the roots, and consequently the produce of the succeeding crop. A friend of mine in Northamptonshire had a field of clover; it was divided into two portions; both were cut at Midsummer, and one part was then fed off with sheep, the other was left to grow till September, when it was again cut and the hay removed. Equal portions of the separate pieces were then compared. Where the clover had been cut once and fed once he got 35 cwt. of clover roots per acre; where he cut twice, 75 cwt., there being a difference of 2 tons of vegetable matter per acre. I believe such will always be the result, and the only case where the practice is objectionable is on certain light lands, which would be rendered too porous by the long roots of the clover, and where the treading of sheep, though with less manure in the land, would perhaps be more beneficial. Now, gentlemen, having thus shown you that the rotation of crops which you employ, the ploughing-in of green crops, and fallowing have but the one object of accumulating in the soil materials for plants, and of obtaining from the air what will secure a greater amount of produce than could otherwise be expected, I shall now speak of manuring in general. What is it that constitutes the virtue of farm-yard dung? If we analyze a ton of farm-yard dung, we shall find that it contains probably what I will now state. The first thing we shall meet with is 15 cwt. of water, which is of no value whatever. We shall next find, perhaps, 4 cwt. of a woody fibrous matter. There will be some mineral matter containing potash and bone-earth. There will be likewise a variable amount of ammonia. In one ton of manure merely made by cattle in a straw-yard, you would probably not find more than 5lb. of ammonia. On the other hand, if you fed the animals with oil-cake on the box-system, or in sheds, you might find above 20 lbs. per ton. Every one knows the difference between the manure of animals fed in the ordinary way, and the manure of animals fed partly on beans, peas, oil-cake, and the seeds of any plants whatsoever. Now let us examine this point. The real object of the life of any plant is to re-produce its kind; and when a seed has been put into the soil it grows up, and is endowed with vitality, in order that it may produce seed to continue the life of the species. If we examine the composition of seeds we shall find that they contain more phosphoric acid (the acid of bones), and more nitrogen (the base of ammonia) than any other portion of the plant. Animals find seeds the strongest and best of vegetable food. They there find the bone-earth—the chief thing required for constructing the frame-work of the system—and also nitrogenous compounds, without which that frame-work could never be clothed with muscles, whose main element is *nitrogen*. You will perceive, therefore, that food will be valuable or otherwise, in proportion to the amount of bone-earth and nitrogen that it contains. You perceive, also, that when you feed your animals on seeds—whether oats, beans, or oil-cake—instead of hay or straw, the dung of those animals increases in value; and you find, in fact, that the best manure is that which contains the most bone-earth and ammonia. Now, the question arises here, are there any other sources from which these manures can be obtained? We all know that you yourselves cannot produce on your farms as much manure as you require, and that you are obliged to go to extraneous sources for a supply. Now, what are the cheapest and best manures that can be made use of? or, rather, what are the sources of supply for those manures which, as practical men, you have found that you require in order to keep your farms in good condition? I shall endeavour to answer these questions—to show you what affords the best means of supplying what is required for the growth of vegetables. We have shown that phosphate of lime and ammonia are chiefly required. We will take the case of bone first. You are aware that animals live for the most part on vegetables, which themselves obtain their bone-earth from the ground. Now, when phosphate of lime has been thus extracted from the ground for a lengthened period, and no supply has been given back, we all know that in such cases bones act almost like magic when applied to the soil. In the case of Cheshire, for example, after cheese had been exported from the county for a lengthened period, the pastures became so poor that there was really very great difficulty in getting the requisite supply of grass for animals; and when bones were there applied the produce was at once greatly increased. In returning to land the phosphate of lime, it must be borne in mind that the more finely divided the more soluble it is, and that therefore a less amount may be used. Bones or other phosphates, made into superphosphate of lime by oil of vitriol, act so efficiently because of their solubility. Now let us consider the sources of ammonia, of which the chief is guano. Guano is one of the most valuable manures ever discovered; and it is a manure derived originally by animals from vegetable matter growing beneath the surface of the ocean. Probably there is a greater quantity of vegetation at the bottom of the ocean as there is on land. Fishes have derived their subsistence from the vegetable matter beneath the surface of the ocean; birds have fed upon these fishes, and afterwards deposited their excrements on many of the small islands which lie along the coast of South America, in latitudes where no rain falls. This manure, therefore, is simply the excrements of birds who have fed upon fishes, the fishes having fed on vegetable matter; so that on these islands you have really the quintessence of the ample vegetation of the ocean. Now the question is, how can these extraneous manures be best made available to the growth of various crops, and to which are they most adapted? I daresay many of you are aware that a great discussion has taken place between Mr. Lawes and Liebig, as to whether mineral matters should be used for the land, or ammoniacal and organic matters. On the one hand we have Liebig maintaining that mineral matters will prove the best; on the other hand it is contended that the application of mineral matters will be of little or no use, and ammoniacal and organic matters are particularly recom-

mended. As in nearly all similar cases, the truth probably lies between the two. Mr. Lawes' experiments were made chiefly on clay lands, which contain a large quantity of mineral ingredients, and in such cases no doubt organic manure would be best; but without the mineral matters the application of the organic would not produce their appropriate effect. Let me illustrate this. In Dorsetshire it might seem to be totally unnecessary to apply lime to the soil, most of your lands being chalky; but, in point of fact, on the *upper soil* of many chalky downs I believe lime can hardly be discovered. The lime is always liable to wash downwards; and though it may be found within a few inches of the surface, a top-dressing is often absolutely necessary for good cultivation. I know some hop land in Kent, within a few inches of the Kentish rag limestone, on which I was able to detect only the merest trace of lime. On this point let me say, that if you put soil into a wine-glass filled with water, and find that the water effervesces after the addition of strong vinegar, you may be sure there is a sufficiency of lime. In most of the western districts lime is the great want of the soil. On Mr. Knight's property, at Exmoor, you will find that a couple of loads of lime per acre will do more good to commence with than any other application of manure. I could give an entire lecture on the subject of lime, did time permit, so different are the circumstances connected with its application; but I must content myself with remarking, that unless there is an adequate quantity of lime in the soil, it is in vain to expect the proper result from the application of any manure. To return to organic manures: let us ask what is the effect of the ammonia applied to plants, either as sulphate of ammonia, or in the cheaper form of guano? You well know, gentlemen, that farm-yard dung, when produced by animals fed on oil-cake, is the best adapted for grasses, and so on; and it is to the great amount of ammonia in the dung of animals fed upon oil-cake that this effect is produced. Professor Kuhlman, professor of chemistry at Lisle, tried a number of experiments on this subject; the result of which is very instructive. Applying equal quantities of ammonia in different forms to pieces of grass land of equal size, he found the produce in each case equal, and much superior to land without the manure. When double the ammonia was put, double the effect was produced; and, in fact, the amount of grass produced was precisely in proportion to the amount of ammonia or nitrogen used. This he found to be the result in whatever form the ammonia might be put on the land; whether as sulphate, muriate, or any other form. This is of great importance to you, who keep a great quantity of stock, and to whom increased food is so essential. Mr. Shittler, of Wimborne, has been trying some experiments with guano; and after applying 2 cwt. of guano per acre, he has found himself able to maintain a much larger quantity of stock than he ever did before upon the same amount of land. While using guano, or other ammoniacal manures, you must not fail, however, to supply your lands occasionally with mineral matter, in the form of ashes or otherwise: these are exceedingly useful to increase the growth of grass and other green crops. When used for wheat or grain crops you must proceed with caution. It is not merely luxuriant vegetation alone that you want in the case of grain crops, but the increase of the ear; and in that case, if they are used without caution, there is great danger of the wheat being thrown down before the harvest. When used judiciously, to the extent of from 1 to 2½ cwt. per acre, guano is one of the best manures for wheat, oats, or barley. Let me here remark, gentlemen, that it will generally be found that the application of 4 cwt. of salt per acre with the guano for wheat will enable you to grow more than you otherwise could expect to do. Salt has the effect of increasing the strength of the straw; and consequently by its aid you can apply ammoniacal manures without incurring the same danger of throwing down the straw, which is an essential point. Well, now, with regard to the question, What kind of ammoniacal manures you should use? let me say that it depends entirely upon the price at which they can be obtained in the market. I was at a meeting of the Royal Agricultural Society the other day, when the Duke of Richmond was detailing the endeavours which had been made to secure a reduction in the price of guano, which is now £9 5s. per ton. No one more than myself wishes that reduction to take place; but it so happens that at this moment all the other sources of ammonia are dearer than guano. How strange it would appear to the Peruvian government to be asked to reduce the price of guano under such circumstances! Now, gentlemen, I am not apt to introduce into my lectures any allusion to the politics of the continent; but I must here observe that those politics happen to be, in some degree, connected with the price of guano. There is a curious link between the price of guano and the disturbances which took place on the continent in 1848. In consequence of those disturbances, large numbers of men were kept under arms, and ammunition was required to be ready for use. In this state of things a large quantity of gunpowder was required. Saltpetre, chemically called nitrate of potash, was therefore in great demand, and its rise in price caused a corresponding rise in all the other salts of potash. The alum makers of this country use either sulphate of potash or sulphate of ammonia, according to the price. Now, as the salts of potash are so dear, the alum makers use sulphate of ammonia, which has raised the price of all salts of ammonia, and consequently, at present, guano, an imported substance, is the cheapest agricultural source of ammonia. If by any means salts of potash decrease in price, a corresponding fall in ammonia will take place. You see, therefore, that peace is essential to your own pockets. Now, gentlemen, for a brief application of the remarks which I have made. I would say, generally, that artificial manures will be of use to you by enabling you to grow more food for your stock, and that stock by eating off the food will enable you to grow more corn on your land. You have seen, gentlemen,

that fallowing is very useful, by enabling you to accumulate from the air a certain amount of materials for the succeeding crop. But, gentlemen, in my opinion, that is not the best plan of proceeding. I like to see land farmed in such a way as not to leave any of its surface unclothed with vegetable matter, at least not for more than the smallest possible time. We hear of farmers who have it uncovered, in order to get rid of the weeds; but, by proper hoeing and cultivation, couch grass and other weeds may be easily eradicated. You want to feed off a large quantity of stock; and, if you pursue the course which I have suggested, you will be enabled to grow a much larger amount of corn. The difference between this county and some counties which I have seen in the north is very great indeed. Before I was acquainted with Dorsetshire, I set it down as one of the first, if not the very first, in a black list; but, I had not known it long, before I formed a very different opinion. I have been through most of the counties of England, and I must say that I have nowhere seen better, more logical, common-sense, and scientific farming than in this county. There may be parts of the county which I have not seen, that do not equal those which I have visited; but those which I have met with, equal any that I have fallen in with either in Norfolk, in Suffolk, or any of our noted counties. There is one other point that I desire to mention; and it has reference to the period at which dung should be applied for wheat. If it be true that the greater the increase of the clover roots the larger the crop of wheat, it will at once be evident that the dung should be applied to the young clover or grasses either in autumn or spring, and not upon the ploughed-up ley just before the wheat is sown. In the former case, your seeds or clover will be materially benefited, the nutriment for stock on the farm will be increased, and a much better grain crop will be sure to follow. It may here be necessary to mention another point of great importance, viz.—Is the use of artificial food (such as oilcake) for stock the *cheapest* mode of introducing bone earth and ammonia into the land? Many farmers are content if their fat stock produce as much money as will pay for the oilcake fed, together with the price of the lean animals bought; thus sinking altogether the turnips, mangold, and hay, likewise consumed by the stock. It appears to be clear that, unless the oilcake affords a profit by the beef or mutton, a more expensive system of *manuring* could not well be pursued. The following table, comparing the manuring values of oil and rape cake with guano, may be of some service in determining the practice of the intelligent farmer:—

TABLE OF THE MANURING VALUES OF OILCAKE AND RAPECAKE COMPARED WITH PERUVIAN GUANO, FROM ANALYSIS MADE IN THE LABORATORY* OF MESSRS. NESBIT, KENNINGTON, LONDON.

	Oilcake from Liverpool.	Oilcake from London.	Oilcake from Marseilles.	Rapecake.	Average of Peruvian Guano.
	lbs.	lbs.	lbs.	lbs.	lbs.
Moisture	268.8	300.7	274.4	195.8	268.8
Organic matter	1739.6	1699.3	1718.3	1654.2	892.2
Nitrogen	109.1	118,5	118.2	115.4	295.0
Ammonia	130.6	143.8	143.4	140.0	358.4
Inorganic matter	122.5	121.5	129.1	274.6	784.0
Containing—					
Phosphoric acid	47.1	30.9	39.4	43.7	224.0
Potash	29.1	19.1	23.7	27.1	67.2
	2240.0	2240.0	2240.0	2240.0	2240.0

* The analyses were made by Messrs. Bailey, Hutley, and L. and E. Cottingham. The potash was not determined, but taken to be in a certain proportion to the phosphoric acid.

From the foregoing table it appears that one ton, or 2,240lbs., of Peruvian guano, containing 16 per cent. of ammonia, would introduce into the farm six times the phosphate of lime, two-and-a-quarter times the potash, and more than two-and-a-half times the ammonia, that would be furnished by one ton of the best oil or rape cake. To pass oilcake through the bodies of animals without some attendant benefit was both expensive and wasteful; and unless they could find their profit in the increase of the beef and mutton, it was an improper expenditure of money. I have now finished what I had to say on the general question. I have not half exhausted the subject; but I shall, as I before stated, be happy to answer questions which may be put to me after I have sat down. Before I conclude, however, I wish to say a word or two on a matter of very great importance to you as farmers. You are no doubt aware that there is in London, as in other places, many persons who live by their wits, and by what capital they may chance to possess besides. And some of these persons, let me tell you, look upon the apathy of farmers as part of their stock in trade. The parties to whom I now refer are engaged, to no small extent, in the adulteration of manures. For many years I was puzzled to guess what became of all the adulterated stuff which was constantly being prepared for sale as manure. I have seen 150 to 200 tons of an article made at Liverpool landed in the Surrey Docks, and there labelled "ex Valparaiso," and so on, and sold at about £7 a ton. Much of it I discovered, found its way into Hampshire and Dorsetshire; and I can tell you, gentlemen, that it contained

seventy-five per cent. of gypsum to begin with, and scarcely a particle of ammonia. I have seen in one place in London sixty or seventy tons of oystershells, all ready for the mill; and these being ground up with bones, are sold as the genuine article. Fifty things are used for the same purpose, and sent into different parts of the country. When gentlemen buy bones for making their own superphosphate of lime, it is especially important that they should contain no oyster shells. Oyster shells contain a large amount of carbonate of lime; and before the oil of vitriol can touch the bones it must attack the oyster shells, which are much more easily acted upon. Every 100 lbs. of oyster shells will require at least an equal weight of acid to act upon them before any effect is produced upon the bones themselves, so that their presence is exceedingly detrimental. When I say that thousands of tons of adulterated bones have been sent out of London this year, I am speaking perfectly within the mark. It is, of course, necessary for you to take care to deal only with respectable persons in the trade. But there is another point to be considered. If you try to bring the price down to the lowest possible amount, if you endeavour to wring the very utmost out of the party with whom you deal, you place the honest dealer in the position either of having to lose your custom or of being tempted to adulterate. So long, gentlemen, as you demand bones at less than the price for which the parties can afford to sell them, so long must you expect to find adulteration carried on at *at your own expense*. Now, with respect to superphosphate of lime, you must of course always take care with whom you deal. Good superphosphate of lime ought to contain at least 30 per cent. of phosphate of lime, of which 10 to 13 or 14 per cent. ought to be soluble. I have met with samples in the market containing only about 20 per cent. in the whole, and only 2 or 3 per cent. soluble. Guano also is subject to great adulteration; but I think I can point out to you this evening some simple means of detecting the grosser frauds to which it is subject. Good guano will contain at least 16 per cent. of ammonia, and if any be sent to you which contains less than that amount, you may conclude that it is not genuine. I should advise you to buy the article under the name of "genuine, unadulterated Peruvian guano." The samples damaged in the voyage are known in commerce as "damaged," "double-damaged," and "wet." Now, it is an undoubted fact, that damaged, double-damaged, and wet guano, may be Peruvian guano; but if parties sell you guano under the name which I have mentioned, and if it turns out not to correspond with the name, you may depend upon it that they will not only have to refund what you have paid, but also to compensate you for any loss which you may have sustained in your crops. The establishments for preparing unadulterated manure are large and numerous. There are places for making preparations of Essex marl, Gravesend chalk, and so so, and to such a system is adulteration reduced, that I might almost defy you to tell from samples, which was good and which bad. Before I proceed any further, let me hand round the room a sample of good and one of bad guano. I should like to hear the opinion of some practical farmer as to their relative merits; but I may as well state that at a meeting of the Wool club which I attended the other day, it was decided by a large majority that a sample which contains 50 per cent. of common white sand was decidedly the best guano (laughter). [Two samples of guano, one adulterated and the other pure, were then passed round the room, but the gentlemen present seemed completely at a loss to discriminate between them.] Mr. Nesbit then showed his methods of detecting adulteration in guano, of which we give the following details:

METHODS OF DETECTING ADULTERATIONS IN GUANO.

Procure from any druggist a common wide-mouthed bottle, with a *solid* glass stopper; one known by druggists as a wide-mouthed 6-oz. bottle will do very well. Let this bottle be filled with ordinary water, the stopper inserted, and the exterior well dried. The scales to be used ought to turn well with a couple of grains. In one pan of the scales place the bottle, and exactly counterpoise it in the other by shot, sand, or gravel. Remove the bottle from the scale, pour out two-thirds of the water, and put in four ounces avoirdupois of the guano to be tested. Agitate the bottle, adding now and then a little more water; let it rest a couple of minutes, and fill with water, so that all the froth escapes from the bottle; insert the stopper carefully, wipe dry, and place the bottle in the same scale from which it was taken. Add now to the counterpoised scale 1½ ounce avoirdupois, and a fourpenny piece, and if the bottle prove the heavier, the guano is, in all probability, adulterated. Add in addition a threepenny piece to the counterpoise, and if the bottle and guano prove the heavier, the guano is certainly adulterated. By this simple experiment a very small admixture of sand, marl, &c., is distinctly shown. From many experiments it appears that the amount of inorganic matter, or ash, varies from 30 to 35 per cent. This affords another method of detecting adulteration. A small pair of scales, a little platinum capsule, a pair of little tongs or pincers, and a spirit lamp, are all that are required. Ten grains of the guano are placed in the platinum capsule, which is held by the tongs in the flame of the spirit lamp for several minutes, until the greater part of the organic matter is burnt away. It is allowed to cool for a short time, and a few drops of a strong solution of nitrate of ammonia added, to assist in consuming the carbon in the residue. The capsule is again gently heated (taking care to prevent its boiling over or losing any of the ash), until the moisture is quite evaporated. A full red heat must then be given it, when, if the guano be pure, the ash will be pearly white, and will not exceed 3½ grains in weight. If adulterated with sand, marl, &c., the ash will always be *coloured*, and will weigh more than 3½ grains. If the adulteration be made with light or flocculent

matters, they may be detected easily, as follows: Dissolve in a quart of water as much common salt as it will take up, and strain the solution. Pour a quantity of it into a saucer or basin, and sprinkle on the surface the guano to be tested. Good guano sinks almost immediately, leaving only a very slight scum. The adulterated leaves the light materials floating on the water. If chalk or ground limestone be used, it may be shown by pouring strong vinegar over a teaspoonful of the sample placed in a wine glass. On stirring, effervescence shows its presence. Genuine guano, under the same circumstances merely allow the escape of a few air bubbles. If farmers could be prevailed upon to spend a small portion of their time in trying the foregoing simple experiments on the samples of guano they use, the fraternity of rogues would certainly have far less chances than they at present possess for pursuing their calling with profit. Still these little operations are only offered to the farmer as a means of detecting the grosser adulteration of guano. Minor ones may still be practised, and men of real intelligence and business habits will regularly call to their assistance the aid of the analytical chemist. Summing up the experiments, the following facts would appear :— 1st. If 4 oz. of guano, weighed with bottle and water as previously directed, take more than 1½-oz. and one fourpenny-piece to recounterpoise it, its purity is doubtful. If an additional threepenny-piece is required, the guano may be considered as adulterated, and the sample should be immediately analysed. 2nd. If the ash be coloured in any way, and not of a pearl white, the guano is bad. 3rd. If the ash of 10 grains of the guano weigh more than 3½ grains, or less than 3 grains, the genuineness of the sample is doubtful. 4th. If strong vinegar cause a considerable effervescence when mixed with the sample, the latter is adulterated. 5th. If the guano floats when sprinkled on strong salt and water, it is not genuine. In conclusion, he begged to thank them sincerely for the kind manner in which they had received him. He was afraid he had performed his task very imperfectly. He was convinced, however, that the real, substantial progress of agriculture was to be promoted, not by lying still, or by being scientific solely, but by combining science with practice. Again he thanked them; and, in conclusion, he would observe that, at any time when he happened to be in that county, he would be most happy again to meet them (cheers).

The CHAIRMAN having invited all present to put any questions which might have occurred to their minds,

A GENTLEMAN asked Mr. Nesbit which was the best method of applying guano for turnips.

Mr. NESBIT: I should certainly sow it broadcast over the field. I have no doubt that a much better result would be got in that way than by using it in the drills.

Mr. HOMER enquired whether Mr. Nesbit could account for the prevalence of the club-root in turnips, so common at present in the county?

Mr. NESBIT said it was tolerably clear to himself that it arose from a want of lime. He had known the evil entirely to cease where lime was applied to the land.

Mr. HOMER: What effect would chalk have?

Mr. NESBIT: Chalk would answer the same purpose, but would require a greater quantity and a longer time before its effect would be produced.

The CHAIRMAN: Why is it, Mr. Nesbit, that we cannot grow clover in this country more than once in six years, and in some cases not even more than once in ten years?

Mr. NESBIT: I must confess that you have almost given me a poser. I have seen a great many reasons given on the one side and on the other, but to my mind they are none of them satisfactory. As far as I can judge, however, the effect has more to do with the physiological condition of the plant than with the method of manuring: probably the too light condition of the land is a great cause of failure. You are aware that clover is grown more frequently on heavy soils than on light ones; and I should therefore recommend means to increase the solidification of the soil, as the most practical plan for the purpose.

Mr. FLOYER said he would not detain the meeting with any lengthened remarks; but, after the interesting lecture to which they had listened, he could not refrain from proposing a vote of thanks to Mr. Nesbit, for the able lecture which he had delivered, and for the clear and lucid manner in which he had expressed his views (cheers).

The motion, having been seconded by another gentleman present, was unanimously agreed to.

Mr. Nesbit briefly returned thanks; and the company then separated, apparently gratified with the proceedings of the evening.

AGRICULTURE; ITS PROGRESS AND IMPROVEMENT.

BY A PRACTICAL FARMER.

"How can he get wisdom that holdeth the plough.....whose talk is of bullocks?"—Ecclesiasticus xxxviii., 25.

That vast improvements are rapidly progressing in every department of agriculture throughout the United Kingdom is unquestionably true. Much has been effected, and still surprising advances are daily making, both in scientific knowledge and general practice. Every intelligent farmer is astonished at the progress made within a few years; the whole agricultural body is now fully aroused, the result no doubt of late and passing

events. All hope is giving way, except what springs from individual acquirements and persevering industry. Every plausible theory, or, if you will, "balance sheet," is subjected to the most searching inquiry, is thoroughly sifted, and few other beside really good and substantial improvements is finally adopted; every farmer's best skill and energy are brought into requisition; new appliances of machinery, of implements, of manures; new modes of culture, of drainage, of cropping, and new kinds of food and new modes of treatment are introduced to promote the more expeditious fattening of cattle, sheep, pigs, &c. These, and the like, are becoming the subjects of daily experiment; all more or less, however, requiring the test of time and experience. And as our desire and aim is to render the business of farming and grazing profitable, though under such adverse circumstances, as both farmers and graziers at present labour under, we venture to offer a few remarks and suggestions on the food and management of cattle during the season of winter. First, then, we would say, that we hold it to be indispensable to their well-being that all cattle, whether intended for fattening, for the dairy, or for ordinary grazing, should be provided with *dry lairs and proper shelter*. What can be more detrimental to them than to be shut up in cold, wet, and comfortless foldyards? Quiet, cleanliness, warmth, and shelter, we hold to be nearly equivalent to food, in cattle economy and treatment. Every animal, cattle or other stock, ought to be kept in a progressive or thriving state from the time of its birth to ripe maturity; otherwise *early maturity* is not worth attention. No pains or care ought to be spared to ensure this—they must not "go back." The time lost in bringing up animals gone out of condition is a serious drawback upon good grazing. Every grazier can best arrange his business to avoid this loss, and to accomplish an object so desirable. All of course will depend upon provident forethought and timely arrangement. Improvidence in this respect is highly reprehensible; overstocking is truly bad management; the purchase of food beyond a certain point is very problematical and unpromising; and of litter to any extent for lairage next to impossible.

The *kinds of food* now in use for the fattening of cattle are many and various, including every sort of grain and roots in general culture, several varieties and preparations of seeds, of mosses, and other gelatinous and nutritious substances given and applied under varied compounds. We are strenuous advocates for simple food of good quality and of easy applicability. In *grain*, we would chiefly confine ourselves to beans, peas, and Indian corn, and but occasionally to wheat, barley, and oats; to the offal of wheat, in moderation, we do not object, nor to meal made from tares. In *roots*, swedes, mangolds, carrots, common turnips, green coleseed, and potatoes. In *seeds*, almost exclusively to linseed in its many forms; rapeseed, and canaryseed we discard. In *grasses*, to good meadow hay. We do not altogether object to rapecake: its hot nature may prove useful as a stomachic in cold seasons. Our decided preference, however, is to the common, usual, and customary food given to cattle. *Turnips, hay, and corn* seem more to us in accordance with the natural requirements and habits, more suited to the appetites and digestive organs of such animals.

We do not approve of anything unnatural either in *food* or *treatment*. We object to close confinement either in a dung-box of their own excrement, or tied up in the stall for any lengthened period without exercise, however valuable such a course may make the manure. We also have objection to strange compound mixtures, however good their ingredients. We say not that such are not good in themselves, and may under minute attention and care be made serviceable, nay, very valuable; but it is in some degree forcing nature, and requires proportionate treatment which the vast majority of graziers are unable to accord to it. We prefer placing them in byres or boxes, loose and airy (not dung-pits), or such other easy state of confinement as our hovels and conveniences admit of; to supply them with good, wholesome, nutritious food, such as their natural instinct would lead them to choose; and to keep their lairs well ordered, clean, and comfortable. We have at different periods tried many adventitious aids to fatten them, and with varied success: still, from one cause or other, we always find ourselves ere long reverting to the more common and accustomed mode. We scarcely know why, but so it is. Two years ago we fitted-up convenient and efficient, though very economical, apparatus for steaming sufficient food for 50 pigs and from 30 to 40 oxen and cows. We proceeded with steaming our chaff—steaming for awhile our turnips—boiling our linseed, and also steeping it, which does as well, but taking more time. The linseed thus prepared we carefully mixed with chaff, according to the best rules, and took every pains to apply it to the stock aright, and keep their cribs free from taint or bad odour. We boiled, and also steamed, both beans and peas, chiefly for pigs; besides which, we steamed globe mangold, swedes, and potatoes. We applied these to both cattle and pigs, as also the liquor draining from them whilst steaming. We set about all this, and carried it on with great zest and pleasure, because we really thought a considerable saving would be effected, and our cattle thrive faster. The chaff was cut from tainted hay and wheat-straw—the steam did certainly take away the taint. The stock eat with avidity both of chaff and turnips, and, upon the whole, we had no reason to complain; yet, notwithstanding, we again find ourselves following our ordinary course. Perhaps it was convenience; perhaps the cheapness of linseed-cake; or, on the other hand, a desire to economise labour, to save coals, to save repairs, &c., &c.; or, what is more probable, our inability to discover any decided advantage in our new mode, that overruled us; but, we again repeat, so it is. Our ordinary course of cattle feeding is this—and we do not introduce it as the best for adoption, but for comparison—it is in labour inexpensive, and, in result, satisfactory: the dullest farm-labourer can carry it through. Our stallage would contain about seventy head of cattle, part of which is, however, appropriated to calves. The stalls are about 8 feet in width under a 16 feet hovel, and capable of holding two oxen in each. These we

either convert into boxes to contain two; or they are tied by the neck to posts connected with the partitions, and adjoining the cribs; between them is a water tub, within reach of both. When first put up we give them common turnips, at the rate of about 2lbs. per day to a 60-stone bullock, somewhat more or less according to the weight of the animal—these sliced, and in equal quantities at six o'clock A.M., twelve o'clock and five o'clock P.M. After the turnips about 3lbs of linseed-cake each, again having regard to the weight of the animal. This is followed by chaff, cut very long from hay and straw. Occasionally those tied up are allowed exercise in the yard; it keeps them healthy, promotes digestion, &c. They are fresh littered or bedded at each meal, and groomed or wisped down at least once in the day. The same course is pursued with those in the loose boxes; these certainly thrive faster: they rest more comfortably, and being less confined, are more healthy. The little additional cost in constructing boxes is soon repaid. When the common turnips begin to lose quality, we commence with swedes, and in March resort to mangold-wurtzel. This may appear an expensive plan; but, compared with the cost of steaming apparatus, labour, coals, repairs, and the negligence inherent to farm labourers, we think we take the wiser course.

We do not profess to bring new subjects, or presume to put forth new theories before our readers, but rather plain matters of regular business, treated in a cautionary spirit, with the sole view of promoting true economy, and the hope of pointing out a source of profit. We are far from depreciating the introduction of any fair and reasonable mode for fatting cattle, but we do urge caution and due consideration before incurring expense. We know that some of the new modes are improvements, and where attendants can be trusted, and appliances are at hand, we approve the judicious adoption of one or other of them. Those most approved are linseed-compounds, or linseed applied variously. Crushed linseed and ground corn, *i. e.*, mixed with bean-meal or the meal of peas, barley, or maize; boiled linseed or steeped ditto and chaff; linseed-oil and bean-meal or Indian corn-meal; linseed-meal and bean-meal mixed with the tops of turnips; indeed, in almost any way that fancy directs. These, and many other like compounds, are good and profitable under regular management and very careful administration; but the generality of labourers are so careless and grossly negligent as to defeat all anticipations. The compound is wrongly mixed—the vats or tubs neglected—the mixture turns sour—the cribs become tainted—*the cattle refuse to eat*. Again the steamers are out of order—the whole course is stayed for repairs—the master has one annoyance after another—thinks his *scheme* won't answer—he becomes dissatisfied, and it is given up. Now, this is not right. A little patience and perseverance would overcome all this. We would urge caution and care in adopting a fresh course, and could censure its hasty abandonment. Linseed compounds with dry food, such as hay, chaff, straw, or even with a small allowance of turnips per day, will do exceedingly well; but such compounds, with abundance of succulent food, we hold to be decidedly objectionable, as being too laxative. Bean or Indian-corn meal will correct this in some degree, but they are better used in their separate state as an adjunct to turnips and similar food, particularly potatoes. We think a fair allowance of good swedes, a moderate quantity of bean meal, and good meadow hay is scarcely to be excelled in promoting the speedy fattening of cattle. Wheat meal should be used as an astringent. Linseed oil is a purgative, and does not possess any fattening principle in itself; we object to its being used for such purpose, but if so applied at all it ought to be given in moderation with bean meal and dry food. Barley and oat meal are both very nutritious, but not equal to bean or pea meal, with succulent food.

In all cases of treatment or management, the attentive eye of the grazier is required; on his judgment much depends. "The eye of the master grazeth the ox." Each animal ought to be inspected daily, and his allowance of food or exercise regulated accordingly. If too lax, deduct laxative food and give wheat or bean meal; if costive, give laxative food, deduct his meal, add exercise and friction—a good brushing with a coarse whalebone brush. The great desideratum is to keep them thriving. Common turnips possess more diuretic properties than swedes; on this account a change may be required. All circumstances must be watched and provided for: the food, litter, and attendants must be in readiness, as upon quickness and regularity in feeding much depends, and it is also of great importance that they be speedily left to repose in undisturbed quiet.

THE CULTIVATION OF THE TURNIP.

WINCHESTER FARMERS' CLUB.

On Saturday, December 13th, 1851, the monthly meeting of the club took place at the Black Swan Inn, Winchester.

The CHAIRMAN (Mr. Pike) observed that the subject for discussion on that evening was one in which they must all feel much interested, inasmuch as it was the foundation of all good husbandry; he would not, therefore, detain them with any remarks at present, but would call on Mr. R. Smither to give them the benefit of his experience.

Mr. SMITHER said he was glad to hear the observation which had fallen from the Chairman, and in bringing the subject forward he hoped to hear from others, better acquainted with it than himself,

some information from which they might derive improvement and instruction, and prove beneficial to each other. Mr. Smither then read the following paper:—

Mr. Chairman and gentlemen,—The subject proposed for discussion this evening—"The Cultivation of the Turnip," is one which we all have an interest in, and one which always commands attention by the stock farmer, as it enables him to lay a foundation for future crops, and yet it is one, like most other of the farmer's operations, requiring different management in different localities and soils, and therefore, Mr. Chairman and gentlemen, I must claim your pardon if I may offer any remarks which may appear theory to you, as what is good practice with one may appear but mere theory to the other.

The preface to a turnip crop ought to be, in my opinion, a clean wheat or oat stubble, made a fallow of as soon after harvest as possible; and if the stubble be foul, as it too often happens to be to our cost, I would recommend, if time and weather permit, the cleansing of it before Christmas; also, if the couch grass be only thinly spread over the stubble, or only in small spots, that it be previously spudded out with a prong, as in ploughing or harrowing such ground we often carry sprigs of couch from the foul spots to the clean ones, and thereby causing us much extra labour; and another reason why, in my opinion, fallows for turnips ought to be cleaned in the autumn is, that I consider it bad policy to move our light dry soils in the burning sun of summer, though the sun very much assists us in cleansing the land, yet at the same time it dries out the moisture so requisite for the growth of the turnips.

Having thus far, Mr. Chairman and gentlemen, finished the fallowing, my next plan is, early in March or April, to cross-harrow the fallows in dry weather, in order that all the small weeds which may have vegetated by the influence of the spring may be killed by the sun, and others that were too deeply buried in the soil may be brought to vegetate by the action of light and heat. My next plan is to cross-plough the fallows, if necessary, for the purpose of cleansing them; but if this is not required, I would recommend the use of Ducie's drag, as it pulverises the soil, which, if afterwards worked with the harrows and rollers, gives it a fine tilth, and serves to keep the moisture in, which, in my opinion, is a most essential point to be kept in view, as then you can vegetate the seeds of weeds, and at your own time sow your crop. There is another thing I would mention here, when speaking of the moisture necessary in our light friable soils, and that is, the use of salt at this time in our turnip fallows. I do not think we appreciate the value of this article sufficiently. From two to five cwt. per acre sown at this season, after the fallows are worked down fine, will be found to assist materially the young plant, especially when the moisture of an evening succeeds a scorching day. I object to the plan, unless it is necessary from the state of the land, of ploughing our light soils so much as is the practice with some, as I think by the use of the scarifiers and harrows the weeds can be kept down, and the land made fine and kind.

I now come, Mr. Chairman and gentlemen, to the act of sowing. In this, perhaps, we may all differ; and yet, perhaps, we may each value our own system the best. As to the sort of turnips we perhaps too may widely differ. For early feeding I prefer the green tankard; I think they are the least likely to be affected by the fly, and the hardiest and most nutritious in growing and feeding. For late feeding I prefer a large breadth of swedes; I have adopted the plan lately of sowing swedes largely; I have this year 80 acres; they are all pretty good. I sow the softer-fleshed sorts for autumn feeding, and the harder sorts for the spring. My sheep are feeding off some of the sort called bullock's-heart swedes now, and I never saw sheep doing better, and with a small quantity of hay, having a yard and barley straw to spread over in the morning, and hay at night. After the swedes are sown, which I think ought to be over by the second week in June, I prefer to sow green rounds. I think that sort of turnip to be the next most useful species. There is very little nourishment in the red rounds, and therefore I prefer the green rounds, and the sowing of these I think ought to be completed soon after Midsummer. There are many other sorts, and every year adds to their number, and will do so no doubt, but these I think are the principal kind of turnips that are sown by us; therefore, gentlemen, having selected the sort, we next come to the sowing part of the business. My plan is to drill my crop with water taken from a pond or river; but I rather prefer pond water, that is to say, stagnant water, as I have seen a difference in my swedes where I used the two, side by side. This water I put in with Chandler's liquid manure drill, at the rate of five or six hogsheads, with 2½ cwt. superphosphate per acre. For turnips I think 2 cwt. of the superphosphate sufficient, and about three pounds of seed. I can drill about 10 acres per day. I have never had a failure of plant with it, and this year I drilled one piece with turf ashes and bone dust, when after they had been sown a month, and showing no disposition to grow, I drilled across the drills with superphosphate and water, and in four days they were up, and in a fortnight they were fit to have their neighbours taken out from amongst them. I never harrow after the drill, and always, if possible, cut the drills from east to west, as the sides of the drill protect the young plant from the heat of the sun when at its height. This, gentlemen, is my system. By this discussion I hope to learn a better, but at present I find this to be the cheapest and best system of sowing my turnip crop.

The next operation is the hoeing. This is performed in various ways; but, in my opinion, the two first hoeings, though perhaps most expensive, should be performed by the hand, afterwards the horse hoe. Nothing so much assists the growth of the plant as the moving with the hoe; therefore, I think, the nearer you can go to the plant the better, and you cannot do that so well as by the hand. I feel that there are many of you who may differ with me; but still I maintain that, though most expensive at the first, eventually it is the best.

Having now, gentlemen, brought the plant to the hoe, I must leave it in your hands, a fine, full-grown, well-shaped green round. You may now dissect it, and if it does not turn out, from the nature of the soil or otherwise, woolly or hollow, you may find it a useful root, one that I believe we, as farmers, have much yet to learn about and improve upon; therefore, Mr. Chairman and gentlemen, with thanks for your courtesy and attention, and in accordance with the subject, I beg to propose the following resolution:—

"That the cultivation of the turnip root is one of the most essential parts of the science of agriculture, as it is a great help to the farmer, and capable yet of being greatly improved."

Mr. T. PERN—after drilling ashes and bones for a month, did you lose your plant?

Mr. SMITHER—No sir, but they were so weak I thought they would not come to anything. I have a very good plant from a second drilling.

The CHAIRMAN observed that what Mr. Pern wanted to ascertain was whether the second sowing did not receive benefit from the double dressing.

Mr. WILLIAM PAIN perfectly agreed with Mr. Smither that it was an excellent plan, if the stubbles are foul, to clean them as quickly as possible after harvest; but, generally speaking, in this part of the country, as soon as they had finished harvest, they had so much land to plough for rye, winter barley, and vetches, that they had no time to do it; this year, however, he thought it might have been done. Mr. Smither had spoken of cross-harrowing his fallows in the spring,—this might do on light land, but on some land it would do more harm than good. The land might be dry and dusty at the top, but it was not penetrated above two or three inches where the harrows passed over, and would come up in great balls from the treading of the horses when ploughed again, and could not be got in a proper state for turnips. He sometimes ploughed his land across, in the winter, in the frost, when it was so hard it was with the greatest difficulty he did so, and sometimes the piece would be half as wide at one end of the field as it was at the other; but he had persevered in this plan, and found it to answer better for turnips than when he ploughed in dry weather in the month of March. He ploughed three times for turnips, but had occasionally used the scarifier instead of ploughing the last time, but was not so successful in getting a plant, as the turnip required a firm and solid bottom to root into, with a fine tilth on the top, and this was obtained better by the plough than the scarifier, as the horse walking in the furrow in ploughing helped to consolidate the land. The turnip spoken of by Mr. Smither—the green tankard—he had seen it grown with good effect, and thought it a very excellent sort; but there was a sort of turnip which he grew, called the Essex White, which he had known to be fit for boiling in seven weeks. He had sown them this year where he cut his rye grass; had been feeding them off within the last month, and had a vast deal of food—in fact, in one instance where he had grown them after rye grass fed off, he had more than from any other sort of turnips he ever saw. Where the land will grow swedes, no sort of turnips would produce the same weight per acre; and if fed off in reasonable time, he thought sheep would do very well on them. He had heard it said that they were not good for ewes and lambs; but he thought otherwise. All swedes which are required for late feeding on should be pulled up and buried in heaps, or put under a furrow, by which plan they would preserve their good quality. No doubt Providence had provided them with turnips suitable for all seasons of the year. He had heard it many times stated that large turnips were of very little use. So far as he was concerned, he did not care how large they were—the bigger they were the better he liked them. They might have a piece of turnips that were thickly planted and small; but if they were large in the bulb, and a thin plant, they would be found to produce more weight per acre than the smaller. The large turnips would always be best if fed in proper season. There was the globe, tankard, Norfolk white, and Essex white, for early feeding, which will last good till December; the green round would then come in, and last good till March; Dale's hybrid would last till April; and swede mangold wurzel as long as you like to keep them. He had used the liquid manure drill twice in his time, and certainly with very good effect once; but another time when he used it, he drilled five acres of swedes, and to make out the day, he put in some Aberdeens about three or four acres. On the next day he drilled in some Aberdeens adjoining the others, with 2½ cwt. of superphosphate, and 20 bushels of ashes. He found that where the liquid manure had been used, the turnips came up sooner than those where manure was put on dry; but those drilled with liquid manure were rotten when he came to feed them, while among those drilled with bones and ashes scarcely a bad turnip was to be found. With regard to the quantity of seed to be used, he agreed with Mr. Smither, who sowed three pounds per acre and recommended that a good quantity of seed should be sown. He had always made it a practice to harrow after drilling, but not to roll; for in a wet season, if he did so, the land would become so hard that it would be impossible the plant could grow. It never had struck him about drilling from north to south, or from east to west; but he invariably drilled from north to south, as

his fields are ploughed in that direction, and not from any other motive. He always set his turnips out by hand hoe; but as soon as he saw them in the drill he put the horse hoe to work. He had this year as good turnips as he ever grew—this he attributed to the use of the horse hoe. This, he thought, was not the case generally—in fact, he had never seen worse than they were in the month of August; but there had been a great improvement within the last two or three months. Many persons entertained an impression that if they stirred the land about with the horse hoe in dry weather it would be injurious; but he was of opinion that it was beneficial. He kept on three or four horse hoes every day during the season, which got over three or four acres a day each, with one horse to a hoe. His general manure for turnips was 1 quarter of bones and 20 bushels of turf ashes to an acre. With regard to the observation made by Mr. Pern to Mr. Smither about drilling a second time, he had seen the same effect produced as that which had been spoken of by Mr. Pern, where he had a crop of turnips fail.

Mr. SMITHER, in reply to a question, said he drilled from 22 inches to 2 feet apart.

Mr. T. EARLE corroborated what had fallen from Mr. Smither, and said that good crops had been produced. In respect to the quantity of seed to be sown he rather differed from him.

Mr. GARRETT said, on one occasion he had sown four acres of land. He drilled two acres of turnips with superphosphate and ashes, and the other two with superphosphate as liquid manure; the latter were certainly up sooner, but he found he had less weight per acre than the former. He once used the liquid manure drill for turnips after rape and vetches, and put on 2 cwt. of superphosphate to the acre, and he had a very good crop of turnips, though late in the year. If sure to get a plant, he considered one pound of seed to an acre enough. With that quantity a man could do much better work in hoeing. Mr. Smither's plan, no doubt, was an excellent one, as to cleaning the land immediately after harvest, if they could always find time to do it; but, as Mr. Pain had very justly observed, it could not always be done.

Mr. JAMES REEVES thought the plan of using the manure in a liquid state very good, but it could not be brought into practice generally in some localities in consequence of the want of water; for his own part he could not adopt it, as he had often not water sufficient for his sheep. As respected the seed he agreed with Mr. Smither that although a less quantity would do, they were not always certain of getting a plant. With regard to his own turnips he always found he got a better plant after ploughing than scarifying. He drilled the land the same day that it was ploughed.

Mr. WILLIAM PAIN considered it advisable to sow sufficient seed to insure a plant. If they let them stay till they got to a large size before hoeing, it must do material injury by drawing the manure away from the land. The seed could be procured for fourpence or sixpence a pound; therefore, in point of expense, the quantity used was unimportant. With regard to the system which he pursued in hoeing, he would mention that he had a child or woman to follow the men as they are hoeing. The man struck with his hoe, and might leave one or two turnips, which were singled out by hand. He paid four shillings an acre for singling; and he had known a man go over an acre of land in a day, with his wife or child. If they once adopted that system, he thought they would never depart from it, for they would get their plants set out regularly and would very rarely see two plants together. Two children six or seven years old might follow any man. With regard to Mr. Garrett's remark on ploughing the land only once, he would say that he did not know how they would get rid of the weeds without they scarified or used the horse hoe as a scuffler. He coincided in the opinion that the sooner they sowed after ploughing the better. It was his custom to put on as many ploughs as would plough the land enough for the drills. He generally put on eight ploughs, which would as much land as he could drill in a day. With regard to harrowing after the drill, one great advantage which he found was that when the plants came up they were not in a hollow, but level with the surface when he came to horse hoe.

Mr. GARRETT in allusion to what had been observed in favour of Lord Ducie's drag, said he had not known any parties who had tried it. If it kept the land clean, and brought all the weeds to the surface, and if they got the couch grass which it would take off, then it would make a very clean job. He had used salt, and on dry chalk land had found it very beneficial, so much so, that when the evening dews were about, the plants seemed to revive. With regard to management he would say that what was the practice with one, might be different with another. He thought that on some of our dry soils we ploughed a little too seldom, and sometimes a little too much. He thought that swedes did much mischief to the land after March, when they struck the green. With regard to the expense, the cost of the seed was small. Nothing tended more to create the growth of turnips than the use of the drag and harrow when in a young state.

Mr. T. PERN thought the ploughing all depended upon the nature of the land—if strong and flinty, a

repetition of it might be advisable. He recollected that some years ago a great secret had come out from a person in Wiltshire, named Sutton, with regard to the fly. This person said the fly was produced by eggs, which on coming into contact with the sun and air, were brought to perfection. Now, the land being moved, and having the advantage of sun and air, brought these eggs to perfection. He thought where the land could be brought into a fit state of drilling, the less they ploughed the better.

The CHAIRMAN said they were all much obliged to Mr Smither for the able manner in which he had brought the subject forward. It appeared that the conclusion which had been arrived at was to sow on wheat stubble. He thought there was nothing in the objection that they ploughed too much; for, in his opinion, they ploughed too little. He could speak from personal experience of the utility of the scarifier, which acted similarly to Lord Ducie's drag, bringing all the couch grass to the surface. His own impression was that land intended for turnips could not be fallowed or crossed too early. He objected to moving it in a hot summer, and therefore he thought the scarifier preferable to the plough. Salt was, no doubt, very beneficial. In addition to the turnips mentioned by Mr. Smither, he thought they might sow more swedes, as they were not merely required for sheep alone, but were applicable as food for other animals, and he once kept his horses on them. With regard to the liquid manure drill, he had only once tried it, and that was for turnips after vetches; that was at a time of year when they required moisture, and he certainly succeeded well, having had an excellent crop. One great evil, in his opinion, was that they did not hoe early enough. He certainly at one time was adverse to hoeing turnips in dry weather; but he had this year kept on hoeing, and had come to the conclusion to hoe earlier, and to begin to do so whatever the weather might be. He had never before heard any remarks relative to the direction in which they drilled. In drilling peas it was usual to go from north to south, the object of so doing being to admit the sun in the ranks. He had used a cloderusher, which prevented the land from becoming too scaly on the top, after a thunder storm, which prevented vegetation. He was a great advocate for land, which was to be sown with turnips, to be ploughed early in the autumn. He thought their root-crop land required to be ploughed deep. One remark he had heard which he could fully agree to; which was, that swedes, if left in the ground in the spring, extract a good deal from the soil, and he therefore did not think it prudent to let them run to greens too much in the spring. Last year he ploughed them up, and turned them in under a furrow, which kept them moist. When he wanted to feed them, he gave them a tine or two with the harrow, which brought them to the surface. The ewes and lambs did well on them, and the sheep did well late in the spring. The use of superphosphate on particular soils in Hampshire must tend to economise the production of turnips; the only difficulty was in getting it genuine. He had dissolved half inch bones at home. If they understood chemistry and geology, they would be enabled to get better crops, and he hoped that in the next generation a knowledge of these sciences would be encouraged as being most essential to the interests of agriculture. A question had been started that there was a difference in the quality of turnips gown on poor land and those grown on good land. He himself was not aware of this, but he knew that there was a difference in this respect as regarded hay. He was convinced, after discussion at their last meeting, that Hampshire must still be considered as a breeding county. On one part of the land they produce good turnips, but not sufficient for grazing purposes. When a stranger came into the county he was impressed with the idea that the agriculture of Hampshire was proceeding under a profitable system. Taking it as a whole, the county was more suitable for breeding than for grazing; and, no doubt, the cultivation of turnips was the foundation of all good husbandry, being the foundation of all cereal crops. Mr. Pain's observations on hoeing, he thought deserving of particular attention. The men so engaged employing one or two of their children was certainly very beneficial, as it enabled them to earn something during the summer months. The Chairman then put the resolution, which was unanimously agreed to.

Mr. W. PAIN said the members were greatly indebted to Mr. Smither for the able manner in which he had laid the subject before them. It was from its nature calculated to excite an interesting discussion, and he hoped that all had been benefited by it. No doubt what would suit on one soil would not do on another; still all have learnt something from that night's discussion. He therefore proposed a vote of thanks to Mr. Smither for the able manner in which he had brought the subject forward.

Mr. GARRETT seconded the motion, which was carried unanimously.

Mr. SMITHER said it was much more agreable to receive a vote of thanks than one of censure. He was glad that the subject had given rise to the discussion, because at that time they would have leisure for consideration before they prepared for the next season.

Mr. W. H. EARL proposed a vote of thanks to the Chairman for his able conduct in the chair on all occasions, and particularly on the present one.

Mr. THOMAS PERN seconded the resolution, which was unanimously agreed to.

The CHAIRMAN said he felt greatly obliged to the members for the kind manner in which they had regarded his feeble efforts. He could only assure them that he felt deeply interested in the welfare of his brother farmers, and was always glad to render them any assistance in his power which might tend to benefit them in the slightest degree under existing difficulties, to enable them to carry on their operations in a more economical, and he trusted eventually in a more profitable manner. He was fully aware that they, as agriculturists, had a great deal yet to learn; and by meeting together as they had done in that room, they would be the means of assisting each other in carrying on their occupation; for scarcely a meeting had been held there from which a farmer might not learn something, and when he got home he had time to reflect upon it, and turn it to his advantage. He hoped the farmers' clubs throughout the kingdom would be productive of advantage not only to them, but be beneficial to the community at large.

"A WORD IN SEASON"—WHEAT GROWING.

The writer of the pamphlet, "A Word in Season," is one who, in wheat-growing, would give as little as possible to the soil, and take all away. He would give no manure, would give but ten pecks of seed, would remove both corn and straw; and yet would expect the land to grow wheat, if not *ad infinitum*, at least for an indefinite period.

His statements are plausible, and at first sight rational. He cites Jethro Tull, who declared his thirteenth crop of wheat the best of all he had grown, and his twelfth wheat crop in succession the next best, by wide-row drill husbandry, without any manure. The writer pleads for a practice superior to Tull's: Tull, he says, never stirred the subsoil, but he has done it, and therefore is in advance of that doubtless great man.

Now we will see for a moment the theoretical basis on which his system rests. Liebig long ago asserted that it was the mineral ingredients of the soil which mainly tended to sustain the wheat crop; that the ammonia was supplied by the air in sufficient quantity, as well as the carbon; nay, that all soils, as he subsequently showed, had more ammonia in them than any crop could take away.

Now, every one knows that a soil will disintegrate and crumble, and liberate its constituents locked up by severe affinities, by the united action of the air, the frost, and the water; and, therefore, if one body of the soil were always subjected to the influence of these, it was like giving a crop an alternate fallow; and this, it will be admitted, would secure a crop for some time, both in the way of cleaning, and also for pulverization, and even sustaining fertility.

Perhaps, too, one of the greatest obstacles in the way of those who have attempted to grow wheat year after year is, that the land became unavoidably foul. Careful digging, cleaning, and forking might, and perhaps would, do much to obviate the difficulty. We never saw cleaner or better beans than those of Mr. Wiley, of Bradsby, who is not satisfied with hand and horse hoeing the wide intervals he allows between the rows. Hence there is, no doubt, great merit in wide and well-stirred husbandry. Now, the anonymous writer begins with land newly taken out of grass, hand manured with the refuse of stock, and the roots of grasses which had perished and decomposed centuries ago. He mixes this, on a strong soil, with the subsoil, by deep trenching the whole, and thus exposing it to the frost, the rains, the air, and the sun. It necessarily becomes open and friable, the ochrey matter present in many clay subsoils will wash away, and the soil will doubtless become deeper year after year.

He commences, however, a system of depletion of an extraordinary kind—he grows wheat year after year, on wide rows, occupying half the land with corn, and the rest with digged, hoed, and forked soil. On this he professes to make a profit, exclusive of rent, of £9 per acre—or, at any rate, of £8; for the accounts vary.

That he is deepening the soil must also be admitted. This is an important point. If he sustain the stable, as he calls it, it would be very well; but his system of taking off all, both straw and corn, is one which must bring any stable soon to an end. Much ammonia as the soil has in it, and much as Mr. Huxtable may talk of its *natural* produce, still there is not enough of either ammoniacal, carbonized, or mineral elements to bear a system of entire withdrawing. A heap, however large, will get less and less by constantly taking from; and our anonymous adviser will find, when the freshness of his soil is gone, his system will disappear with it.

In his balance-sheet for 1850, he makes out an expenditure of £3 14s. per acre; his four quarters and two bushels of wheat to be worth £8 10s.; and his twelve cwt. of straw to be worth £3 4s., showing a profit of £8 per acre. Now, as this theory, if true, were also true seven years ago, had he taken it up with wheat at the price it averaged for a great number of years, about 50s. per quarter, allowing the straw to be the same, it would have been thus:

Wheat, 34 bushels at 7s.	£11	18	0
Straw, as above	3	4	0
	£15	2	0
Deduct expenses, as above	3	4	0
Would leave a profit of, per acre	£11	18	0 !

The idea—for such it is—is preposterous!

It seems to us there are three great elements of error into which he has fallen in his calculations. First, he over-estimates the straw. There is no farm process to which it can be applied to be worth £2 per ton. It is generally a loss. To convert it into manure is the great object of the farmer, and he too often, recently at least, has done it to his cost, as we have seen by recent examples; but to reckon on anything like £2 per ton for straw, when manure for wheat is of no value, is quite absurd and irrational.

Secondly, he over-estimates his crop. Once he has had thirty-four bushels per acre—he has had it more than once; but this is not anything extraordinary on fresh land, and it is certain it cannot be depended upon with our climate and the contingencies of a crop, even if the fertility of the soil be kept up. Nay, more; the fact is well known that fresh soil will keep much easier free from weeds than any that is old going; and therefore, while the expenses of production will increase, the produce will fall.

The following will be a nearer estimate:—

From 34 bushels of wheat, at 5s., deduct 10 per cent. for probable failures, and 3s. for tail corn not worth 5s.					£7	10	0
Then deduct expenses as given	£3	14	0				
Rent	2	0	0				
Interest of capital	0	14	0				
Oversight	0	10	0				
					6	18	0
					£0	12	0

This is without any deduction for deteriorated condition of the soil, which must soon require manure; nor is the rent charged at a sum commensurate with that which ought to be charged for newly taken-out land.

Altogether there is no more hope for the farmer in low farming than in high; that is, to lay a judicious expenditure on a farm is far preferable to any excess or any stinginess; and we cannot help holding up Mr. Mechi on the one hand, and Mr. Stout British Farmer on the other, as beacons to warn the grower against following. We were told Mr. Mechi's predecessor grew 28 bushels of wheat per acre; he has increased it to 35 by enormous cost. We should like to know if this be true.—Gardeners' and Farmers' Journal.

THE SMITHFIELD CLUB.—THE NEW ARRANGEMENT FOR THE CLASSIFICATION OF ANIMALS.

The inhabitants of the British islands being essentially a meat-consuming people, it is a matter of great importance that an ample supply should be provided; in effecting which object quality and price must form most important ingredients. The Smithfield Club was, as we have frequently heard a former respected President of the Society (the late Earl Spencer) express it, established for the purpose of "supplying the markets with the *best* and *cheapest* meat;" and that it has been preeminently successful in promoting that object, is admitted even by those who from time to time indulge in strictures on the "mountains of fat" exhibited on the carcasses of some of the animals. We are not of the number of those who place implicit confidence in the saying, "Let well alone;" because by so doing we might interpose a barrier to improvement. But we deem it prudent not to forget another old saw, "Hodge was well, wanted to be better, took physic, and died." We think that when doing "well," clear and sound reasons for believing that we shall do better should be advanced before we expose ourselves to the chances attendant upon a change of system. No men can better appreciate the value of this proposition than farmers. The Smithfield Club was once at a very low ebb, but by the energy and devotedness of the late Earl Spencer, and the practical men that he gathered round him, aided by the untiring exertions of the late Hon. Secretary, Mr. Brandreth, it attained a high position, and has continued, under the present excellent official management, to progress up to this time. Those persons who are conversant with the arrangements of the club are aware that the prizes have hitherto been open to animals of every breed; Shorthorns, Herefords, Devons, Scotch, and all other breeds, competing with each other. At the meeting of the club in December last, however, pursuant to the recommendation of a committee appointed in December, 1850, to consider the subject and report thereon, a radical change has been effected, and in future the animals will be classed according to their respective breeds; by which means all comparison and competition between breeds will be put an end to, the only competition being between animals of the same breed. The same sums will be given in prizes to each of the breeds—Shorthorns, Herefords, and Devons; and however coarse and bad the animals in any one of the breeds may be, however inferior a class of one breed may be to the like class in another breed—as was seen at the late show—the same stamp of merit will be affixed upon them, the prizes awarded being the test of merit. There are also separate classes for "Scotch, Welsh, and Irish," for "other pure breeds," and for "cross or mixed breeds," the prizes for each class being smaller in amount than for each of the three first-named breeds. Now,

so far as we could collect, the principal reasons assigned for the change were, that a feeling of dissatisfaction existed amongst the exhibitors, arising from the belief that the judges were influenced in their decisions by prejudices in favour of the particular breeds of which they themselves were breeders, and hence that strict justice was not done; and further, that the classification of breeds had been adopted by the Birmingham Society, was approved generally, and that it would have the effect of taking exhibitors away from the Smithfield Club if the same system were not adopted. An instance was cited as having occurred in December last, in which a Devon cow had been sent to Birmingham because she stood no chance of winning at Smithfield. Now there can be no doubt that it is very judicious in the individual, whose object it is to obtain a prize, to exhibit his animal where he is most likely to be successful. But why was want of success anticipated? There are three grounds, and three only, which present themselves to our imagination: First, positive inferiority to other animals exposed in competition; secondly, the incompatibility of a Devon competing with a Shorthorn, a Hereford, or any other breed; and thirdly, the apprehension of a prejudiced decision by the judges, adverted to before. Now, in respect to the first ground, we throw it overboard altogether as most improbable. As regards the second ground, we ask is it impracticable to determine the relative merits of animals of different breeds? and if so, how comes it that the objection has not been raised long ago? How is it that the system adopted in the Smithfield Club has worked so well hitherto? In respect to the third ground, the most important, as being the foundation of the recent change, *we* say it is not founded in fact. In order to test the merits of this question, we submit to our readers a statement, in a tabular form, of all the prizes awarded by the Smithfield Club during the last twenty years, with the breeds of the animals to which prizes were awarded; distinguishing each as "oxen," or "cows and heifers," or "cows," as the case may be, and adding the names of the judges in each year.

This statement will, we think, afford valuable information to persons who take an interest in this question, so as to enable them to arrive at a sound conclusion upon it. We must confess that we are much surprised at some of the facts elicited by the investigation we have made, and which are set forth in the statement to which we have before referred. We should here observe that the statement is principally made up from the list of prizes, which appeared in the periodicals of the day, and hence may not be perfectly correct; but we will undertake to say, that the errors, if any, are not such as to materially affect the results.

It appears that in the 20 years from 1832 to 1851 inclusive, there have been 308 prizes awarded for cattle. Of these 210 have been awarded to oxen, and 98 to cows, or cows and heifers. That of the 210 awarded to oxen, 109 have been carried off by Herefords, 55 by Shorthorns, and 28 by Devons; the remainder, 18, by other breeds. Of the 98 prizes awarded to cows, 81 have been taken by Shorthorns, 11 by Herefords, and 2 by Devons; the remaining 4 by other breeds. Of the 210 prizes awarded to oxen, 103 were *first* prizes; and of these the Herefords took 50, the Shorthorns 21, and the Devons 18; the remaining 14 were taken by other breeds. Of the 98 prizes given to cows, 48 were *first* prizes, of which the Shorthorns carried off 42, the Herefords 3, the Devons 1, and the Longhorns 2. Of the gold medals to oxen, the shorthorns took 10, the Herefords 8, and the Devons 2. Of the 6 gold medals to cows, the Shorthorns took 4, and the Herefords 2. From these figures it will be seen that in a period of twenty years the Hereford oxen have beaten the Shorthorns nearly two to one, and the Devons nearly four to one; yet under the new system both Shorthorns and Devons will have the same encouragement, the same sum of money awarded to them.

In cows the Shorthorns have beaten the Herefords more than seven to one, and the Devons more than forty to one; and yet the Herefords and Devons will now have an equal sum in prizes with the Shorthorns. But then it will be said this inequality arises from the prejudice of the judges. Let us refer to the names. We are tolerably well acquainted with most of them, and we believe we may state with confidence that a very small proportion of the judges who have acted during the period referred to are breeders of any description of stock. They are principally graziers or feeders; and if there be a preponderance of breeders of any particular sort, the Shorthorns have the advantage in that respect, although so vastly behind in the prizes for oxen. Here then we find the Herefords eminently superior in the ox classes to the Shorthorns, whilst the latter are pre-eminent in the cow and heifer classes. Is there any sound practical inference to be deduced from these results? Under the new system, had it prevailed during the last twenty years, all would have stood alike. Are we to infer that Herefords are best for ox beef, and Shorthorns for cow and heifer beef? We have no object in referring to this subject but to put those who take an interest in the Smithfield Club in possession of facts which may show how the old system worked, and thereby enable them to form a better opinion of the probable operation of the new system. We entertain a strong opinion that the change which has been effected is subversive of the principle upon which the Club was founded; nevertheless if it shall prove more effective in attaining the object sought, it will have our most cordial support. At present, however, we consider that instead of promoting inquiry into the relative merits of animals of all descriptions, with a view to encourage those which will "supply the markets with the best and cheapest meat," the new system will encourage all breeds alike, without reference to which may produce the "best" or "cheapest" meat. As regards the Scotch cattle, it is well known that Scots fetch a higher price in Smithfield market than animals of any other breed, and yet they are stamped as of an inferior class, lower prizes being given to them. We much fear that the "prejudice" charged upon the judges rests elsewhere. —Mark Lane Express.

PRIZES AWARDED FOR CATTLE BY THE SMITHFIELD CLUB, FROM THE YEAR 1832 TO 1851 INCLUSIVE (20 YEARS), WITH THE NAMES OF THE JUDGES IN EACH YEAR;

THE ANIMALS BEING CLASSED UNDER THE HEADS "OXEN," "COWS AND HEIFERS," AND "COWS," AND THE SEVERAL BREEDS DISTINGUISHED.

Year.....	1832.	1833.	1834.	1835.	1836.	1837.	1838.	1839.	1840.	1841.	1842.
JUDGES..	T. Chapman.	T. Umbers.	C. Stokes.	R. W. Laxton.	C. Stokes.	E. Franklin.	V. Barford.	W. Pratt.	C. Stokes.	C. Stokes.	Mr. Hewitt.
	R. W. Laxton.	S. Druce.	S. Druce.	E. Franklin.	E. Franklin.	R. Oldacre.	T. Beasley.	Mr. Short.	W. Trinder.	S. Druce.	S. Druce.
	S. Druce.	S. Bennett.	S. Bennett.	S. Bennett.	Mr. Hirst.	J. Jellico.	W. Trinder.	W. Trinder.	R. Parkinson.	S. Bennett.	Mr. Buckley.
OXEN.											
1st Prize ..	Hereford	Shorthorn	Shorthorn	Shorthorn	Hereford	Hereford	Hereford	Hereford	Shorthorn	Hereford	Hereford
2nd Prize..	Shorthorn	Hereford	....	....	....	Devon	Hereford	Shorthorn	Hereford	Shorthorn	Shorthorn
3rd Prize ..	....	....	....	....	....	....	....	Hereford	Hereford	Shorthorn	Shorthorn
1st Prize ..	Shorthorn	Hereford	Shorthorn	Hereford	Shorthorn	Hereford	Hereford	Hereford	Shorthorn	Hereford	Hereford
2nd Prize..	Hereford	Hereford	Shorthorn	Shorthorn	....	Shorthorn	Hereford	Shorthorn	Shorthorn	Hereford	Shorthorn
3rd Prize ..	....	....	....	....	....	....	....	Hereford	Hereford	Shorthorn	Ayrshire
1st Prize ..	Hereford	Shorthorn	Hereford	Hereford	Hereford	Hereford	Devon	Hereford	Hereford	Hereford	Hereford
2nd Prize..	Hereford	Hereford	....	Hereford	Hereford	Hereford	Hereford	Hereford	Hereford	Shorthorn	Hereford
3rd Prize ..	....	....	....	....	....	....	....	....	....	....	....
1st Prize ..	Scotch	Hereford	Hereford	Hereford	Scotch	Hereford	Shorthorn	Hereford	....	Hereford	Hereford
2nd Prize..	....	Hereford	Hereford	Hereford	....	....	....	....	....	Hereford	Hereford

COWS OR HEIFERS.						**OXEN.**					
1st Prize ..	....	Shorthorn	Shorthorn	Shorthorn	Shorthorn	Hereford	....	....	Hereford	Shorthorn	Hereford
2nd Prize .	....	....	...	....	....	Scotch	....	....	Hereford	....	....
COWS.						**COWS OR HEIFERS.**			**OXEN.**		
1st Prize ..	Shorthorn	Shorthorn	Shorthorn	Shorthorn	Shorthorn	Shorthorn	Shorthorn	Shorthorn	Scotch	W. Highland	Scotch
2nd Prize..	Shorthorn	Shorthorn	....	....	Shorthorn	Shorthorn	Shorthorn	Shorthorn	....	Polled Angus	....
3rd Prize ..	....	....	....	....	....	....	....	....	....	....	....
						COWS.			**OXEN.**		
1st Prize..	....	....	....	....	....	Shorthorn	Shorthorn	Longhorn	Scotch	Polled Angus	....
2nd Prize..	....	....	....	....	...	Shorthorn	Hereford	Shorthorn	....	Scotch	....
3rd Prize..	....	....	....	...	....	....	....	....	....	....	....
									COWS OR HEIFERS.		
1st Prize ..	....	....	....	....	....	....	....	....	Shorthorn	Shorthorn	Shorthorn
2nd Prize..	....	....	....	...	....	....	....	....	Shorthorn	Shorthorn	Hereford
3rd Prize..	....	....	....	....	...	....	....	....	....	....	Shorthorn
									COWS.		
1st Prize ..	....	....	....	....	....	....	....	....	Shorthorn	Shorthorn	Shorthorn
2nd Prize..	.. .	....	....	....	....	....	....	....	Longhorn	Shorthorn	Shorthorn

Year....	1843.	1844.	1845.	1846.	1847.	1848.	1849.	1850.	1851.
JUDGES.	S. Druce.	Mr. Worthington	T. Parkinson.	G. L. Franklin.	S. Bennett.	Mr. Chapman	T. Townsend.	T. Reynolds.	J. Quartley.
	S. Bennett.	Mr. Ladds.	G. L. Franklin	Mr. Smith.	R. Oldacre.	Mr. Umbers.	J. Booth.	R. Oldacre.	H. Chamberlain
	W. Bartholemew.	Mr. Franklin.	T. Harris.	Rev. Mr. Smythies.	W. Torr.	Mr. Loft.	T. Reynolds.	S. Wiley.	T. Greetham.
OXEN.									
1st Prize..	Shorthorn	Shorthorn	Hereford	Hereford	Shorthorn	Hereford	Hereford	Devon	Hereford
2nd Prize..	Hereford	Hereford	Shorthorn	Shorthorn	Shorthorn	Shorthorn	Shorthorn	Hereford	Shorthorn
3rd Prize..	Shorthorn	Hereford	Shorthorn	Hereford	Devon	Shorthorn	Hereford	Hereford	Hereford
1st Prize..	Shorthorn	Shorthorn	Devon	Hereford	Shorthorn	Hereford	Shorthorn	Shorthorn	Hereford
2nd Prize..	Hereford	Hereford	Hereford	Hereford	Hereford	Hereford	Devon	Shorthorn	Hereford
3rd Prize..	Hereford	Shorthorn	Hereford	Shorthorn	Hereford	Shorthorn	Hereford	Shorthorn	Hereford
1st Prize..	Devon	Hereford	Devon	Hereford	Shorthn.& Dev.	Shorthorn	Shorthorn	Hereford	Hereford
2nd Prize..	Hereford	Hereford	Hereford	Hereford	Devon	Shorthorn	Shorthorn	Shorthorn	Hereford
3rd Prize..	....	....	....	....	....	Shorthorn	Devon	Shorthorn	Hereford
1st Prize..	Devon	Hereford	Devon	Hereford	Devon	Devon	Devon	Hereford	Devon
2nd Prize..	Hereford	Hereford	Hereford	Hereford	Devon	Hereford	Hereford	Shorthorn	Hereford
OXEN.									
1st Prize..	Hereford	Hereford	Devon	Devon	Devon	Devon	Devon	Devon	Devon
2nd Prize..	....	....	....	....	....	....	Devon	Devon	Devon
COWS OR HEIFERS.									
1st Prize..	Shorthorn	Shorthorn	Shorthorn	Highland	Highland	W. Highland	W. Highland	Galloway	Pembroke
2nd Prize..	Shorthorn	Shorthorn	Shorthorn	....	....	....	....	....	....
3rd Prize..	Ayrshire	Shorthorn	Shorthorn	....	....	....	....	....	....
COWS.						COWS OR HEIFERS.			
1st Prize..	Shorthorn	Shorthorn	Hereford	Shorthorn	Hereford	Shorthorn	Shorthorn	Shorthorn	Hereford
2nd Prize..	Shorthorn	Hereford	Shorthorn	Shorthorn	Shorthorn	Hereford	Devon	Shorthorn	Shorthorn
3rd Prize..	....	....	....	....	....	Hereford	Shorthorn	Shorthorn	Shorthorn
COWS.						COWS.			
1st Prize..	Shorthorn	Shorthorn	Devon	Shorthorn	Shorthorn	Shorthorn	Shorthorn	Shorthorn	Shorthorn
2nd Prize..	Shorthorn	Shorthorn	Hereford	Shorthorn	Hereford	Shorthorn	Shorthorn	Shorthorn	Shorthorn
3rd Prize..	....	....	....	....	....	..	....	....	....
1st Prize..	....	....	....	Shorthorn	Longhorn	Shorthorn	Shorthorn	Shorthorn	Shorthorn
2nd Prize..	....	....	....	Shorthorn	Shorthorn	Hereford	Shorthorn	Shorthorn	Shorthorn

ANALYSIS OF THE PRIZES AWARDED TO OXEN.

Total Number of Prizes.. 210		Total No. of First Prizes.. 103	
Herefords	109	Herefords	50
Shorthorns	55	Shorthorns	21
Devons	28	Devons	18
Scotch	16	Scotch	12
Pembroke	1	Pembroke	1
Cross Shorthorn and Devon	1	Cross Shorthorn and Devon	1
	—210		—103

ANALYSIS OF THE PRIZES AWARDED TO COWS, AND COWS AND HEIFERS.

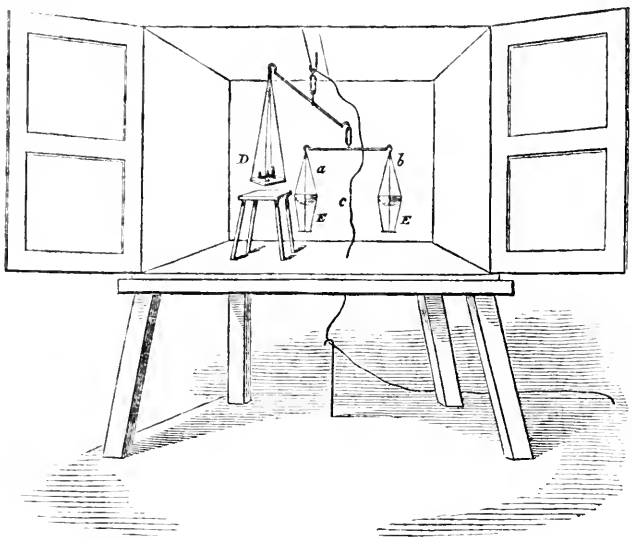
Total Number of Prizes.. 98		Total No. of First Prizes.. 48	
Shorthorns	81	Shorthorns	42
Herefords	11	Herefords	3
Devons	2	Devons	1
Longhorns	3	Longhorns	2
Ayrshire	1		— 48
	— 98		

GOLD MEDALS TO OXEN.

1832.. Shorthorn	1833.. Hereford	1834.. Shorthorn	1835.. Shorthorn	1836.. Hereford	1837.. Shorthorn
1838.. Devon	1839.. Hereford	1840.. Shorthorn	1841.. Shorthorn	1842.. Shorthorn	1843.. Shorthorn
1844.. Shorthorn	1845.. Hereford	1846.. Hereford	1847.. Shorthorn	1848.. Devon	1849.. Hereford
1850.. Hereford	1851.. Hereford.				

GOLD MEDALS TO COWS.

1846.. Shorthorn	1847.. Hereford	1848.. Shorthorn	1849.. Shorthorn	1850.. Shorthorn	1851.. Hereford.



REFERENCES.

a Silken threads.
b Fine copper wire.
c Stout copper wire, connecting the arrangement with the ground.
D Weights representing the total evaporation from both vessels.
E Small weight dishes, for the restoration of balance, from difference of evaporation in insulated and non-insulated vessels.

ATMOSPHERIC INFLUENCES—THE POTATO DISEASE.—*(By* FRANKLIN COXWORTHY, *author of "Electrical Condition.")*—This interesting question may be considered under three distinct heads — the formation of ammonia during the crystallization of snow, which formed the subject of my paper in the *Journal* of the 17th of January, and which may be regarded as the permanent although constantly-increasing condition, with the increase of nitrogen evolved by combustion, and the evolution of carburetted hydrogen consequent on the accumulation of carbon in the soil by the annual raising of about 50,000,000 tons of coal—the fluctuating evaporating influence in the atmosphere, and the relative electrical condition of the earth and the air; and although "out of sight out of mind" may have divested the question of some portion of its interest, it must nevertheless be self-evident to the reflecting reader, that any system that shall abate or arrest the complaint, under the combined influence of all the conditions, must necessarily tend to the general improvement of the root of the potato, and cannot fail in devising the system of dressing best suited to the plant itself. We are a matter-of-fact nation, and therefore on facts alone I shall base my conclusions; and, that these may be the more readily understood, I must first beg a reference to the accompanying diagram of the apparatus, that has elicited such important information, and for the illustration of which I am indebted to the *Mining Journal*, in which it appeared in the number for Sept. 20th, 1851.—On the north side of the wall, at the botton of the garden, is a summer-house, the roof of which consists of boards covered with painted canvas, a lining of stout brown paper being introduced to equalize the temperature, which under the roof, during the hottest days, does not exceed that of the external air in the shade by more than one or two degrees. Into the west end of this house is placed an ordinary meat safe, the sides and doors of which consist of stout gauze, so that when the doors are closed, the apparatus represented in the accompanying sketch, whilst it is under the free influence of air, is protected from wind, the necessary precautions being taken to ensure that both the copper vessels, which contain each 32 oz. of water, and are $7\frac{1}{2}$ in. in diameter, shall be similarly circumstanced. The copper wire, *c*, which is connected with an iron rod driven 4 feet into the ground, is likewise conducted some distance underground outside the building in connection with the garden wall, which ensures full terrestrial influence, so that whilst the vessel *b* is always connected, electrically, with the earth, *a* is insulated from it. Whether attention be first directed to the information afforded by the scale *D*, which represents the total amount of evaporation from the vessels *a* and *b*, as ascertained by taking off weights from the flat board until the balance be restored, or to the relative evaporation from *a* and *b*, is perfectly immaterial: and it will be seen, on reference to the following statement, that throughout the epidemic period there prevailed an enormous evaporating influence.

STATEMENT OF TOTAL EVAPORATION, AS REGISTERED AT 9 O'CLOCK IN THE MORNING, 5 IN THE AFTERNOON, AND 10 AT NIGHT, AT 17, CANTERBURY-PLACE, LAMBETH-ROAD:—

Date.	1846.	1847.	1848.	1849.	1850.	1851.
January	3360	3720	7680	9120	3240	4125
February	6240	5240	9600	9600	4200	2995
March	10080	9480	10560	8640	5040	5285
April	14400	14400	11040	13440	6240	5970
May	22560	22540	29860	15360	9600	10625
June.....	32160	23040	21120	24960	15840	15075
July	29280	24960	24000	24960	14880	12895
August.....	17280	24480	17760	22560	11515	13530
September ..	15120	19680	14160	13360	9460	9570
October	8160	12000	12480	12200	5730	5985
November ..	6240	9600	12640	10000	5010	3380
December....	3360	8640	7680	7500	1385	2640
Grains	168240	177780	178580	171700	92140	92075

Any corroborative evidence cannot fail in adding to the value of the above statement; I am therefore induced to place in juxta-position the inches of rain registered by Mr. Henry Dixon, leaving the question of the greater fall of rain in thickly-wooded districts for future consideration:—

	1848.	1849.	1850.	1851.	
Evaporation....	178,580	171,700	92,140	92,075	grains.
Rain.....	30·00	23·12	17·25	19·91	inches.

Gardeners' and Farmers' Journal.

TIPTREE-HALL FARM.

MR. MECHI'S LONG-EXPECTED BALANCE-SHEET.

Dr. TIPTREE-HALL FARM.

To Valuation, 30th October, 1850:—						
Horses, 8	£80	0	0			
Sheep	169	0	0			
Bullocks, cows, and calves	473	0	0			
Pigs	296	19	6			
Implements, including 12 iron stack frames, iron hurdles, &c.	394	17	6			
Tillages, hay and manure (the tillages include the cost of the unconsumed root-crops)	557	5	7			
To labour (ordinary farm)	240	5	6	1,971	2	7
Do. (treble trenching), and removing rocks from 15 acres of land	90	0	0			
Do. in connexion with the live stock in yards, &c.	150	0	0	504	5	6
To rent on 125 acres (landlord's measure) of my own land, at 36s. per acre; ditto, on 45 acres I rent, at 20s. per acre, with 5s. which I add for my improvements on it.				281	5	0
Tithes, poor-rates, church, police, and surveyor's rate, property tax, &c.				58	18	5½
Tradesmen's bills, including purchase of a Bentall's broadshare				104	4	10½
Coals for steam-engine				55	15	0
Repairs to engine				20	0	0
Miscellaneous payments				6	4	4
Man's wages, acting as engineer, miller, and stoker to engine				39	8	11
Seed-corn, &c.				48	8	0
Live-stock bought				710	12	0
Oil-cake and corn, bought as food for stock				1,558	17	6½
Interest on farm capital, £2,700 at 3½ per ct.				94	10	0
Guano, superphosphate of lime, and chalk, bought as manure				135	7	8
				£5,588	19	10

Cr.

By Valuation, 30th October, 1851:—						
Horses, 5	£55	0	0			
Sheep	167	8	0			
Bullocks, cows, and calves	479	0	0			
Pigs	278	3	0			
Implements	367	5	0			
Tillages and manure	499	8	3			
				£1,846	4	3
By wheat crop, 72 acres; average (including one field injured by blight) 36 bushels of marketable wheat per acre, is 2,592 bushels, at 5s. per bushel				648	0	0
27½ acres of potatoes, only half a crop, having been injured by drought, quality of potatoes good, selling at an average of 1s. to 1s. 2d. per bushel; 4,000 bushels in all, the small ones for seed and consumption by stock				150	0	0
Meat and live stock sold				2,181	0	4
Wool sold				30	17	2
Butter, &c., produce of eight cows				60	10	0
Miscellaneous receipts				17	9	9
				£4,935	1	6
By apparent deficiency to balance, arising entirely from the large quantity of food purchased for feeding stock, as per account annexed, and £90 labour in treble-trenching and removing rocks—a permanent improvement. This apparent deficiency is amply compensated by the additional manure obtained				653	18	4
				£5,588	19	10

MEM.—The wear and tear of implements, depreciation on horses, &c., are all considered in valuation.

No seed potatoes charged for, or taken credit for.

The farm would be fairly entitled to a considerable sum for food consumed by visitors' horses, and occasionally by my own private horses, dogs, &c., but no credit has been taken for this.

The credit price for wheat is taken at 40s. per qr., because already above 100 quarters of this year's crop have been sold to average as near that price as possible.

No account is taken of the straw on either side; the custom of valuation in this county being to allow it to the incoming tenant gratis, as a set-off against thrashing and marketing the crop.

The root-crops are all valued at their actual cost, both at in-coming and out-going.

The charge for labour includes the bailiff's salary.

In addition to the 72 acres of wheat, and 27½ of potatoes, I have 20 acres of mangold wurtzel, 30 tons per acre; 6 ditto of swedes, 18 tons per acre; 13½ acres of red clover, consumed; 12 acres of green-top turnips, after tares.

Although by landlord's measure I have 170 acres of land, the actual available land is only 155 acres, and 2 acres of lawn, garden, &c., buildings, stackyard, &c., occupying the rest. So that, although I did away with 4½ miles of useless fencing, there is still a considerable degree of waste.

It is necessary to remark, with reference to my statement of last year, that on receipt of the valuation for rent I found it to be 36s. per acre, including the 5s. for machinery.

FARM ACCOUNT (IRRESPECTIVE OF LIVE STOCK AND PURCHASED FOOD).

Dr.

To labour, including bailiff's wages	£264	5	6
Rent	241	5	0
Rates, tithes, &c.	58	15	5
Seed	47	8	0
Tradesmen's bills	60	0	0
Horse labour—6 horses at £25 per annum	150	0	0
Portion of engine work for thrashing	30	0	0
Purchased manures	135	0	0
Interest on capital, £1,500, at 3½	52	10	0
Wear and tear of implements and miscellaneous expenses—casualties	25	0	0
	£1,064	3	11
To profit beyond interest of capital	71	2	1
	£1,135	6	0

Cr.

By 72 acres of wheat—36 bushels per acre, at 4s. 9d. per bushel	£615	12	0
27½ acres of potatoes—4,000 bushels	150	0	0
20 acres of mangold wurtzel—30 tons per acre, at consuming price, 6s. per ton	180	0	0
6 acres of swedes—18 tons per acre, at 5s. 6d. per ton, consuming price	29	14	0
6 acres of pasture, consuming price	18	0	0
13½ acres red clover, consuming price	54	0	0
13 acres tares, at £4; 12 acres white turnips after tares, at £3	88	0	0
	£1,135	6	0

I have only valued the wheat crop at 38s. per qr., although the 100 quarters I have already sold average over that price. I apprehend the most critical cannot object to this account. All the green and root crops (and part of the potatoes) are consumed on the farm, besides the 100 tons of wheat straw and the wheat chaff. In addition to all this, £135 is paid for guano, superphosphate, &c., so that the farm will actually increase in fertility under this system.

It is my custom to take wheat alternately on half my farm, the soil not being adapted for barley, and the climate is too dry for oats. A very heavy rent is charged to cover former improvements, and there has been no sparing of hand labour. My land is annually improving in fertility.

Many will no doubt say that I have undervalued my root crops. I have certainly not over-valued them, for I could sell the mangold wurtzel here, without cartage, in any quantity, at 9s. 6d. per ton, but then I should get the manure made from their consumption.

Dr. LIVE-STOCK—TIPTREE-HALL FARM.

To valuation of live stock, 30th October, 1850..				£1018	19	6
Stock since bought				710	12	0
Corn, linseed, and rape cake bought				1558	0	0
*Produce of root and green crop, hay, &c., grown on farm				350	0	0
				£3637	11	6
By expenses—Man occupied as miller, stoker, and engineer	£39	8	11			
Coals and repairs..	75	15	0			
	£115	3	11			
Less charged to farm	30	0	0			
				85	3	11
†Labour—3 men feeding stock, 2 boys, and extra labour cutting chaff, carting extra manure, &c.				150	0	0
Interest on capital in live stock, £1,000 at 3½..				35	0	0
Rent on extra buildings, and machinery required by stock				40	0	0
				£3947	15	5
Cr.						
By valuation of live stock, 30th October, 1851.				£979	0	0
Meat and live stock sold				2181	0	0
Wool				31	0	0
Produce of 8 cows				60	0	0
				£3251	0	0
Consumed by horses, as charged in the farm account				120	0	0
				£3371	0	0
Loss on live stock, chargeable against manure.				576	15	5
				£3947	15	5

Now, the allowance of one-third value of the purchased food, which I should receive by the most recent custom in the best-farmed district in Lincolnshire, would about equal the balance of loss shown, and it is a remarkable evidence of the importance attached by those eminent farmers to imported food, that even when I should have cropped all the land in 1852, still they would allow me one-sixth of the food consumed in 1851, assuming, of course, that I had not received any valuation in 1851.

* The roots (crop of 1850) are charged at 9s. per ton; the hay and other food in proportion.

† This includes every charge, even to carting and spreading the extra manure.

TO J. J. MECHI, ESQ.

DEAR SIR,—We have at length got your long-looked for balance-sheet—ay, the balance-sheet of the far-famed Mr. Mechi. Some people will perhaps say, "far-famed" for what? Why, as it clearly appears on the face of your balance-sheet, "for humbug;" for you have for years been talking of your profits and of your remunerative system of farming, when the real fact of the case is, that all your farming operations have been carried on at a loss instead of a profit. Ay, and that a very considerable one; for in this (to you) eventful year, in which you were to produce this rare document, you have no doubt strained every nerve to show a profit, instead of which a loss is exhibited of £653 18s. 4d. on an occupancy of 170 acres, being only the trifling loss of £3 16s. 11d. per acre. But what I complain of you, sir, is, that you are not content to let the fact go forth without endeavouring to prove to the "*uninitiated in farming operations*" that the loss of £653 18s. 4d. is no loss at all, in consequence of the large amount expended by you in food for cattle. Now, let me ask, can you expect to get back this amount, when the whole proceeds of your cereal crops (and which, allow me to state, in many instances is nearly all the tenant-farmers of England are allowed to dispose of) amounts only to £648? So, then, after all your assertions of the profits you have been making by farming, your loss has been £3 16s. 11d. per acre. I really must express my surprise that you, sir, knowing—ay, and well knowing—as a man of business, that such was not the case, and that no pecuniary beneficial results had been obtained—that you should have had the audacity to beard the tenant-farmers of England with your too-oft-repeated assertions that they did not at all understand their own business. I think you will now deeply regret having given their judgments such an almost universal condemnation when you prove that all your farming operations have been attended with a loss, and that you never have derived from Tiptree Hall one shilling for the interest of capital employed.

Sir, you have often ridiculed me for being a Protectionist. *I am proud to say that I have ever honestly, and to the best of my ability, advocated the necessity of a protective policy, which you have now so clearly proved necessary to protect the heavily-taxed and over-burdened producers of the United Kingdom from the inevitable ruin which I felt confident would result—and you have now so clearly proved has resulted—from that insane policy of calling upon them whilst so heavily taxed to compete with the lightly taxed producers of other lands.*

Allow me, now, my dear sir, most heartily to congratulate you on becoming one of the most able champions in the cause of "protection to native industry;" for we, the farmers, have been taunted by our opponents for not pursuing the high system of farming adopted by Mr. Mechi, and that had we done so we might have realized a profit. But thanks to Mr. Mechi, who has now clearly shown to the whole world that taxation and

local burdens do enhance the cost of production in England to that extent, that, with present prices for corn and meat, with no lack of capital nor want of desire and inclination to apply that capital liberally to the land, yet you, Mr. Mechi, the great authority for this assertion, now tell us and the country that such has been the deadening and depressing influence of free trade, that you have not, nor can you, obtain a profit from the cultivation of land.

Mr. Editor, allow me through the columns of your valuable journal, on behalf of the tenantry of the Unit d Kingdom, to ask the Government to retrace their steps, and on the impartial and unerring evidence of Mr. Mechi—unerring because supported by the testimony of three highly respectable men—and to implore them to stay that desolating and destructive policy which is so fast ruining and destroying so valuable a portion of the community. *For if Mr. Mechi, when aided by steam, science, and unlimited capital, cannot cultivate land without losing more than three times the rent, I ask, what must be the result of these measures upon the great body of the farmers of England?*

Most sincerely congratulating you, Mr. Mechi, upon now having joined the ranks of the Protectionists,

Believe me your Brother Sufferer,

Ickleton, Dec. 13, 1851. SAMUEL JONAS.

MR. MECHI'S BALANCE-SHEET.

SIR,—What a wonderful year is this 1851! The Great Exhibition had hardly closed its peaceful doors, when many of its visitors, on their return home to France, found themselves involved in another bloody revolution. There seems no pause in the course of great events; for the long-looked-for "balance-sheet" is now brought before the public. Mr. Mechi has not only redeemed his pledge, but he has had his eye to this particular season of the year; and, instead of the worn-out and neglected Christmas carols and pantomimes, he has given us a new entertainment of a much more interesting character. What glorious fun will the farmers have in cutting up this Tiptree Hall "minced-pie" at their Christmas festivals! I am a farmer in a small way; and since balance-sheets have been so much talked of, I have repeatedly tried my hand at it, but, somehow, I never could arrive at a satisfactory conclusion; and as I fail in the magnanimity shown by Mr. Mechi, who, regardless of the balance being so largely on the wrong side, still shows it fearlessly to the public, I shall withhold mine till another year, when perhaps something may be wanted to gratify curiosity. If Mr. Mechi's object in showing himself so prominently before the public for the last seven or eight years was that of bringing out a profitable system of farming by the application of unlimited capital, aided by what he calls scientific principles, he has signally failed; and this may prove an unfortunate result, for it may deter others in attempting the same thing, who might succeed by more carefulness and judgment; for although what is called "science" may by some be sneered at, yet first principles are as necessary to the farmer as to the mechanician; and he practises them daily, too, if he understands his business, although he may not be able to explain them. So far Mr. Mechi's attempt was in the right direction, and why he failed I will leave to others for the present to enlarge upon; for this celebrated "balance-sheet" will doubtless be the subject of much discussion and criticism. There is one good effect, however, that must follow—we shall no longer hear of landlords holding up Mr. Mechi as an example to be studied and followed. That gentleman must now stand or fall upon his own merits, indicated by his published system, concerning which there can be no further mistake; and I can hardly think that any man will be so bold as to follow or recommend such an example. Protectionists will rejoice in this unfortunate display: but let them recollect that it does not prove that farming under free-trade is either a losing or a winning business, but simply that Mr. Mechi is an individual loser, and to an enormous amount: for the published account of Tiptree Hall now before us is only for one year, and that the seventh or eighth since Mr. Mechi commenced his operations; the preceding losses or expenditure are not referred to as matter of account, but they are well known to have been of a startling character. It is beyond all question that the present value of the estate, comprising the stated improvements of the soil or the farming buildings, bears a very small proportion to the outlay. If Mr. Mechi had started originally as a professed experimentalist, and had shown from time to time his failures or his successes, he might have earned for himself deserved fame; but he took the contrary course, and has constantly, both in his writings and speeches, laid claim to uniform success. He has placed himself before the world, not only as a scientific farmer, but as a profitable one, advocating his own particular views to the disparagement of others, and as a practical man. Whoever has read his writings and speeches will find that he has changed his system as frequently as he has changed his coat. A man who is qualified to be an example to others in any pursuit can only obtain credit by carefully maturing and realizing his plans before he submits them to the public. Now, the whole course of Mr. M's farming, since his coming to Tiptree Hall, has been a series of constant changes in the essential parts of agriculture. He seems to have hastily adopted all sorts of speculative schemes engendered in the brains of others or his own, and as hastily recommended these as infallibilities to the public. He throws to the winds the realized and sound practices of men whose minds and talents have been constantly and successfully applied to the cultivation of the soil, for the visionary speculations of the theorist. That the *hits* or *misses* of such a man may be sometimes useful I do not deny; but, at the same time, he cannot be a safe example to follow; and even in a public view the application of capital uselessly is a loss to the community, to whomever it might belong.

On the other hand, I concede to Mr. Mechi the claim of consistency in his reiterated attacks upon the great

obstacles to the safe and profitable cultivation of the soil, namely, useless trees, hedges, want of drainage, game, &c., and its influence backed by the less noisy labour of others may be seen in all directions. It is impossible that in this remarkable age of progress agriculture should not come in for its share, and no one can doubt that much remains behind for men of intelligent and practical minds to accomplish, but this can only be carried out by patient investigation and clear induction from facts. Mr. Mechi has evidently a mind ill adapted to such a course of proceeding. Till the fatal balance-sheet made its appearance, he probably jumped to the conclusion that the money he seems to have constantly found in his pocket came from the profits of his farm, and not from the till in Leadenhall-street. The various items in the balance-sheet are as difficult for me to understand as my own, so I will leave them for the present to be investigated by clearer heads than I can lay claim to; but whoever shall endeavour to disentangle the mystery, I hope that it will be done with all fairness and courtesy. No man has a greater claim to consideration of this kind than Mr. Mechi, if the unvaried kindness and hospitality of Tiptree Hall to one and all for many years past is properly appreciated.

Yours, very truly,

PHILO-TULL.

MR. MECHI'S BALANCE SHEET.

(From the Gardeners' and Farmers' Journal.)

As we before stated, the interest in Mr. Mechi's balance sheet is by no means exhausted by the figures it contains. It has bearings economical and political, as well as statistical and arithmetical. Politically, as a question of free-trade and protection, we will leave it in the hands of the *Times* and *Morning Herald*. But as a question commercially considered, it affects no little, questions of political economy, on a basis much broader than any party question. Mr. Mechi has a large capital invested in his farm. It is the source of all his hopes and all his success. It is on this that the whole question hinges. It may very easily be demonstrated as a fact, that a farm will not pay its way in 1850-1 which will do so in 1851-2, and this, as far as we can understand by Mechi's paper, is the point at which he drives. If this be so, his £653 18s. 4d. deficiency ought to be capitalised. But, as this only applies to farms undergoing improvement, we would ask, when it is to stop? and is the capital account ever to be closed?—a question which he ought to answer, if he cared about money, as anxiously as any railway proprietary. His justification of the great outlay, and consequent loss in cattle feeding, is thus given: "Acting on the principles defined by Mr. Lawes, in his able paper, I availed myself of the price of cattle food, and fed a disproportionately large number of live stock, with a view to the permanent fertility of the soil."

Now we think this excuse certainly admits one stunning fact—that, with all the skill of science, with all the *low price of cattle food*, Mr. Mechi has not made feeding pay its way. We happened to know a gentleman—a Quaker, too—who kept an eye on money-making, who determined to grow corn at a profit, at five shillings per bushel, by Mr. Huxtable's pig scheme. He took a farm, bought Indian corn and other low-priced food, and kept a balance-sheet, which showed, by pigs alone, the moderate loss of £100 in a single year. True his manure was good, but he applied it to his corn crops and left the farm—the only way, he said, he found to keep his *capital* together. Mr. Mechi goes on to say that the loss has indeed been considerable, but few practical farmers will deny that "this investment will be ultimately remunerative."

Now Mr. Mechi has been going on investing for some seven years in this manner. He has been looking forward to remuneration for the whole of this long period; and how does it happen that, for crops' sake, for ultimate remuneration, he has to invest what amounts to some four pounds per acre, after all he has before done, to make the farm pay?

But what does Mr. Mechi mean by remuneration? We fear his ideas of the remuneration of farming is different from that of shop-keeping. How does it happen that he only charges 3½ per cent. for the sunk capital—for interest? We never knew it charged so low. To expend £2,700 on 170 acres of land, and then to have to add £653 to this, in order to get a return, and that only a return of 3½ per cent., is perhaps one of the very worst aspects of the sad condition into which farming has fallen. He ought at least to have charged 5 per cent.; though some will say 6 or 6½ will not be at all too high, under the circumstances. Had he charged five per cent. it would have increased the amount of loss to £694 3s. 4d.—nearly £700; and let it be remembered that in 1851-2 the capital would be increased to £3,400, on which a proportionate interest would be paid.

But Mr. Mechi goes on to contend that "in Lincolnshire an outgoing tenant would receive from his successor one-third of the cost of purchased food (of some kinds, he should have said), in addition to the ordinary value of the farmyard manure. On this principle," he goes on to say, "I should be allowed between £500 and £600 on account of my purchased food, besides a proportion of the bones, chalk, &c., used this year, and also a portion of the permanent improvement by treble trenching."

This is undoubtedly true. Mr. Mechi has a right to place himself in imagination as an outgoing tenant, and to claim any equitable allowance which

may be made in any part of the country, though unusual in Essex, because it matters little, as a commercial question, whether he gets his remuneration fairly, from one source or from another.

But, to look at the question fairly, Mr. Mechi must, if treated as an outgoer, be also treated as an incomer. Now, he before purchased food for cattle, because it was low, and cake, and bones, and, for aught we know, chalk too! From his allowance as Mr. Mechi the outgoer ought to be deducted the allowance to Mr. Mechi as incomer. Some regret that he did not get a Lincolnshire valuer; for, to the valuation of 30th October, 1850, would doubtless have been *added* "allowance for tillages," and the valuation 30th October, 1851, would probably have contained the element of "allowance for tillages" also; to take the one without the other would be extremely unfair, and we fear, if the outlay of 1849-50 were deduced from that of 1850-1, the difference would be very trifling, and therefore the debit of the unfortunate balance-sheet would, we fear, be unaltered.

We are unable to divine how Mr. Mechi happens to farm his drained lands, as he says, at "much less cost than the general run of farmers holding unimproved farms."

Now, while we neither say that they are farming profitably—that these farmers, to do the same amount of work, may have to employ an extra quantity of labour—yet we can hardly see how the balance sheet makes out the much less cost. For instance, Mr. Mechi has a steam-engine, and still employs, in one sheet five, in another eight horses. Did three die during the year? for no credit seems to be taken for their sale. This number may be necessary, where so many roots are carted, and sheep house-fed. But his steam-engine costs—

	£	s.	d.
Engine-man's wages	39	8	11
Repairs of engine (*now* almost new) ..	20	0	0
Coals (query, any charge for carting?)	55	15	0
Showing an annual charge for working expenses, without any allowance for depreciation, or interest of capital ..	115	3	11

Now this has thrashed 324 quarters of corn—all the produce of the farm, as far as we can see—at a cost of upwards of seven shillings per quarter, if it were used for this alone. But probably it was not. It cut the straw, and ground the corn for the cattle; as this was really done at a loss, it would seem that the steam-engine at any rate has not done much for its owner. It has not saved the horses—it has thrashed the corn at double the expense of horse labour, and, whatever else it has done, it has done at a loss, or for a loss.

If Mr. Mechi's system be right, we agree with him, when he asks the question if farming is as profitable as trades or professions, that "I should say decidedly not." And, so long as he carts off turnips to light land for sheep, so long as he buys expensive food for stock, so long as he farms bad land at a great expense, with low prices, we shall have, we fear, to re-echo his "decidedly not."

While the incesant din of Mr. Mechi's losses by high farming is raising a perfect babel of tongues on the losses of the very tip-top farmers—the example men of their class—the fruit of science and skill, with a £600 annual loss, there are others who are still holding out that low or cheap farming, or the very reverse of Mr. Mechi's school, ought to be adopted to meet the exigencies of the times.

One urges that great outlay should be made—great sacrifices for the sake of getting manure, and even £600, after seven years' improvements, is not too much to expend for the purpose of fertilising the land: another does away, Jethro-Tull like, with all manure and its appliances, at one fell swoop, and repeats the adage, "Dig deep, and treasure you will find." And "A Word in Season; or how the corn-grower may yet grow rich, and his labourer happy," is addressed by an anonymous writer to the stout British farmer.

He took a four-acre field; and we thus dash into his practical facts—for his theory and reasonings we shall refer to hereafter; and to show the results of his system, and the state of the soil, he says he took the land in hand October, 1850, and it produced 20½ qrs. of dressed wheat, weighing 61 lbs. per bushel, and 8 tons of straw. The previous treatment of the soil had been—the land had been manured at the beginning of a four-course rotation, and this was the last crop. This he ploughs seven inches deep, *without manure*, and sowed in drills, three rows together, one foot apart; then an interval of three feet, then other rows at a similar width. The intervals are digged between, and forked over twice, and hoed frequently, he says *ad libitum*. He then calculates the general expense of the process—

	£	s.	d.
One double digging	1	10	0
Two single forkings	1	0	0
Pressing, sowing, hoeing, carrying, thrashing, rates, and taxes	2	1	0
2 pecks of seed, at 5s. the bushel	0	2	6
	£4	13	6

This is for half an acre or £9 6s. per acre.

The field in question, however—the one on which he gives his balance-sheet—is differently treated. It is ploughed seven inches deep; he has forty-one bushels per acre; wheat after wheat, without manure, where the crop was five qrs., showed that his previous tenant ought not to have been discharged. However, he takes it in hand, and the following

is the balance-sheet. How different to Mr. Mechi's!—

Ploughing, 12s., half portion of the acre	£0	6	0
Harrowing, levelling, and clearing the foul stubble	0	10	0
Pressing the channels for the seed.....	0	1	0
Dropping the seed by hand [Why is this done?]	0	5	0
One peck and a-half of seed, in round numbers	0	2	0
Rolling	0	0	6
Hoeing the rows, scarifying the intervals, bird-keeping, and all the operations, down to harvesting and marketing.....	2	0	0
Rates, taxes, and interest [Query tithe?] ..	0	10	6
	£3	15	0
5 qrs. and 1 bush. of wheat, at 35s.	£8	15	0
2 tons of straw, at 40s.	4	0	0
	£12	15	0
Deduct outlay	3	15	0
Total amount of profit to the proprietor	£9	0	0

Now, it is impossible not to stop here and inquire if this leaves a profit of £9 per acre? and this it appears to be the object of the proprietor to show. What was the rent of the land? and how much of the forty-one bushels per acre was due to the manure—the capital of his unfortunate tenant left in the land? and how much to his management, for it is quite clear that he neither manured, double-digged, forked, nor interfered at all with the subsoil. Mr. Mechi, we fancy, would have voted away all this to be paid to the out-going tenant.

But it seems still more clear that whatever merit his Tullian mode of husbandry may have, he has not adopted it, when he takes land from a tenant which he has previously properly cultivated.

It will be seen, also, he takes credit for both the straw and corn. Not to say one word of the impossibility of finding a market for all the straw, especially if *manure were of no use*, how can it be reconciled with any showing of chemistry whatever, that all may year after year be carried off the land, and nothing brought back, and still the land be capable of growing wheat for ever?

The only thing he tells us of the soil is, that it is a gravelly loam. He neither tells us the rent the previous tenant paid, nor gives us any idea of the depth of its soil Only to plough seven inches deep after wheat is not a very remarkable circumstance, and shows that he had more faith in the unexhausted manure of his tenant, on the surface, than he had in the fertility of his fee, the soil beneath. But he got a still further insight into the fallacy of his system even than this: on his own land, doctored after his own fashion, and which he had had in hand before, his other land, as he calls it, he had averaged about 34 bushels; so that we fear his tenant's system had been a far preferable one to his own. On the land he so inconsiderately took in hand he had 41 bushels; on his own, an *usual* produce of *about* 34 bushels. His balance-sheet, therefore, shows his own to be a bad system of farming.

We have the low farming of this instructor of his race in contrast with the high farming of Mr. Mechi, and neither of them seems to pay. We fear, if the stout British farmer is yet to live by either of these unhappy systems, he will be very awkwardly situated!

CORN AVERAGES.

(From the *Gazette*.)

Return, stating what has been, during seven years, ending on the Thursday next before Christmas day, 1851, the average price of an imperial bushel of British wheat, barley, and oats, computed from the weekly averages of corn returns.

Published pursuant to an act passed in the 6th and 7th year of the reign of William IV., entitled "An Act for the Commutation of Titles in England and Wales."

Wheat.	Barley.	Oats.
s. d.	s. d.	s. d.
6 $2\frac{3}{4}$	3 $10\frac{1}{4}$	2 $7\frac{1}{2}$

The average price of corn per quarter (imperial measure), in England and Wales, for the quarter ending Christmas, 1851.

Wheat.	Barley.	Oats.	Rye.	Beans.	Peas.
s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
36 7	26 1	17 10	25 5	29 0	28 3

HENRY FENTON JADIS,
Controller of Corn Returns.

Corn Department, Board of Trade, Jan. 1.

TITHE COMMUTATION.

SIR,—As your agricultural, as well as clerical, readers may feel anxious to know the result of the Corn Averages for the seven years to Christmas last, published in the *London Gazette* of this evening, viz.—

	s.	d.	
Wheat	6	$2\frac{3}{4}$	per imperial bushel.
Barley	3	$10\frac{1}{4}$	do.
Oats	2	$7\frac{1}{2}$	do.

I beg to state for their information that each £100 of rent-charge will, for the year 1852, amount to £93 16s. $11\frac{1}{4}$d., or very nearly $2\frac{3}{4}$ per cent. less than last year.

The following statement from my "Annual Tithe Commutation Tables" will show the worth of £100 of rent-charge for each year since the passing of the Tithe Commutation act, viz:—

		£	s.	d.
For the year	1837	98	13	$9\frac{3}{4}$
Do.	1838	97	7	11
Do.	1839	95	7	9
Do.	1840	98	15	$9\frac{1}{2}$
Do.	1841	102	12	$5\frac{1}{4}$
Do.	1842	105	8	$2\frac{3}{4}$
Do.	1843	105	12	$2\frac{1}{4}$
Do.	1844	104	3	$5\frac{1}{4}$
Do.	1845	103	17	$11\frac{1}{2}$
Do.	1846	102	17	$8\frac{3}{4}$
Do.	1847	99	18	$10\frac{1}{4}$
Do.	1848	102	1	0
Do.	1849	100	3	$7\frac{3}{4}$
Do.	1850	98	16	10
Do.	1851	96	11	$4\frac{3}{4}$
Do.	1852	93	16	$11\frac{1}{4}$
	16)—	1,606	5	$10\frac{3}{4}$
General average for 16 years		£100	7	$10\frac{1}{4}$

I am, Sir, your most obedient servant,
CHARLES M. WILLICH.

25, Suffolk-street, Pall Mall East, Jan. 2.

COURT OF QUEEN'S BENCH.

REGINA *v.* VANN.—LIABILITY OF A FATHER TO BURY HIS CHILD.

This was an indictment for a nuisance in not having buried the body of a dead child, but leaving it in a yard, the stench from which was a public nuisance. It appeared that the child of the prisoner died; that he applied to the parish to bury it, but the guardians said that, under the power of the Poor Law Commissioners, they would lend him 7s. 6d. to bury the child, provided he would sign a document undertaking to repay the amount on demand. The prisoner refused to sign this document, and the relieving officer refused to advance him the money. The prisoner then removed the body to a yard, and the stench from it amounted to a nuisance. The chairman of the Leicestershire sessions told the jury that as the prisoner had been offered relief he was bound to receive it, and he was not excused from his liability. Upon this the prisoner was found guilty. A case was reserved, whether the prisoner by refusing to render himself under an obligation for a debt had not rendered himself liable to this indictment?

Lord CAMPBELL said—We are clearly of opinion that this conviction is unlawful. There is no doubt that if the man has the means of burying his child he is bound to do so, but he is not liable to be indicted for a nuisance if he has not the means of burying it. He cannot sell the body or throw it into a river. Unless he had the means of giving the child Christian burial he does not commit a nuisance by the child remaining unburied, although it might be a nuisance to the neighbourhood, for which the parish officer would probably be liable. The defendant was not bound to accept a loan and render himself liable to be proceeded against, and lose his liberty and lose the means of maintaining his family, by incurring a debt.

Conviction quashed.

A CUSTOM BINDING THE LANDLORD TO PAY 2-7THS OF THE EXPENSES INCURRED UPON TILE DRAINING TO THE TENANT ON QUITTING THE FARM NOT UNREASONABLE.

LUDLAM *v.* MOSELEY—This was an appeal to the Court of Queen's Bench, from a decision of the Judge of the County Court of Derby, and came on last Wednesday. An action had been brought by the outgoing tenant of a farm against his landlord, to recover, among other claims, a claim for "tile and brick draining," executed by the plaintiff on the defendant's land during the plaintiff's tenancy. The plaintiff was to cultivate the land according to the rules of good husbandry and the custom of the country. According to the plaintiff's evidence, the custom of the country was, that the landlord was bound to pay an outgoing tenant 2-7ths of the expense incurred by the tenant in the drainage. The defendant's evidence went to show that the custom was for the landlord only to pay such proportion of the expense when it was incurred with his consent. The judge said it was a question for the jury as to what was the custom, and that was to be determined by the credit they gave to the respective witnesses. The jury found for the plaintiff. Mr. Phipson, on the part of the defendant, now contended that the direction of the judge was wrong, for though the jury had found as to the custom in the plaintiff's favour, the custom itself was unreasonable, and the judge ought to have told the jury so. Mr. Tomlinson, who appeared for the plaintiff, was not called upon. The Court thought that where the tenant was to cultivate according to the rules of good husbandry, it was not unreasonable that he should be entitled to recover 2-7ths of the expense incurred in drainage, and dismissed the appeal with costs.

EXCHEQUER CHAMBER.

REGINA *v.* CHEAPOR.—ARE TAME PIGEONS CAPABLE OF BEING RE-CLAIMED?

The prisoner had been tried at the sessions held at Nottingham, on the 7th of July last, for stealing four pigeons, which the indictment alleged to be tame and reclaimed. The pigeons were kept in a dovecote, over some stables. On the outside were holes through which they had ingress and egress; and at the bottom of the floor of the dovecote was a trapdoor, which was kept locked. This door the prisoner opened, and by that means stole the birds. It was contended at the trial, by the prisoner's counsel, that the pigeons, being enabled to go in and out of the dovecote through the holes made for that purpose, were not reclaimed birds, and the learned chairman directed the jury that they were not reclaimed, and could not be the subject of larceny; but the jury took a different view of the case from the learned chairman, and found the prisoner guilty.

The Court was of opinion that the chairman was wrong in so directing the jury; for pigeons must see and enjoy the air, and unless the holes were made in the dovecote they could not get out. According to the doctrine of the learned chairman geese and ducks, and other barndoor fowls, could not be made the subject of larceny. The jury found that the pigeons were tame and reclaimed, and the Court thought they had come to a right conclusion, and that pigeons were reclaimed although they had the opportunity of going out and enjoying themselves in the open air.

Conviction confirmed.

COPPER SMELTERS LIABLE FOR DAMAGE TO CROPS BY SMOKE.—A case of considerable importance to copper smelters and farmers in the vicinity of such works was decided in the Llanelly County Court on the 20th inst. Mr. Williams, a small farmer, claimed compensation for damage done to his corn, and for loss in the produce of his cows in the year 1850, by the vapour arising from the operations of Messrs. John Schneider and Co., of the Spitty Copper Works. The plaintiff was a small farmer, residing at Penscallen, in the borough of Loughor, and the defendants were owners of copper works on the other side of the river; the works had been carried on many years previously by Messrs. Shears, but had been idle sixteen years, when defendants commenced about five years since. In 1850 plaintiff saw the copper smoke over his land, and when his wheat crop of about an acre was coming into ear: in former years he obtained 30 Winchester bushels from it, but in that year only 4½ bushels. The smoke also passed over the grass, the cows dried up in milk, and from being healthy and fat became ill and thin; they had been so bad as almost to have ceased giving milk, and the wheat scarcely paid for harvesting. The crop had been valued, and the cows inspected. It was also proved that defendants had paid other parties compensation, and had remunerated plaintiff for the damage done in 1851, but declined any attention to the claim of 1850. Mr. Gaskoin, for defendants, claimed a nonsuit on the authority of Penruddock's case, which required notice to defendants of a nuisance before action, and on the ground that the works had been established twenty years, which, however, the Court refused. Counsel then attempted to prove the nuisance came from some glass-works, much nearer the plaintiff's farm than the copper works, but failed, and the judge having clearly summed up the case, the jury gave a verdict for plaintiff, damages £5 5s., to which the judge added all the costs.—*Mining Journal.*

GLASS WALLS.

"The best is always the cheapest in the long run," is an aphorism of universal acceptation, and implies a principle which we, at least, never once heard called in question. If, therefore, we can be permitted to take this ground, we thrust aside as wholly obtrusive and uncalled-for the question of first cost, be the object what it may. It may be said this is taking royal ground, and we admit that it is so; but, unless we ignore principle altogether as a rule of guidance, and become the pliant subjects of expedient, there seems no alternative but to admit the truthfulness of the quaint truism, and repeat that "the best is always the cheapest." As gardeners, however, we often entertain very wayward notions of the real value of principle. To-day we buy the best, because in the end the cheapest garden seeds we can obtain; and this we say we do upon principle. To-morrow we buy an old greenhouse, because, being cheap at first, it is excessively dear in the end; and therefore proves

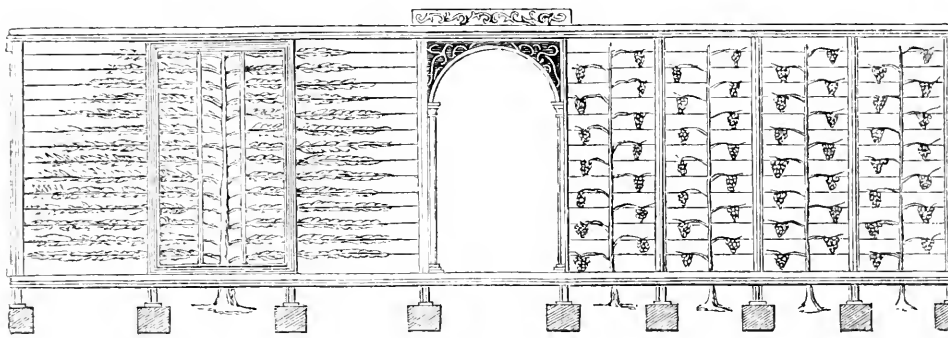


Fig. 1.

REFERENCE TO THE ENGRAVINGS.

Fig. 1 represents a portion of the glass wall, with an opening in the centre, and showing the mode in which the uprights are fixed in the ground. To the left (*a*) is seen a tree trained to the wires in the horizontal manner: the sashes here slide to the right or left on small wheels; one sash is seen at the centre of the tree; the parts at the right and left of this is supposed to be open. To the right of the opening of the centre, the portion above (*b*) shows a different construction. Here the sashes do not slide, but open outwards, and are secured at any angle by iron rods. As may be seen, the divisions or sashes here are narrower than at (*a*), and which is owing to the difference of construction. The sashes may be any convenient width on the sliding principle, but if they are made to open outwards, they would be too readily acted on by wind, and take up much space unless their width were more limited. We are not enabled at present to give details as to the exact measurement, but this is a point that may be best determined by taste or other considerations. In any case the trees may be trained in the centre, as shown by Fig. 2, which shows a vertical end section, with the ventilators open at the top, or close to the glass on each side, as shown by Fig. 3. Fig. 4 shows the exterior of the end as it appears when finished. Fig. 5 is the ground plan of the portion (*a*) Fig. 1, showing the sashes both open (*c*), and closed (*d*). Fig. 6 is a similar plan of the portion (*b*) Fig. 1. With respect to prices, we learn from a prospectus before us that the class A, with sliding sashes, are priced as follows:—No. 1, per lineal foot of 9 feet high, glazed with 16 oz. sheet glass, £1 4s. 6d.; No. 2, do., with folding top, £1 6s.; No. 3, do., £1 1s.

the greatest contrast and opposite to the principles which we professed the day before. We had better, however, proceed no further in this direction, lest we find ourselves nearing the conclusion and unavoidable admission that gardeners, like most other classes, are open to the allurements of expedient, just as often as they are guided by the higher dictates of principle.

Having, therefore, run this narrow circuit, we find ourselves brought back to precisely the same point from which we started, but without having reached any very positive conclusion, or discovered that, as horticulturists, we do other than bend to the passing necessity, and follow expedient to the full as frequently as we do that of principle. Therefore, according to this view, sanctioned as it is by the developed habits and conduct of all classes, it is evidently a problem still unsolved whether we ought to say the best is the cheapest, or the cheapest is the best. Whether Mr. Ewing's glass walls—fig. 2—may tend to throw any light upon this question, we wait for experience to tell. The pre-

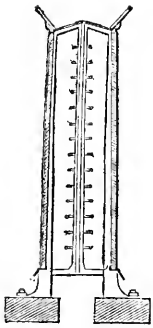


Fig. 2.

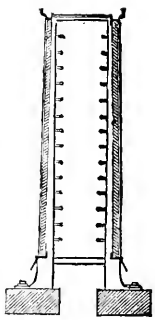


Fig. 3.

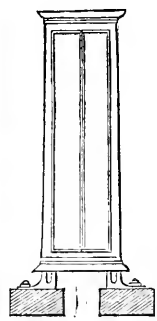


Fig. 4.

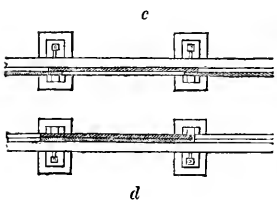


Fig. 5.

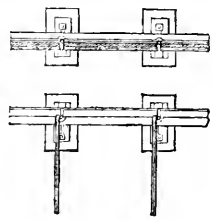


Fig. 6.

sent, suffice it to say, offers a fair opportunity for seeing through a difficulty of this kind. Looking at these walls abstractedly, as compared with the very unsightly, or positively ugly, common red brick wall, one would think there could be no two opinions as to which was the *best*—to look at, at least; and although the one may be as dear again as the other, it ought not to be forgotten that the glass wall is in fact not only a wall, but a hothouse or forcing house: not like a brick wall, which cannot be renewed but at the expense of a new one, a glass one is, or may be, portable; and the materials when taken down are nearly as valuable as new. These are not unimportant points, although the main one, we admit, is suitableness to the end in view; and here, of course, for a time at least, speculation must occupy the place of experience. That these walls will approve themselves to all, or even to any large number of gardeners, is far from likely; nor do we by any means regard them as all perfection, and no drawback. No such thing; for indeed they would then form an exception to every thing which we know connected with gardening, or any thing else. One thing is certain: these glass walls are not designed as a substitute for a thing already perfect, for we suppose no one will venture to affirm that brick walls are perfect, and without a drawback. A glass wall, as we have already said, viewed merely as a glass wall and nothing else, must, in spite of all that can be advanced to the contrary, be a more agreeable object to look at, whether near or at a distance, than glaring red brick. If this be conceded, then comes the question, can a glass wall be made to afford as much protection to fruit trees as a brick wall? Can there be any doubt about this? We think there must be more—much more. It is true, as a fence against thieves, a fellow might take a hammer, or the end of a stick, and break his way through a glass wall. We never, of course, heard of this being done through a garden-wall of brick; but we have often heard that brick walls proved but small protection against thieves. It is contended that the trees in these walls cannot be attended to; that the management of the ventilation will be most difficult; that they cannot be kept clean; that there will be a waste of heat; and that they will be very cold at night—perhaps the latter may prove no disadvantage, since the trees themselves will be kept dry. Nor is this all; it is fully expected that these walls cannot stand—that the wind must blow them down. All these, we admit, would be very great defects, should they ever be realized; but the most unpromising things do sometimes turn out better than expectation; as our readers must remember, it was said the Crystal Palace, from its peculiar construction, ought to have fallen when it was full of people; and yet somehow the thing never happened: so was it expected by all true Frenchmen that the world would stand still when Napoleon died; and yet this never came to pass: therefore we may hope that some of the apprehended disasters may be averted from the glass walls. They are, of course, as yet wholly untried; and for the present the wisest course for those who wish to be near the truth will be to make some deductions from those who pronounce them to be perfection, and a like deduction from those who *pooh, pooh!* and call them toys; for they are neither the one nor the other. The thing is right in principle; and if the present application be less perfect than future experience may ultimately make it, that forms no valid argument against the present effort. The first step once taken is always something gained. The idea contains enough of promise to claim for it at least a fair trial. With these remarks we now give engravings which will convey an idea of what glass walls are.—Gardeners' and Farmers' Journal.

THE GREAT EXHIBITION.

FARM BUILDINGS.

A good example of the best buildings of the highly-cultivated districts of Northumberland and the south of Scotland was shown by the model of farm buildings, Class 30, No. 228A, designed by Mr. John Bullman, builder, of Kelso, and erected by him at Wark, in the county of Northumberland, in the year 1850, for the Earl of Tankerville. A greater value is given to this design on account of its being the counterpart, on a reduced scale, of a farmsteading actually erected, whilst many of the others, however convenient their apparent arrangement, have never reached beyond the pasteboard of the modeller. From the details given by Mr. Bullman, we learn some interesting particulars relating to the farm upon which his design was carried into effect.

It appears the farm is one of 930 acres of rich loam, capable of producing the usual grain crops, and highly suitable for turnip husbandry. The rent is understood to be about £2 11s. 6d. per acre, or £2,394 15s. per annum. Mr. Dove, the present tenant, is understood to have expended in draining, lime, and manure, during the first twelve months, little short of eight thousand pounds, exclusive of outlay in the purchase of stock and in buildings. A large proportion of the farm is managed upon the four-course rotation, and there are usually about 400 acres in corn crop, 200 acres of turnips, and as many in potatoes as are required for the use of the servants and others upon the farm, the remainder being in pasture and hay.

About one-half of the turnip crop is consumed upon the ground by sheep; the other half by cattle, in the courts or curtains, and in feeding-boxes. There are generally upwards of 100 cattle fattening at one time, and their places are filled up by others so soon as they are fit for the butcher. In addition to the turnips, the cattle have corn or cake—the latter a practice rather unusual amongst north-country farmers, many of whom feed solely upon turnips.

The machine for thrashing the crop is propelled by water collected from springs upon the higher parts of the farm into a reservoir upwards of 1,000 cubic yards in extent, which is discharged into the river Tweed at a distance of about 200 yards. The water-wheel is of ten-horse power, 18 feet in diameter, and five feet broad.

The plan of collecting the water of the farm, either of drainage, or from the small streams which are so abundant in a hilly country, for the purpose of working the machinery of the farm, is very general in the north of England, and might in many instances be very advantageously followed in other districts.

The site of this steading, with the stack-yard, stands upon upwards of 3½ acres. The buildings themselves are arranged in a square form, having the barn, granary, and cart-sheds on the north side; stables on the east; cattle-sheds on the west; and cattle-boxes on Mr. Warne's plan complete the square by forming the south side. In the centre of the square are sheds and cattle-yards, between which and the four sides of the external buildings is a roadway giving easy access to every department.

As it would require too much space to give the details of the construction of each separate building, it will be sufficient for us to say that the barn is arranged upon the usual Scotch system, there being a small thrashing-barn upon an upper floor, beneath which is the barn for winnowing the corn as it comes from the thrashing-machine, and a straw-barn conveniently placed for receiving the straw from the machine, and for its removal to the cattle. What is unknown in an English homestead is the servants' byre, 50 feet by 15 feet, for 15 cows, the produce of a cow being part of the wages of the labourer. The access for milking to this and to the farmer's byre is from the outside of the steading, the doors communicating with the court being only used for cleaning and supplying the cattle with food and fresh litter. The method of supplying water is perhaps the best that can be adopted. From a small regulating cistern, having a ball and ball-cock, the water is supplied to 38 troughs throughout the steading. These have been carefully levelled, so as to give a proportionate quantity of water to each.

The immense number of stacks shown in the model is a peculiarity in the Scotch homesteads which always strikes a south-countryman. The yard in the model contains the same number of stacks as were actually built from the crop of 1850. They are 18 feet in diameter, and so placed that any particular one can be taken at pleasure.

No. 215A, Class 9, is the model of farm-yard and buildings where steam-power is used, designed by Mr. Isaac Tyson, of Selby, Yorkshire. It is calculated for a farm of 500 acres, 350 acres being arable land, and the remaining 150 grass. The designer attaches much importance to the aspect of the farm-stead; the loftiest buildings are, therefore, placed upon the north side. The implement and cart and waggon-sheds open on the north and west sides, where the sun will least affect them; and the lowest buildings on the side most sheltered from the cold winds, and forming, in Mr. Tyson's model, a uniform block of buildings, with a couple of warm and well-sheltered yards, having a double row of cattle-boxes ranging between them, and at right-angles with the barn. Tramways are laid from the feeding-houses to the stables, cattle-house, and piggery, to admit of the food being taken at once, on a

truck, to the animals. The turnip-cutter is so fixed that the cut turnips drop into the truck, and are at once taken away to the cattle. The greatest novelty, however, is that the stacks, weighing 15 or 20 tons, are built on frames with wheels, running on tramways, arranged in three lines, each line forming a series of from four to eight stacks. Each stack can be drawn by the engine into the corn-shed adjoining the barn where the threshing-machine is fixed, without the aid of horses or men; and by this arrangement the corn is pitched at once from the stack to the thrashing-machine. In the barn itself the whole process of threshing, winnowing, packing, and even loading the waggons is by the aid of machinery carried on without lifting by manual or horse labour. An elevated tank, with pipes and taps attached, supplies the whole of the buildings with water.

In Class IX, No. 205 is a model of a farmstead, by Mr. George Bland, of Market Harborough, described as "suitable for a farm of from six to seven hundred acres, of which five hundred may be arable. The buildings are so arranged that by the aid of a two-horse-power steam-engine the whole of the usual operations required on such a farmstead may be performed." The design shows a good farm house, large cattle yards (to which tolerably convenient access is obtained). The arrangements for the steam-engine are upon the Scotch system: altogether is more extensive than those usually seen.

No. 170 in the same class is a model of farm buildings exhibited by Mr. Edward W. Wilmot, of Congleton, Cheshire, for a farm of about 300 acres, with plans of farm house and labourers' cottages. The architect estimates the cost of the farm buildings at £600, the farm house at £250, and that of two cottages at £150; which are very reasonable prices when compared with the cost of buildings usually erected upon farms of 300 acres. The buildings are arranged in an oblong form, and consist of a barn and engine house, cart shed, cow houses and cattle boxes, having in the centre a large tank (71 by 22 feet) to receive the manure. Above this are the sheep and pig pens, covered over with a rough description of roof. This is a convenient arrangement for collecting the whole of the dung of the farm yard into one reservoir, to be improved and preserved by admixtures of charcoal, &c. W. H. R.

DEVOURING TENANT-FARMERS' PROPERTY BY GAME AND RABBITS.

SIR,—The tide of reason and justice long delayed, long checked and obstructed, has nevertheless set in, so that the British farmers will but little longer suffer themselves to be eaten up by game and rabbits. For the landlord to let the land at a rack-rent to a diligent farmer, and to stock it (without stint) himself with animals which the farmer cannot empound nor lay on damages for depredations committed by them, is monstrous indeed. Who indirectly supports the gamekeeper and his family? Why, the tenant-farmers. Many game-keepers are allowed to stock their masters' domains with as many rabbits as they think proper; which, in most cases, is one of the keeper's perquisites, or part of his wages, to fill the hungry maws of the gamekeeper and his family, and this after the farmer's property is reduced thirty per cent. by Act of Parliament, and in many cases without an abatement of rent or tithe. A single rabbit running over a farm will, in one year, destroy a bushel of wheat; and what is the rabbit worth when it has destroyed the bushel of wheat? Why, from 6d. to 8d. Is this system wise, just, reasonable, or honest, that the industrious farmer and his family should be driven to the workhouse by his crops being destroyed, by what he justly calls vermin? Well may the Americans, in their exultation on acquiring true liberty, point the finger of scorn to the cultivator of land in England, who dares not destroy the spoiler of his harvest; the hare not only fattening on his corn, but destroying five times the quantity eaten, attacking the joints of the spindle, leaving the remains as a witness of destruction; and encroaching on his very garden, eating his tender plants raised for his own support, and which must not in their plunder be disturbed; for the act of coercing them from their depredations, observed by some lord's dependant (more tyrannical than the lord himself) is construed into an offence against the game-laws, and the free-born Englishman is cast into a loathsome prison, prosecuted, and confined, even beyond his power to satisfy, and thus thousands of families sink to ruin. The British farmers are not only called upon to pay the county rates for the prosecution of poachers for destroying animals which devour their crops, but they have to support the wives and families of the said poachers confined in prison, and of those who are transported, which is doubly tyrannical and disadvantageous to the British cultivator. Will not such treatment drive thousands of the best British farmers to cross the Atlantic and farm in a free, untaxed country, where there are no old feudal game-laws, and where they do not pay from 70 to 90 per cent. taxes (under free-trade) for converting barley into malt?

Before I finish I will mention an extremely hard case, of a farmer living not one hundred miles from the north side of Old Rockingham Forest, who rented a farm of 120 acres at 25s. per acre. His family had lived upon the estate and in the lordship for 370 years. This straightforward, hardworking, homely tenant has been greatly eaten up with hares and rabbits, at a loss

of more than one pound per acre per year for thirty years. As something in the shape of a proof: In a deep snow, on a moonlight night, 140 hares were counted, by three substantial witnesses, upon five acres of common white turnips, first helping themselves before forty lamb hogs. Justice calls out aloud and wide, and says, "How long would 140 hares be in eating and destroying five acres of turnips in a frosty winter?" Under such a system of depredation committed by hares and rabbits, coupled with the free-trade price of corn, this tenant's property was consumed, and he was advised to make an assignment of his property for the benefit of his creditors. The money which the property made found its way through the auctioneer into the lawyer's hands; and now it appears to be all swallowed up, because he tells the creditors there is nothing for them, and this poor farmer's friends are now raising money to carry him through the Insolvent Court; which I hope will be a caution to farmers making assignments, because it does not free them of their other debts, unless the creditors all sign.

A Looker-on.

Southorpe, near Stamford, Dec. 8.

LONDON FARMERS' CLUB.

The following are the subjects for discussion at the forthcoming meetings of the London Farmers' Club:—

February 2, 1852.—On Guano: its Application, Supply, and Adulteration: with Details and Statistics, collected from original sources—Proposed by Mr. E. Haslewood, of the Stock Exchange.

March 1.—On the Necessity for, and Means of Extending Agricultural Education—Mr. S. Sidney, of Thurlow Cottage, Clapham.

April 5.—On the best System of Management for Light Land—Mr. W. Bennett, of Regent-street, Cambridge.

May 3.—On the Injurious Effects of Copyhold Tenure on the Cultivation of the Soil—Mr. W. Fisher Hobbs, of Boxted Lodge, Colchester.

June 7.—To what Extent can Landlords afford Substantial Relief to their Tenantry in the present Emergency, without involving any considerable Outlay of Capital?—Mr. W. Shaw, of the Strand.

November 1.—On the Use and Abuse of Lime in Agriculture, and the Properties of different kinds of Limestone—Mr J. C. Nesbit, of Kennington-lane.

December 7.—Upon the Economy of Farming—Mr. R. Baker, of Writtle, Chelmaford.

CHICORY.

Chicory having been cultivated in many places for the sake of the roots, which are prepared and substituted to a considerable extent for coffee, and as the present time commences the proper season for saving and curing it for the merchant's use, a short account of the mode may be of service at this juncture. The process of lifting the roots may now be commenced, and continued during the winter, as the root is very hardy, until all may be finished; but the better plan will be to lift the crop as soon as possible after the full development of the root is effected, our mild winters keeping up an almost incipient vegetation, which, to a certain degree, weakens the tonic properties of chicory. When extensively grown, it is usual in some districts to plough up the roots with strong ploughs, drawn by four to six horses, with men stationed along the line of drill, to separate them from the clods with forks, in the same manner as we lift potatoes, with women and boys to gather them up; but though the roots descend to a considerable depth, they are so small generally, at the depth of twelve or fourteen inches, that they are not worth the additional expense, and the work is more satisfactorily done, and as cheaply executed, by digging them out. The common spade is not so suitable for lifting the crops as implements made similar to the docking-fork or spade, which is cloven to receive the tapering root, and pull it up. A boy should attend the digger, to catch hold of the root and pull it upwards, at the same time the digger gets his purchase on it. When dug, the tops are carefully twisted off with the hand, and the roots thrown in heaps, whence they are carted to the most convenient spot for washing—a clear stream, with a clean, gravelly bottom being best; but in lieu of this, in a large establishment, there are tanks and pumps, and other machinery erected for that purpose, which are more expeditious. The roots are then cut into small pieces, from one quarter to half an inch thick, according to the diameter of the root, either by hand or by a turnip-cutter, so that the pieces may be of as uniform a size as possible; the pieces are then passed through a riddle, to separate the larger pieces from the smaller, as the larger pieces take more drying than the smaller. They are then put in coarse canvas bags, and placed on a kiln to dry, after which they are ready for disposal to the merchant, who roasts and grinds them as is done with coffee. The crop, after being lifted and topped, may be stored away in small heaps, like potatoes, till it may be convenient to roast, cut, and kiln-dry it. After being cut it should be kiln-dried as soon as possible, the roots being subject to bleed away the milky juice, which contains its most valuable properties; and on this account we have before suggested the propriety of partially kiln-drying the roots before they are cut. Cattle of every description are fond of the leaves; and it is usual, after getting the roots away as quickly as possible, to turn in both cattle and sheep in large numbers to devour the leaves.—Irish Farmers' Gazette.

WORCESTERSHIRE AGRICULTURAL SOCIETY.—Messrs. Walker and Rogers, the judges appointed by the committee, have awarded the prizes for the best crop of swede turnips as follows:—Mr. Foley's premium of £10 to Mr. Thomas Harris, Tardebigg; weight, 21 tons 5 cwt., 1 qr. 12lbs. per acre. There was one other competitor, viz., Mr. Adcock, Inkberrow; weight, 20 tons 9 cwt. 2 qrs. 16lbs. Mr. Webb's premium, a silver cup, to Mr. E. Herbert, Powick; weight, 20 tons 10 cwt. 3 qrs. 16lbs. There were two other competitors, viz., Mr. R. Adcock, Inkberrow; weight, 20 tons 9 cwt. 2 qrs. 16lbs.; and Mr. J. Webb, Claines; weight, 18 tons 1 cwt. 2 qr. 4lbs.

ANNUAL REPORT OF THE WOOL TRADE.

LIVERPOOL, JANUARY 1, 1852.—The general course of trade during the past year has by no means realized the sanguine expectations which were indulged in at its commencement. To what cause this is to be ascribed, if to any one in particular, may be difficult to state; at the same time it is undeniable there have been influences to contend against which have in a great measure baffled former experience. The great alterations in our commercial system of late years removing the restrictions in trade will require time for full development. The facilities of inland transit and the regular and rapid communication by steam and otherwise may have had some effect, tending to a closer adjustment of prices at home and abroad, and limiting the scope of the enterprising merchant. The official trade returns are of the most satisfactory nature; the increased exports of our products have been well sustained, the home demand has been to an extent without parallel, and there has been a general amelioration in the condition of the people. Altogether, the state of the country has been in the highest degree prosperous; at the same time we may state that the past year has proved to importers generally the most disastrous on record, not even excepting 1837 and 1825; then the losses fell principally on Bankers, whereas on the present occasion all classes of the commercial community have suffered severely. Continental politics have exercised a prejudicial influence; the large armaments that have been kept up, the disaffection of the people, the embarrassed state of the finances, particularly in Austria, and the consequent derangement in the exchanges, could not be viewed without alarm, still further aggravated during the latter months by the partial failure of the grain crops in some of the countries of Northern Europe. The startling news in the beginning of Dec. of the outbreak of a fresh revolution in Paris created considerable uneasiness, and the result was a rapid decline in our funds and other public securities, but produced little effect on our produce markets. Such an event had long been looked forward to as likely to occur sooner or later, and, as it often happens that the anticipation is worse than the reality, so it has proved on the present occasion, for since affairs have assumed a more settled aspect confidence has revived in a surprising degree.

While, therefore, the state of commercial affairs during the past year has in general been of an unpromising, if not even of a disastrous nature, it is a matter of satisfaction to be able to state that the wool trade has in a great measure formed an exception. The condition of this trade and throughout the manufacturing districts has, on the whole, been sound and healthy. The increase in shipments of manufactured goods has not been in the same proportion as in the previous year, which was the largest on record; still, even compared with that, the result is most gratifying, and at the same time the home demand has, we believe, been greater than at any former period. For the last four or five months the position of spinners has been unsatisfactory, and complaints have been general of the trade being unprofitable, no doubt well founded, with the exception of some branches of the fancy trade; but it should be borne in mind that they had previously enjoyed a period of great prosperity, and the profits had been much larger than in any other department, which has enabled them to bear up against these reverses, and there is reason to hope the turning point has now been passed. The state of the woollen districts has been good, and, as regards the manufacture of woollen cloths, there is much cause for congratulation; there seems a determination to pursue an onward policy, and by adopting improvements in dyeing and finishing, to struggle with our continental rivals to regain the pre-eminence in this most ancient branch of our wool manufacture; and possessing the advantage of free imports of all raw materials, it will be little to our credit if we cannot successfully meet this competition. The Great Exhibition has given an impetus to manufacturing skill and ingenuity; great preparations were made in all departments of wool manufactures, however; the newest designs were kept back till too late in the season, which to some extent interfered with the home demand; but the happiest results, in many respects, may be anticipated from this, one of the greatest events of the age. During January and February there was a very active demand for all descriptions of wool, and prices advanced considerably; after that, the prospects not appearing so promising, consumers supplied themselves merely to meet immediate requirements, so that at our clip time stocks were nearly exhausted, which caused an eager competition for home wools in June and July, and higher prices were paid than circumstances warranted, which has since placed the trade in an awkward position, the supplies left in growers' hands being light, and held for higher rates than have been current in the manufacturing districts. The demand throughout the year has been of a legitimate character, free from speculation; consumption has been very large; prices have not fluctuated to any great extent, the advance obtained in the spring having been subsequently lost, and they are at present pretty nearly on a par with the same period last year, although generally rather below.

The position of the wool trade was never more sound, and we regard the future prospects as highly promising. The principal cause for alarm is a short supply both from our Colonies, and also that the stocks of home

wools will fall short before the new clip; and should this be the case, with the cheapness of money which is likely to prevail, prices may be forced up to a point which will render caution necessary.

From our Colonies the receipts have been fully to the extent expected, and prices have left a fair margin of profit to the importer; but foreign wools generally have not been remunerating, and imports have been restricted. The consequence has been, that throughout the year our markets have been badly supplied, and have offered little choice. The exports both of British as well as of foreign and Colonial wools have been much less than in the previous year, the former to the extent of more than 25 per cent., and the latter nearly 10 per cent. less as compared with those in 1850.

Australian and Cape of Good Hope.—The total receipts show a satisfactory increase, and a fair quantity was for Liverpool account, which would have come direct to this port if there had been the same facilities of shipment as to London. The condition this season has been fair; on the whole, there has been some improvement. The periodical public sales in London have been generally well attended, and offer few features for remark. Arrivals having come in very freely, the quantity brought forward has been unusually large, and up to the close of the last public sales, on the 14th Nov., amounted to the entire import for the year to that period. The discovery of gold in Australia has opened a new era for the colonies; the latest accounts do not afford sufficient information to form a correct opinion as to the future, but the progress made during the winter season, and the large masses that had been found (in one case exceeding 100 lbs. weight) is sufficient to excite the deepest interest, and when the mild weather sets in, operations would, no doubt, be pursued with more vigour. While the consequences will, no doubt, in some respects, be of great importance, there is no denying that as regards the great staple export of the colonies—wool—there is cause for great anxiety. The allurement of gain may be expected to attract great numbers to the gold districts to the partial desertion of the flocks, even should it not become more general than has already been the case. In addition to this, they have suffered severely from drought, particularly in Port Philip, so that under the most favourable circumstances a reduced quantity, as well as deteriorated quality, may be expected; and it is to be feared that the condition will prove very imperfect from the scarcity of labour at the time of shearing. The disturbance at the Cape, although the seat of hostilities is some distance from the wool-growing districts, may injuriously affect the future supplies from this quarter.

Germany.—The import continues to decline, and a few houses now find it worth while to continue it as a trade. Within a short period the receipts have fallen off two-thirds, but the consumption in Germany has increased to more than the same extent, particularly of medium class wools, and each year they are becoming larger customers in this country for such descriptions.

Spanish and Portugal.—The former is now of uncertain sale; there has been little inquiry during the year: at present, however, there is a fair demand, and the prospect is good. Estremadura and Border wools have been of very current sale, and continue so. A large quantity of fine unwashed has been received, but there is generally a dislike to wools in this condition: a portion has consisted of black, which, being to a great extent a fancy article, the demand is rather uncertain, and the stock is at present rather large. Of Oporto the receipts have been less than usual; and, although long-washed wools have met with ready sale, the prices have not been remunerating; while in the unwashed state they have been only saleable at forced rates.

United States.—About 2,000 bales have been received; they have, however, not consisted of wools of American growth, but chiefly of Mediterranean kinds, imported direct, which have been sent to this country with the hope of finding a better market. Their manufactures are rapidly extending; and, notwithstanding the increased growth, which now exceeds 100 millions of pounds, it is all required at home; but the condition of the trade seems to be in by no means a sound state.

Peruvian and Alpaca.—The supply of sheep's wool has been on a very reduced scale. There has been a fair demand; stocks have been very light throughout the year, and are at present entirely exhausted. The receipts of Alpaca have been very large; they have met with very ready sale at well sustained prices, and the market is at present entirely bare of the article.

Buenos Ayres and River Plate.—The receipts have been to a diminished extent (the principal part having been sent direct to the United States), which is more apparent when we state that the weight of the great portion of the bales has been much less than usual. They have generally met with ready sale on arrival, at full market value, compared with other kinds, and a good portion was sold early in the year, at prices which could not have been since obtained till lately. The accounts of drought and gold discoveries in Australia led to some speculative purchases in Colonial, which gave a firmer tone to other descriptions, in which Buenos Ayres wools participated, and we consider the prospect favourable for next season.

East India.—The demand has been uniform and good, more attention has been shown in bringing them forward as they were required by the trade; prices have, therefore, been well supported. We could do with a greatly extended supply, but it is understood the quantity to be obtained does not exceed 12,000 to 13,000 bales, and our last year's import nearly reaches this amount.

Russia.—The import is much in excess of last year, principally to London. Donskoy fleeces, suited for combing, has been in good demand, but the quantity of this description seems to be yearly decreasing; shorter stapled kinds have been less, although in fair request; autumn has been of current sale; lambs' less so, excepting superior quality, of which we have seen very little. Zegay has been generally dull, and very little has come to hand. *Scoured*, *brook-washed*, and *germanized* have not been in much favour; but the demand is improving, and they are likely to be wanted.

Mediterranean shows a fair increase, chiefly consisting of Egyptian, which have been very current of sale; we are sorry, however, to observe, that they have not been by any means so well got up as formerly. It only requires proper attention in this respect to render them a favourite article, and they would be at all times very saleable. Other kinds—as Servia, Bosnia, Vidino, Volo, Scopia, Scutari, &c., of which in former years we have been accustomed to receive large supplies—have almost entirely failed, having been worth more in other markets.

Mohair.—The import has been rather less than last year; the demand has been good, prices have been well maintained, and have not varied more than 2d. per lb. during the year. The quantity received here has exceeded by 2,000 bags the import of the former year, but the principal part, having been for London account, has been sent up under the *strange* impression that better prices can be obtained there, when more than *three-fourths of the entire import* is consumed in *York-*

shire (close to our doors), and chiefly by the purchasers of Alpaca Wool, of which the entire trade is centered here. The advantages of our market are too palpably apparent to need further comment, and we venture to predict that in a short time it will become the chief mart for Mohair, as it already is for Alpaca, and which, from its proximity to the chief seat of consumption, it cannot fail to be.

MOGADOR.—The supply has been about an average. They have generally met with a ready sale, although importers have complained of prices not being satisfactory; still, compared with other kinds, they have brought their full value.

ICELAND.—It will be seen that the import has been nearly double what it was in the preceding year. There has been a fair demand at current rates, and a good portion was sold on, and some previous to, arrival.

DOMESTIC WOOLS.—In English a large business has been done at intervals throughout the year, and present stocks are supposed to be much below an average. During the last month there has been an improved demand for combing Wools, at advanced prices; which has also been the case in Irish, even to a greater extent, and since the revival of confidence in France, there has been an extraordinary demand for this description, being particularly required for that trade. Holders are very exorbitant in their demands, and stocks seem to be less than they have been for the last five years, which confirms the opinion that there has been a great falling off in the growth. Noils have been in good demand, at well-sustained rates. Scotch.—Prime white Cheviot has not met with ready sale, but for other kinds the demand has been generally languid; for Laid Highland there has been more inquiry of late, and for these, as well as other descriptions, there is an improving prospect.

SHEEPSKINS have generally been in good demand, and are at present much wanted.

HUGHES & RONALD, Wool Brokers.

SEED AND OIL TRADE.—ANNUAL ACCOUNT.

Messrs. Edwards and Eastty, in the seed and oil trade, thus sum up the annual account—

"The termination of an eventful year affords us again the pleasure to address you our annual circular, with retrospect of prices, and the chief incidents marking our trade during that period, together with the comparative imports to previous years, and probable supplies to be expected during remainder of season, &c.

"LINSEED.—The import into London is an average, being some 25,000 qrs. in excess of 1850. Hull, the chief port of entry for seed, exhibits a deficiency of about the same quantity, whilst into the whole United Kingdom we shall probably be 35,000 qrs. short. Compared with the former year, a still greater deficiency is found, viz., 50,000 qrs.; and with 1848 220,000 qrs. The change in the places of supply is again worthy of notice, our increase this year being attributable to the East Indies, which has supplied us no less than 52,000 qrs. out of the 145,000. The Baltic imports were insignificant, not amounting to 20,000 qrs., whilst from other places no great difference is observable. Black Sea seed, as usual, forms the most prominent feature in the supply, 170,000 qrs. having arrived during the year at Falmouth, for order, and which were divided as follows:—49,000 to London, 35,000 Hull, 13,000 Dover, 9,000 Southampton, 8,500 Yarmouth, 8,000 Newcastle, 6,000 Liverpool, 5,500 Ipswich, 3,600 Grimsby, 3,200 Gloucester, 2,400 Rochester, 1,800 Dublin, and to the Continent 25,000. St. Petersburgh supplied 105,500 qrs., Archangel 65,000; Riga also about 65,000 qrs. crushing. Only 12,000 qrs. (nearly all of which was shipped since September) were re-exported, showing a great falling off by comparison with previous years.

"The price on the spot of Black Sea seed at commencement of the year was firm at 49s. per qr.; but oil becoming slacker, and one or two speculative parcels being forced on the market, drove it down to 46s. during the month of January, at which period also a little was contracted for, for summer shipment, at 46s. 6d. per qr. In February seed was found to be very scarce, and 48s. 6d. was again paid.

"March still further improved us, and 49s. 6d. to 49s. were the current values. From then until July we were without any stock or new supplies of Black Sea; but other sorts bore a relative value, and only gradually declined to meet the price of the new seed, in which a fair business was done early in June at 46s. per qr. for average quality. Up to that period the business had been very inconsiderable, the positive loss to the crushers in working deterring them from buying more than they could actually help, so as just to keep their regular customers supplied.

"In July there was a large trade at 46s. 6d. per qr., up to 47s. 6d. and 48s. for picked samples. Contracts of some magnitude were likewise entered into for East India seed at 48s. per qr., which sort of seed had by that time established a preference over Black Sea of a difference of 1s. to 1s. 6d. per qr., the latter having but little improved upon the bad quality noticed the previous year.

"In August an occasional sale occurred at unaltered rates; after which, until nearly the end of October, we had an exceedingly dull trade, and scarcely a sale upon which to mark a quotation; the tendency being decidedly to a fall, owing to the reported abundant crops in the south of Russia. We had at that time, within a few days, to quote a fall of 3s. per qr., 46s. having been made one week, and 43s. accepted the next. At this time, also, an immense business had begun for shipment from the Sea of Azov next season at 40s. per qr., and from then until now we will venture to say a greater quantity of seed has changed hands than was ever known in a similar period of time. The prices have scarcely varied since the opening contracts; but, if anything, they are in sellers' favour.

"The sales comprise—average quality on the way, and shipping at 43s. to 43s. 6d. per qr.; fine samples at 44s.; East India at 44s. 6d. to 43s. 6d., according to the date of shipment; Alexandria at 41s. to 42s.; and all other sorts in proportion. And, for next season, Black Sea at 40s. (also by sample at 41s. to 41s. 6d.); and East India, for shipment before June, at 41s. 6d. to 42s. 6d. In the aggregate at least 300,000 qrs. have found buyers during the last two months.

"To-day our market is very quiet, but prices firm, a parcel Black Sea sold ex ship at 44s.; East India, of good quality, at 44s. 6d.; other descriptions remain as quoted.

"The quality of the East India seed has been much approved.

Archangel also gave great satisfaction. The Riga was of the most inferior description, and the bulk of the St. Petersburgh likewise of very low quality. The Alexandria seed, the bulk of which, before the unsettled state of France since 1848, went directly to Marseilles, has been very good. The earliest cargoes from the south of Russia showed some improvement over the previous two years; but the later arrivals were far from satisfactory. The new seed, however, of which a little is already to hand, is excellent; and the hope expressed in our last is, we trust, about to be realized, Black Sea seed regaining the character it formerly bore, and again standing pre-eminent in point of quality over all other sorts.

"In granary we have 9000 qrs. only—namely, 6500 St. Petersburgh, 1500 Archangel, and 1000 Riga. Of East India there is also some small quantity, but it is chiefly in crushers' hands. Afloat, we have a seemingly very large quantity—say, 210,000 qrs., coming from the following places: Black Sea, 150,000; East Indies, 35,000 qrs.; Alexandria and sundries, 25,000 qrs.

"This fact has led to the inference that we shall have more seed than will be wanted for remainder of our season's working, and that prices must necessarily decline; but how does the fact really stand? In the first place, the Continent is very bare of linseed. We know a good deal is destined there, and probably at least one-fifth of the 210,000 quarters will eventually be so ordered. Then, again, at this time last year, in Hull and London alone we had more than 100,000 qrs. in granary, and, besides this, imported a further 177,000 qrs. into the kingdom by June, at which period nothing was left in stock. Our great supply, therefore, is soon reduced; and, by comparison, we shall actually be short, instead of showing a surplus.

"If, instead of comparing our imports from January to December, as customarily taken, we take the working season, and which is really the crushers' year, or say from July to June, we get, in round numbers, the following results:

1848-49	709,000 qrs.
1849-50	600,000 qrs.
1850-51	700,000 qrs.

And if our estimate prove correct, we shall find 1850-52 to be within 600,000, thus, under every phase, showing a deficient quantity. From all we can gather, our crushers generally are lightly stocked, especially in the north; and if any casualties occur to the expected arrivals, seed will not be found so plentiful.

"The present prices of oil and cake will not justify us in looking for an advance in seed; particularly as the cheaper parcels to come in for next season will induce crushers to work up every qr. rather than hold stock to meet those arrivals. We must say, however, we do not anticipate any decline during the next three or four months; more particularly as the destinations of the floating cargoes become clearly defined, showing how widely they will be spread. Our supplies, after July, will doubtless be very large; the crops everywhere being reported so large in quantity, and we are glad to add also superior in quality, that we trust low prices may stimulate such a trade for next year as will in some measure compensate the crusher for the unprofitable workings of late.

"Linseed Oil.—The high rates paying for this article during the first nine months of the year materially checked speculation; and it has been therefore much more even in demand, and steadier in price, than for several years past. As we expected, the light stock and great export when the year opened told immediately upon the value, and within a day or two of our last annual circular £34 10s. was the current price, and some sales made for forward deliveries as high as £35; this brought out many sellers, and it fell during January to about £33, at which price to 10s. more we were very steady during February, March, and April. In May there was a very dragging trade, owing to the discouraging accounts from the United States, and the price receded to £30 10s. at the end of the month. June, however, again showed how empty all the cisterns were, about 9,500 tons having been by that time exported, whilst the arrival of seed during the same period was scarcely 180,000 qrs.; and it followed therefore every gallon of oil made from the seed imported during the six months had been exported, leaving the home-trade wants to have been supplied from the short stocks left over in 1849. In less than a fortnight we recovered to £32 10s.; at about which we continued until August, when we again touched £33.

"In the absence of any American demand, upon which we so much depend for any long continuance of high rates, since the mills recommenced work in September, it has been one downward course; September, £32 to £31; October, £31 to £29; and November, when the cake trade was exceedingly brisk, £28 10s. to £26. Latterly we obtained a shade more money, having, in the middle of December, improved 10s. to 20s. per ton, the great reduction having rendered many Mediterranean orders executable, and also encouraged an export to the German, Dutch, and Belgian ports. The course of prices as shown herein have been of a very even tenor, subject only to the most legitimate influences throughout the year, and far fewer speculations have been entered into than usual. The future is again full of uncertainty, and any mere opinion valueless. We believe high or low prices depend exclusively on our export, and are confirmed in this opinion by a reference to our export tables. We shall be found in 1851 to have sent away nearly an equal quantity to 1850, in which latter year it was evenly divided over the 12 months, and prices at opening and close of the year (although they had as usual fluctuated considerably during the time) showed no great difference. Last year, however, two-thirds of the export was at beginning of the year, and the decrease at its close has left us with a depreciation on the opening price of more than 20 per cent. No doubt the present value, which is about an average one, will materially increase the late consumption, still the market must far exceed any possible home demand. The cake trade increases year by year—so much so, that within the last few months three or four new mills have been erected, and the old ones throughout the kingdom have several of them added additional presses to their works, so that the quantity of oil made is consequently greater than ever. The relatively higher value of fish, and all other oils, will tend to prevent any further reduction, and also cause a large continental demand. To the American markets, however, we must again look, for upon them do we still mainly depend. They are reported to have good crops of seed, and their mills (many of which, for the last two or three years, had been standing idle) to be at full work, quite adequate to their consuming wants. We doubt this; surely after many years taking a large proportion of our make, they cannot all at once do entirely without, especially with their increasing population, and, owing to their Californian gold, greater facility of payment. We expect yet to see considerable shipments to meet their spring trade, and that present prices will in any case be maintained for some months to come, whilst anything approaching the demand from thence of the last two years would greatly enhance the value here. Large speculative transactions have been entered into for monthly deliveries this year, at £27 10s. to £27 for January to June, at £26 10s. for all the year, and to meet cheap seed coming in for next season, at £25 10s. to £26 for last six months. To-

day the price is £26 10s. to £26 15s. per ton for immediate deliveries, and but little doing, but there are many inquiries for spring deliveries on continental account.

"LINSEED CAKES have become an article so well known and of such very regular and extensive use that they require now but little remark from us beyond a register of the course of prices. The price opened at £7 to £7 10s. per ton, with a large trade, but at barely supported prices during the first three months of the year. In April the scarcity of foreign cakes, which has continued throughout the year, began to tell, and we were again very firm at the opening prices. The summer demand was slacker than usual this season, and £7 was an extreme value. The dealers, as the autumn set in, showed much anxiety to contract for winter deliveries, which was but rarely met on the part of the crushers. From September to October we had scarcely an average business doing, but in November an immense trade set in, and prices advanced £1 per ton, which is firmly maintained, and £8 is the present London value, while in the consuming districts the value is £8 10s. to £9 per ton taken from the mills, the crushers holding even less stock than usual, and no foreign cakes in hand. We consider this rise will be maintained to the end of the season, and for two reasons; first, we shall have but very moderate supplies of foreign, we shall not be over-d ne with seed, and the low price of oil would cause the working short time of many of the mills, if they did not get remunerative prices for their produce; and secondly, the scarcity and comparative high prices of all other feeding stuffs and lower qualities of grain. The harvest was generally so well secured last year, the farmers find themselves with very little bad or ill-conditioned corn; it will probably, therefore, all go to market in lieu of finding its way into the feeding stalls, and the want thereby occasioned be supplied by an increased demand for linseed cake, especially if the meat market continues in its present healthy state, and which we see no reason to doubt.

"RAPESEED.—Although our import here is in excess of 1850, the quantity into the United Kingdom will fall far short —probably some 20 per cent.; still this is greatly in excess of the quantities we have been accustomed to in former years. The bulk of seed brought in being East India, we take it as the standard, and find that the price of 42s., with which we commenced the year, was maintained until the middle of February, when it fell to 40s., and the heavy stocks on hand sent it back gradually to 38s. in April, which price held until August; it then recovered the fall, and maintained it for some time. By October, however, it was again at 38s., to a little over. In November its value had improved to 39s., and to-day that price to 39s. 6d. are the exact quotations. To-day a sale has been made of 500 quarters, at 39s. 6d. per quarter.

"RAPE OIL has had a very large consumption throughout the year. Our home make being considerable, added to an extensive importation of foreign, which has kept our market well supplied. At the opening of the year foreign ranged from £37 to £38, and English £36 10s., but exhibited a drooping tendency till May, when it touched £34 for foreign, at about which it ruled during the remainder of the year. We quote the price of refined to-day £33 10s. to £33 foreign, and £31 10s. English.

"RAPE CAKES.—About £4 per ton has been the ruling figure throughout the year for this article, varying from 2s. 6d. per ton less, to 10s. more than that price, and we have usually had to write them of 'very ready sale.' They are now very extensively used for feeding, displacing some of the lower sorts of foreign linseed-cake, and the value, which is higher than it used to be in former years, seems likely to be of permanent duration, at the rates current to-day, which is £4 10s. per ton."

SMITHFIELD CLUB.

SIR,—Your exposition and remarks upon the past 20 years' results of the Smithfield Club are valuable, and must prove exceedingly interesting to the public.

As an old member of this national institution, allow me, sir, to thank you for your zeal upon all agricultural matters, but more especially for the late "tabular statement" containing the information referred to.

It is far from my wish to disturb the harmony of the past, or to reflect upon the future; but I cannot refrain from a remark upon this national subject.

The historical results of the Club laid before the public in your last journal must be gratifying to the founders of the Society, as by analysis it is found to expound and confirm the object they had in view—"The establishment of the Smithfield Club for the express purpose of a national comparison of fat animals (regardless of breed) to stimulate the breeders and feeders to further exertion in the supplying of Smithfield market with the cheapest and best meat." Your clear and explicit remarks upon the past and probable future need no comment at my hands, my only desire being to support the attention you have paid the subject, and to express my sorrow that so important a change should have taken place in the absence of evidence to support it. No one heard a complaint in the Show yard as to the award of the judges, the classification as to breeds, weights, or otherwise; neither should we have had the old constitution of the Club changed, had you published the present tabular form before the late decision took place.

My views are simply these: The Smithfield Club being instituted for the express purpose of "supplying the consumer with the cheapest and best meat," I consider that the original plan of all fat animals of any breed or cross being classed together, under their respective ages and weights, to compete for a given sum of money, as more likely to accomplish the great object of the Club, than by dividing the same amount of money between the several breeds and crosses, regardless of competition and comparative merit. As regards the selection of judges and their past awards, who can now question the result of the last 20 years? and what is important—a majority of them have been feeders in accordance with the objects of the Club. Again, if a difficulty or prejudice existed in making the award under the old plan of classification, how is it to be remedied by the judges in future, when the animals are classed in breeds, or in the award of the gold medal? Breed against breed!

Yours, &c.,

AN OLD OFFICER OF THE CLUB.

—Mark Lane Express.

BOARD OF GUARDIANS—EXETER.

[We beg especial attention to a report laid before the Board of Guardians of the Exeter Poor-law Union, upon "an industrial scheme for the purpose of training the children to manual employment, and turning to account the surplus labour of the house," and, by which, a repeatable balance is shown in favour of the scheme. The chairman very appropriately observed, that it was "a most interesting document"—interesting, in a two-fold point of view: first, as regards the interests of the rate-payers by relieving the rates; and next, as regards the children themselves, by training them, as observed by Mr. Coward, "in the habit of earning a livelihood by their own industry." It is lamentable to feel that youths intended as future labourers are left wholly to blunder upon the right mode of using the tools by which they are to earn the value of the labour paid for by their employers, and by which they are to obtain their own subsistence. At all events, Poor-law Unions might be made schools of instruction for the inmates. Nay, we go further: fortified by the successful results of the experiment of the Exeter Union in respect to children, we maintain, as we have done on former occasions, that our poor law unions (so far as regards all except the sick and the aged) and our prisons might be made self-supporting. It is absurd to suppose that a working man or woman cannot earn his or her support within the walls of the union as well as without—it is preposterous to expect that the honest and industrious should be called upon to contribute to maintain the vicious and the indolent in a prison, or on board the hulks, whilst they have strength and ability to earn their own maintenance. The rule should be, "He that doth not work neither shall he eat." The idea of entering into competition with the free labourer is absurd. Were these people honest instead of dishonest they would be competitors in the field of labour: they are no more, within the walls of a prison.—ED. F. MAG.]

G. S. CURTIS, ESQ., CHAIRMAN.

SUCCESS OF THE INDUSTRIAL SCHEME.

It is stated having been the first to adopt an industrial scheme for the purpose of training the children to manual employment, and turning to account the surplus labour of this house, much interest was felt in the following report, which was brought up by Mr. Storey:—

AGRICULTURAL REPORT.

Cr.	PAYMENTS.	£	s.	d.	£	s.	d.
Rent of new field, Michaelmas 1850, to Michaelmas 1851		18	0	0			
Ditto, to date		13	7	4			
Taxes, rates, and tithe rent charge		5	19	9			
Wages of superintendent, to Michaelmas		20	3	10			
					57	10	11
Allowance for value of crops in the garden at Christmas, 1850		£10	0	0			
25 bags seed potatoes, from old field, at 4s. 6d.		5	12	6			
5 bags do, from Mr. Beazley, at 5s.		1	5	0			
5 bushels seed barley, from Mr. Symons, at 3s. 3d.		0	16	3			
Seeds and plants, purchased by the master		1	17	7			
					19	11	4
20 hogsheads of lime, and drawing					4	8	0
2½ dozen spades purchased		3	13	7½			
6 barrows do.		4	10	0			
3 reaping hooks, 7s. 6d.; 3 Norway stones, 6d.		0	8	0			
2 hay rakes		0	1	6			
Draining tiles		0	8	4			
					9	1	5½
Hire of horse and cart for harvesting barley		1	0	0			
Cider for men, for harvesting barley		0	5	2			
Reed, &c., for binding barley, 4s.; thatching, 3s.		0	7	0			
Thrashing 55½ bags of barley, at 6d.		1	7	9			
					2	19	11

LIABILITIES UNPAID.

Rent of fields from Michaelmas to Christmas		9	0	0			
Wages of superintendent, do.		7	10	0			
1 poor rate, 14s. 6d.; 1 highway rate, 14s. 6d.		1	9	0			
					17	19	0
					£111	10	7½
Dung					3	10	0
					115	0	7½
Balance					52	2	3¼
					£167	2	10¾

CR.

By vegetables consumed by the inmates, from Christmas, 1850, to Christmas, 1851.

	£	s.	d.	£	s.	d.
Cabbages, 2,839	11	16	7½			
Lecks, 61 score, 6⅓lbs.	4	5	1			
Onions, 109 score, 5lbs.	6	5	10½			
Carrots, 12 cwt. 1 qr. 7lbs.	1	8	7½			
Turnips, 41 cwt. 3 qrs. 2lbs.	3	16	2			
Parsnips, 23 cwt. 3 qrs. 20lbs.	4	14	0			
Herbs, 6 score lbs.	0	10	0			
Celery, 5 score, 10lbs.	0	9	2			
Peas, 16 peck	0	8	0			
Scarlet-runners, 173lbs.	0	8	7			
				34	2	1½

Potatoes consumed by inmates:—

Lady-day to Midsummer, 10 score, 17lbs.		0	6	9¾			
Midsummer to Michaelmas, 59 bags, 3 score		10	8	0			
Michaelmas to Christmas, 91 bags, 6 score		24	9	10			
					35	4	7¾
Straw supplied for bedding, 17 seams					2	3	0

Supplied to piggery:—

Small potatoes, Midsummer to Michaelmas, 59 score, 15lbs.		0	14	11			
Ditto, Michaelmas to Christmas, 63 bags		6	6	0			
Straw, 14 seams		1	15	6			
Barley, 36 bags		11	14	0			
					20	10	5

Balance for crops growing, and in store :—

IN STORE.

Potatoes, 156 bags	41	12	0			
Ditto seed, 30 bags	8	0	0			
Ditto, small, 41 bags	5	9	4			
				55	1	4
Barley, 19½ bags				6	11	7½
Leeks, 56 score	2	16	0			
Parsnips, 39½ cwt.	4	18	9			
				7	14	9

GROWING.

Cabbages, winter grown	2	10	0			
Swedes, 6 tons	3	0	0			
Celery	0	5	0			
				5	15	0
				75	2	8½
				£167	2	10¾

Memorandum.—6½ seams of straw, used to cover potatoes, in caves 0 15 3

PIGGERY ACCOUNT.

Dr. Payments.	£	s.	d.	£	s.	d
Purchase of 15 pigs, and ringing do	12	5	0			
Ditto pollard, bran, and barley meal	9	1	1½			
Ditto grains, by the master	4	3	3			
Ditto 6 bags of potatoes	0	15	0			
				26	4	4½

Field Account.

Potatoes, Midsummer to Michaelmas, 59 score 15lb.	0	14	11			
Ditto, Michaelmas to Christmas, 63 bags	6	6	0			
Straw, 14 seams and two-tenths	1	15	6			
Barley, 36 bags	11	14	0			
				20	10	5
				£46	14	9½

Cr.	£	s.	d.
By produce of 4 pigs killed, gross weight 52 score 17lb.	17	3	6
By balance for pigs in store, 10 pigs, weighing 78 score	25	7	0
	£42	10	6
By manure	3	10	0
	£46	0	6
Loss	0	14	3½
	£46	14	9½

The Chairman said the balance now handed in presumed that the Board would pay the salary of the Inspector of Labour, but that was not so; the inspector's salary was paid by the Council of Education, and this would increase the balance in favour of the union to £88 17s. 6½d. He might fairly say, in asking them to receive the report, that it was the most interesting document that had been presented to them since he had been a member of the Board. (Hear.)

Mr. Creed had much pleasure in moving the adoption of the report. He thought the best thanks of the Board were due to the committee, for the zeal they had manifested in carrying out the scheme; and he moved, also, that the thanks of the Board be given to the committee.

Mr. Coward seconded the resolution, and hoped the gentlemen of the press would do their best to give publicity to the report, in order that other unions might be induced to follow the example, and adopt industrial schools to employ the surplus labour of the house, and educate the young in the habit of earning a livelihood by their own industry. (Hear.)

The Rev. C. Wolston having expressed his gratification, and Mr. Falk having made some suggestions for the better management of the piggeries,

Mr. Hutchings, the introducer of the scheme, said the report exceeded his anticipations, but it was only one half of a scheme that he intended to propose, and he should shortly take the opportunity of introducing the other half. (Hear.)

CLOVER SICKNESS.

Sir,—I have read with much interest in your impression of the 12th inst., the report of Mr. Nesbit's lecture at Dorchester, and am now about to draw your attention to that part only of the proceedings relative to the cause of *clover* being occasionally an uncertain crop. The chairman of the meeting put the question—"Why was it that clover could not be grown in that county oftener than once in six years, and, in some cases, not even more than once in ten years?" to which Mr. Nesbit replied that it was "almost a poser."

The question is one which applies to many localities besides Dorsetshire; and probably the answer is the most satisfactory which could have been given, inasmuch as it is not calculated to *mislead* any one in their endeavours to investigate the cause of so singular a phenomenon, and in seeking to apply a practical remedy.

The complaint which I have here designated as a singular phenomenon, I have generally found most prevalent on lands where a large proportion of *root crops* are grown, and am strongly inclined to think that on such due attention is often not paid by the farmer to a sufficient restoration of *sulphates* to the soil. All animal and vegetable substances contain a certain quantity of sulphur as a constituent of their organism; and more especially turnips, red clover, lucern, sainfoin, &c.; so that the inference is probable that land repeatedly cropped with turnips may be so far deprived of its sulphates, by growing that root, as to be deficient in the requisite quantity necessary for carrying clover to maturity in the rotation. The experiment would be well worth a trial, as the expense would be very trifling, for the quantity required would not exceed a few lbs. per acre, and may be supplied by various sulphates, such as gypsum (sul. of lime), alum (sul. of alumina), sulphuric acid, or common brimstone, and also coal ashes. Sulphur is but sparingly supplied by most lands in the natural decomposition of the soil itself; for as a constituent of the natural crust of the earth, it is found only in small quantity, and as it exists in notable quantity in hair and wool, where many sheep and beasts are kept, a considerable portion is consequently sold off the land annually; it is therefore important to the farmer that a sufficiency of this material should be restored when a deficiency of it in the soil may be suspected.

In concluding these remarks, I would venture an opinion that the deficiency of a due proportion of sulphates in arable land is frequently the *cause* of a number of the *unaccountable diseases* of which farmers and gardeners so much complain.

I remain, Sir, your obedient servant, David Scott.

Hendon, Middlesex, Jan. 22nd.

—Mark Lane Express.

METEOROLOGICAL DIARY.

Dec.	Barometer. 8 a.m.	Barometer. 10 p.m.	Thermometer. Min.	Thermometer. Max.	Thermometer. 10 p.m.	Wind and State. Direction.	Force	Atmosphere. 8 a.m.	Atmosphere. 2 p.m.	Atmosphere. 10 p.m.	Weath.
	in. cts.	in. cts.									
	29.54	29.84	40	45	42	S. by East	varble.	cloudy	cloudy	cloudy	rain
23	30.10	30.23	38	42	41	Northerly	gentle	cloudy	cloudy	cloudy	dry
24	30.25	30.27	35	40	38	S. East	calm	cloudy	sun	cloudy	dry
25	30.29	30.34	30	40	38	W. or by North	calm	cloudy	sun	cloudy	dry
26	30.40	30.51	31	37	25	Easterly	calm	fine	sun	fine	dry
27	30.51	30.38	25	34	34	Var., Westerly	calm	haze	cloudy	cloudy	dry
28	30.30	30.42	33	37	36	N. East	gentle	cloudy	cloudy	cloudy	rain
29	30.48	30.48	33	39	36	E. by North	calm	haze	haze	cloudy	dry
30	30.48	30.40	34	40	30	Var., S.E.	gentle	cloudy	cloudy	fine	dry
31	30.28	30.10	29	36	35	S. West	calm	cloudy	cloudy	cloudy	dry
Jan. 1	29.98	29.84	31	35	31	S. Westerly	calm	haze	cloudy	fine	dry
2	29.75	29.69	28	40	38	S. Westerly	gentle	cloudy	fine	cloudy	rain
3	29.68	29.60	35	45	45	S. West	brisk	fine	sun	cloudy	dry
4	29.55	30.10	42	44	32	N. by West	brisk	fine	sun	fine	dry
5	30.20	30.10	28	42	38	S. or by E.	lively	fine	sun	cloudy	dry
6	29.96	29.70	34	44	44	South	lively	fine	sun	cloudy	dry
7	29.55	29.88	38	48	40	S. Westerly	lively	cloudy	sun	fine	rain
8	29.88	29.23	37	47	47	S. West	strong	cloudy	fine	cloudy	rain
9	29.19	29.50	34	39	34	S.W., N.W.	very bk	cloudy	fine	fine	rain
10	29.65	29.48	30	37	37	W.byS., Sthly.	gentle	fine	sun	cloudy	dry
11	28.97	29.24	36	50	47	S. West	brisk	cloudy	cloudy	fine	rain
12	29.29	29.39	46	46	45	S. West	lively	cloudy	cloudy	cloudy	rain
13	29.51	29.58	39	49	49	Estly. S.Wsty.	varble.	cloudy	cloudy	fine	rain
14	29.70	29.79	47	51	45	S. Westerly	gentle	cloudy	sun	cloudy	dry
15	29.63	29.50	45	52	52	S. Westerly	strong	cloudy	fine	cloudy	rain
16	29.70	29.92	46	50	45	S. Westerly	gentle	cloudy	fine	cloudy	dry
17	30.—	30.27	41	47	37	Wstly., N.W.	gentle	fine	sun	fine	dry
18	30.31	30.30	32	44	37	S. West	gentle	fine	sun	cloudy	dry
19	30.20	30.02	33	42	42	S. West	gentle	fine	sun	cloudy	dry
20	29.80	29.83	40	48	42	S. or by West	gentle	cloudy	cloudy	fine	rain
21	29.96	29.49	35	50	50	South	strong	cloudy	cloudy	cloudy	rain

ESTIMATED AVERAGES OF JANUARY.

Barometer. High.	Barometer. Low.	Thermometer. High.	Thermometer. Low	Thermometer. Mean.
30.77	28.89	52	11	36.1

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
43.22	35.64	39.43

Weather and Phenomena.

December 22—Soaking showers. 23—Changeable; fine mid-day. 24—Some sun till evening. 25—Frost early; fine. 26—Clear; keen frost. 27—Rapid change. 28—Damp and chilly. 29—Hazy; cloudy. 30—Fine, and richly tinted clouds at sunset. 31—Frosty; then a thaw.

Lunations.—New Moon, 22nd day 3 h. 34 m. afternoon. First Quarter, 30th day 15 m. afternoon.

1852: January 1—Semi-haze; quite tranquil. 2—Gentle; improving. 3—Beautiful day. 4—Rain in night. 5—Beautiful; gorgeous sunset; green, silver, and golden strata. 6—Fine cirro-stratus. 7—Early frost; pale lunar halo. 8—Changeable; hints of rain. 9—After night rain a fine day. 10—Fine. 11, 12, 13—Night rain at first; copious rains follow. 14—Fine. 15—Much rain, with storm. 16 to 20—Little sun (but dry), excepting on the 17th and 18th. 21—Very wet.

Lunations.—Full moon, 7th day, 6 h. 9 m. morning; sets eclipsed. Last quarter, 14th day, 1 h. 11 m. morning. New Moon, 21st day, 7 h. 27 m. morning.

Remarks referring to agriculture.

The winter is passing away, and since the early frosts of November, is of a decidedly mild character. No snow is seen in East Surrey; and the fields are verdant as in spring. A very good supply of rain has fallen since the 20th night of Dec., and the spring will probably rise fast. The wheat remains subdued, and everything on the farms is looking well. Some keen ground-frost might be healthy and seasonable, affording also a useful check.

Croydon. J. Towers.

CALENDAR OF HORTICULTURE.

PLANT HOUSES.

Conservatory.—Use every exertion to keep this house gay by a constant draught upon the Forcing-house and the Store-pits; and if such plants as Euphorbias, Aphelandras, Justicias, Poinsettias from the stove, together with Dendrobiums, Odontoglossum grande, and Bletias from the Orchid-house, are brought into it, the temperature will require considerable attention, and should be kept as high as 55 degrees by day, and about 10 degrees less by night: such plants should have the warmest places selected for them. Take care that they are not exposed to cutting draughts. The same remarks will apply to plants from the Forcing-house, of which there should now be a good stock in bloom, such as Hyacinths, Tulips, Narcissi, Rhododendrons, Kalmias, Deutzias, Lilacs, Indian and hardy Azaleas, and a few of the dark China and Fairy Roses; Mignonette, also, will now be coming on, if kept near the glass. Make a small sowing in pots for succession, and place them in a cold frame near the glass. Lachenalias will soon be throwing up their bloom spikes, and should be placed on a shelf close to the glass, otherwise the bloom will come weak and small. Amaryllids should be removed from the pit to a forcing-house, or early vinery, as soon as they indicate flowering. Water them freely when well started. Camellias will now be in great beauty; therefore, in syringing, avoid wetting the flowers, as it will most likely spot them. Be careful at all times, in syringing, to use very clear water. Sprinkle the walks &c. daily, to keep up a pleasant, but not too moist an atmosphere.

Stove.—This house is generally more liable to a variety of insects than any other, and there is no more important operation in the plant department generally than that of keeping down such vermin. Omit no opportunity of doing so; for if allowed to get ahead, the labour is doubled and trebled. Prune and re-pot Stephanotis, Allamanda, Dipladenia, Manettia, Clerodendrons, and other plants of a similar habit; syringe them occasionally with tepid water, but do not water too freely at the roots until growth commences. Examine Ixoras, and give them a shift if necessary, and remove them to a lively bottom-heat.

Greenhouse.—Calceolarias will now require considerable attention to shifting, as the roots are in full action, and, if fine plants are desired, they must not be cramped for pot room; for, if they are, they will throw up for bloom too fast, which is not desirable just yet. Apply liquid manure to such as are in a free growing state. Thin out the branches of Pelargoniums where too much crowded, so that the air may circulate freely amongst them; persevere in training as they make growth, and continue shifting the late plants. Small plants of Indian Azalias, intended to be grown on for specimens, may now be shifted at once, and removed into heat. Larger plants of the above, for next seasons forcing, should also be started in heat, to make an early growth. Do not permit them to flower. Remove forced Camellias which are past blooming into heat, to make fresh growth for early blooms another year. Prepare a selection of pots, composts, and drainage for shifting hard-wooded plants.

Florists' Flowers.—Auriculas have now begun to make growth; let them be top-dressed immediately, all decayed leaves removed, and every encouragement given to obtain a stocky growth, by abundance of air, and situation close to the glass. A little more water may now be given to them, but avoid too much. Carnations and Picotees are on the move, and will soon be ready for shifting into blooming pots; see, therefore, that the compost is getting ready, and be sure that it gets a thorough manipulation, to destroy every vestige of wire-worm. Stir the surface of the beds of Pinks and Pansies, and apply a slight dressing of soot and ashes. Bulbs of all sorts, such as Anemone, Hyacinth, Ranunculus, Gladiolus, &c., remaining unplanted, should be got in without delay. Those advancing in growth must be protected from frost and heavy rains.

FORCING HOUSES.

Vineries.—As the fruit will now be mostly cut in the latest houses, the trees should be pruned without delay, and dressed over with a mixture of soft soap, sulphur, soot, and lime, in about equal proportions, with just sufficient water to make it of the consistency of paint. It is best to apply it warm—100 degrees is not too much—afterwards the houses should be put in thorough order, the glass washed, and cleanliness established throughout. The recent drenching rains will render it necessary to examine the state of the borders in the early houses,

Add fresh fermenting material, so as to keep the heat a little below 70 degrees as possible. If this mode of heating the borders is not employed, at least endeavour to adopt some means of throwing off the drenching rains from the borders, which, at this season, cannot but be very injurious, and much more so if the drainage is at all imperfect. Attend to previous directions with regard to syringing and thinning the growth.

Peach-house.—The latest houses may now be put in good order, the trees pruned, and, previous to being fastened to the trellis, well and carefully painted with the mixture above recommended for vines, commencing at the base of the shoots and using the brush upwards; the house may then be closed, and, after a few days, slight fires put on. Early houses as before directed.

Pits and Frames.—Look to the state of the beds intended for Early Melons and successions of Cucumbers. As soon as the bottom-heat has fallen to 80 degrees, the plants, previously well prepared, as directed before, may be planted in the ridges, and carefully watered with tepid water. Do not cover too heavily whilst the heat is very lively. Look to the stock of fermenting material, and keep plenty ready for use.

Mushroom-house.—Prepare materials for making beds for succession: those lately made may be safely spawned as soon as the heat has sunk to 80 degrees. Beds in bearing will be much benefited by being watered with some warm liquid manure, in which a handful of salt has been dissolved. Keep the house moderately warm and moist.

FLOWER GARDEN.

Continue to make the best use of whatever vacancies may occur in heated structures to put off autumn stores and bring them forward in rooting, which is of more importance than their making much top-growth. See that abundance of air is supplied to store plants in pots, such as Pentstemon, Antirrhinum, Pansy, &c. A bed, or beds, may now be sown with Delphinium consolida for the earliest blooming. Prepare also beds for Dwarf Rocket Larkspur, and for another sowing of Hardy Annuals. Ten-week stocks may be sown and brought forward on a gentle heat; but it is full early, unless in special request.

KITCHEN GARDEN.

A first sowing of one of the most useful vegetables extant, Brussels Sprouts, may be got in this week for the earliest crop. Cauliflowers in frames and hand-lights will require abundance of air, and dressings of soot and ashes to keep down slug. See that a piece of ground is in course of preparation for the first sowing of Parsnips. Plant Jerusalem Artichokes and new Horseradish beds.—C.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR JANUARY.

Notwithstanding that very large quantities of rain have fallen in most parts of the United Kingdom during the month just concluded, our reports, in reference to the general appearance of the fields, are tolerably favourable. It cannot be denied, however, that a few somewhat sharp frosts, aided by a moderately-deep fall of snow, would now be beneficial to the winter wheats, as well as to the stocks of grain in stack. The former have, in some districts, grown somewhat rapidly, whilst the latter are mostly in a damp and somewhat unsaleable condition; nevertheless, considerable inroads have been made upon the supply of wheat of last year's growth in the hands of the growers, with a greater inclination on the part of millers to operate, arising chiefly from the large consumption and the falling off in the imports from abroad. On the whole, the supply of grass in the pastures in many of the leading grazing districts has been good, yet from the opportunities of turnips have been consumed by the stock. Although advices have reached us to the effect that very large supplies of linseed—nearly 200,000 quarters—are on passage from the Black and Mediterranean Seas, including the East Indies, that article has been in improved request, and nearly or quite the whole of the arrivals have been disposed of at full prices. For cakes the demand has improved to some extent, at higher figures. It is thought, therefore, that graziers in general have come to the determination to force additional numbers of both beasts and sheep for our various markets; but we believe that, as the system has never given an adequate return for the outlay of capital, it will be a matter for serious consideration on the part of those immediately interested whether it would be prudent to make large investments in an article which does not tend to lessen the cost of production. Our opinion is that—owing to the unusually small imports in 1850—the supply of linseed in the hands of the crushers is much smaller than usual, especially as a continuous demand has taken place for shipment to the continent, where it is now used more freely than heretofore; and hence that the consumption is spread over a larger surface than in the ordinary run of years. Compared with most corresponding periods

prior to the present tariff laws coming into operation, prices of all fat stock—arising, of course, from the heavy arrivals from the continent—continue low; nevertheless, it is pretty generally admitted that, as they have fluctuated but little for several months past, and that, as a consequence, store beasts and sheep have been more easily purchased by small farmers, the losses have not been so severe as in some previous seasons, more especially as the stock has proved comparatively free from disease. Our Dutch letters state that the numbers of stock ready for shipment to England are much larger than usual, but, owing to the short days and strong gales, that the exports will be small during the next month.

As to quantity, the crop of barley grown in this country last year is proving good, but mostly deficient in quality—very little of it being fit for malting purposes. Fine samples have commanded somewhat high rates, and a steady business has been doing in grinding and distilling sorts at improved currencies. The aggregate yield of oats, beans, and peas is turning out a fair average one, yet there appears to be every reasonable prospect of steady prices. Much surprise has been expressed in several quarters respecting the immense abundance of the crop of potatoes. The metropolitan, including the country, markets have been heavily supplied with that esculent in excellent condition, whilst the imports have been under 40 tons! The low figures at which potatoes have been disposed of have, as a matter of course, interfered to some extent with the consumption of the better kinds of food, and we may safely venture to assert that the supplies still on hand are considerably in excess of most former seasons. Throughout the continent, the yield has been found unusually small, and deficient in quality—a convincing argument against shipments to the United Kingdom. During the year 1850 the arrivals into England from France, Holland, and Belgium, were nearly 60,000 tons; but in 1851 they were under 8,000 tons, and those chiefly derived in the months of June and July. As far as we can understand, the breadth of land under potato-culture in the above countries has increased fully one-third during the past two seasons; consequently, as no surplus has been left for the outward trade, the losses to the growers must have been enormous.

In most parts of the country very abundant supplies of both hay and straw are to be met with. Of course they have materially lessened the graziers' expenses in providing food for cattle. Prices have, in consequence of this abundance, ruled very low. In London, meadow hay has sold at from £2 12s. to £3 17s.; clover do., £3 5s. to £4 6s.; and straw, £1 to £1 7s. per load. Grass-land farmers naturally complain of these low currencies; but then they must take into the account the additional supplies still on hand, though, of course, they have entailed upon them additional expenses for cartage.

The arrivals of artificial manures into the United Kingdom have been large in the extreme, viz., about 10,000 tons from Calko, and 2,000 tons from other quarters. The accumulated stock is now little short of 120,000 tons—or the largest on record. The high rates still demanded by the consignees of the Peruvian government have operated against sales; hence the quotations have ruled almost nominal. Should, however, the value of wheat continue to improve to anything like a paying point, we may fairly anticipate an improved demand.

Sheep-shearing has been partially commenced in our flock districts, and we may intimate that much attention is now being directed to the article of wool. In the manufacturing districts—where every evidence is manifested of activity and profitable returns—the stock of both English and colonial wool is unusually small; whilst the accounts at hand from the Cape, and likewise from Australia, tend to confirm the impression that the present year's clip in those quarters will be much smaller than usual. In reference to the Cape, we may observe that the warlike operations carried on there have destroyed a large portion of the stock in that country, and which cannot by possibility be replaced for some considerable time. Labour has become scarce and dear: whilst immigration has received a severe check. In Australia the gold fever has taken away some thousands of persons from agricultural employment, and it has become a matter of doubt whether a sufficient number of hands will be found to carry on the usual branches of trade, much less the shearing of sheep, which is almost invariably done by parties who have no settled homes. Fortunately for the manufacturing interest, the quantity of colonial wool in warehouse in the metropolis is large, or about 70,000 bales, the greater portion of which will be offered for public competition in February and March; yet it is evident that prices will continue very firm for some considerable time, as there is every prospect of production barely keeping pace with our actual demands. The immense trade at this time carried on between this country and the United States, the important discoveries of gold in California, added to the deficiencies of foreign wool calculated to compete with the produce of our colonies, induce the opinion that the future prospects of the wool trade are good.

In Scotland and Ireland the prices of all agricul-

tural produce, including those of fat stock, have had an upward tendency, with a good consumptive demand. The shipments to England have steadily increased.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

The actual numbers of English stock on sale in Smithfield in the month just concluded have been by no means extensive, the time of year considered; yet they have proved equal to the demand. Prices, however, arising from the immense consumption, have been steadily supported. As we are now drawing near the close of the season's receipts of beasts from the north of England, it may not be uninteresting to observe that those reported during the past six months have not been very first rate, either as regards quality or weight. Hitherto the arrivals from Norfolk and Suffolk have been exceedingly good. An excess has taken place in the imports from abroad, yet the total supply of beasts has exhibited a slight deficiency; but that of sheep has increased to some extent, about 10,000 more having been exhibited and disposed of than in January 1851. The continuous extension of railway communication, and the comparatively high rates at which the offal is selling in some parts of England, added to the saving of commission in many instances, have been beneficial to the producers of fat stock; hence unusually large quantities of country-killed meat have been forwarded up to Newgate and Leadenhall, where they have been mostly disposed of at fair quotations. That the system will continue to extend does not admit of a doubt, notwithstanding that, during the continuance of warm weather, a portion of the arrivals is frequently sacrificed.

The total supplies exhibited in Smithfield have been as under:—

	Head.
Beasts	17,325
Cows	442
Sheep	102,976
Calves	1,336
Pigs	2,515

CORRESPONDING PERIODS.

	Jan., 1848.	Jan., 1849.	Jan., 1850.	Jan., 1851.
Beasts	15,589	16,623	15,553	18,310
Cows	480	568	442	361
Sheep	61,880	93,150	95,560	92,590
Calves	770	873	1,014	1,178
Pigs	2,435	1,185	1,783	2,998

Very little change has taken place in the quotations, the average of which have ruled thus:—

Per 8lbs., to sink the offals.

	s. d.	s. d.
Beef, from	2 4 to	3 10
Mutton	2 8 to	4 4
Veal	3 0 to	4 0
Pork	2 8 to	3 10

CORRESPONDING PERIODS.

	Jan., 1848.		Jan., 1849.	
	s. d.	s. d.	s. d.	s. d.
Beef, from	3 4 to	5 0	3 0 to	4 0
Mutton	3 8	5 4	3 8	4 10
Veal	4 4	5 6	3 6	4 8
Pork	3 8	5 2	3 4	4 8
	Jan., 1850.		**Jan., 1851.**	
	s. d.	s. d.	s. d.	s. d.
Beef, from	2 10 to	4 0	2 6 to	3 8
Mutton	2 10	4 2	3 4	4 4
Veal	3 0	4 0	3 0	3 10
Pork	3 4	4 2	2 10	4 0

The bullock supplies have been thus derived:—

	Head.
Norfolk and Suffolk	4,900
Northern districts	3,400
Other parts of England	2,000
Scotland	1,364

The imports of foreign stock into London have been:—

	Head.
Beasts	1,924
Sheep	7,298
Calves	1,307
Pigs	38
Total	10,567

During the same period, in 1851, we received 9,018; in 1850, 3,220; in 1849, 4,495; and, in 1848, 5,485 head. The total supply at the outports has been only about 2,000 head.

Rather an extensive business has been doing in Newgate and Leadenhall markets, where the currencies have ruled tolerably firm. The general quality of the meat disposed of has been somewhat superior to some past seasons.

CHIPPENHAM MONTHLY CHEESE MARKET has again begun its annual round, with every indication of increasing prosperity. It may not be out of place here to state that during the last year nearly 2000 tons of cheese were brought to market, and disposed of, and this cannot have realized much less than the large sum of £80,000. The average monthly supply throughout the year appears, therefore, to be upwards of 150 tons, derived from the counties of Wilts, Somerset, and Gloucestershire, and consists of all qualities, from 30s. to 70s. per cwt. The market was supplied with about 100 tons of cheese, which was nearly all sold at a slight improvement in price. Broad doubles, 40s. to 46s. per cwt.; prime Cheddar, 56s. to 60s. do.; thin, 30s. to 40s.; leaves, 44s. to 46s.; skim, 22s.

GLOUCESTER MONTHLY MARKET.—There was a short supply of both beef and mutton, which sold readily at the following prices:—Beef, 5d., mutton from 5½d. to 6d. per lb.

WORCESTER MONTHLY FAIR.—The attendance of buyers was very numerous, and the show of stock large, as well of beef as of mutton, also stores of all classes. Beef fetched from 4½d. to 5d., and all sold. Mutton 5½d., wethers 6d., and nearly all sold. Of pork there was a small supply, price 4½d.; stores a shade lower. A very bad show of horses, and very little doing.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF JANUARY.

The weather has, contrary to expectation, been remarkably mild up to the present period, not only in this country, but likewise over the greater part of the north of Europe, resembling in this respect the winter of 1850 and 1851. The season is now so far advanced that any protracted interval of severe frost is, to say the least, improbable; and we are therefore likely to have a forward spring. A mild open winter is not generally deemed favourable, but the result of last year's harvest has proved that the rule is not without exception, as, notwithstanding the almost total absence of frost, the autumn-sown crops gave a very good return both in quantity and quality. That the consumption of all kinds of food has been economised in consequence of the comparatively mild weather cannot be questioned; but in one respect it has proved injurious to the farmer, the humidity of the atmosphere having had a very deteriorating effect on the condition of all kinds of grain in stack; but we think this disadvantage has been more than compensated by the saving of fodder for cattle, &c.

In our last monthly article we prepared our friends to expect some advance in prices, and the course the trade has taken since then has proved that our opinion on this point was not ill founded. Since the commencement of the new year the value of almost all kinds of agricultural produce has steadily improved, and present appearances induce us to believe that the upward movement has not yet reached the maximum. The cause of the rise has unquestionably been the deficient yield of rye and potatoes on the continent, and a consequent increased use of wheat in countries where, in ordinary seasons, the bulk of the people live principally on the inferior kinds of food. This has naturally led to a decrease in the shipments to England; and our markets having been temporarily freed from the undue pressure of foreign importations under which they have laboured since the first introduction of free trade, something like confidence has been restored. The causes which have produced this effect still exist, and it is therefore fair to infer that the improvement will go on for some time longer; but we would caution our agricultural friends not to become too sanguine, and allow the opportunity to realize somewhat more remunerating prices to escape them. So long as quotations abroad continue so much above those current here, as they now are, there is little chance of overwhelming imports; but we are of opinion that the rise in Germany, though originally founded on sound basis, has latterly been greatly assisted by speculation, and that a good deal of that bought will ultimately have to be resold. When this time arrives the local demand may not perhaps be adequate to take all that is brought forward, and consignments to Great Britain will in that case be resorted to, more especially if (as is not improbable) our prices should meanwhile creep up. Experience has proved that whenever anything like scarcity is calculated on in this country the extent of the expected want is generally overrated; the prospect of a profit is sufficient to induce our merchants to enter into preparation to meet the anticipated demand, and though as yet there has been nothing like excitement, many are disposed to take a much more sanguine view of the probable future range of quotations than we consider warranted by our position; and we should therefore not be surprised if purchases were to be made abroad at prices which may ultimately involve the operators in loss. We consider it by no means sound reasoning to argue, because we imported nearly 4,000,000 qrs. of wheat in 1851, that the same quantity, or anything approaching it, will be again needed; without comparing the last crop with either of those of the productive years of 1834, 1835, or 1836 (when no foreign supplies at all were needed), we are satisfied that the produce of 1851 very greatly exceeded that of the season immediately preceding, and that a much larger proportion of the potato crop was saved sound both in this country and in Ireland, than in any former year since the first appearance of the disease. It would not, therefore, we think, be safe to estimate our probable wants by the standard of imports of last year. We are induced to make these remarks to guard against any undue expectations; though, as we have already intimated, a further moderate advance appears not only possible, but probable.

A good deal of importance is just now being attached to the fact that purchases of wheat have been made in this country for shipment to the continent. This is certainly a novel feature, but to what does it amount? The exports have probably been greater from Hull than from any other port; still the total quantity shipped from thence since

the first commencement of the foreign demand has not exceeded 20,000 qrs., and we question whether more than 100,000, or at most 150,000 qrs., have been taken altogether. Against which we have imported into the United Kingdom, in the month ending 5th inst., 178,839 qrs. wheat, 366,750 cwts. flour, and 126,183 qrs. Indian corn. Of the last-named article the stocks in Ireland are computed to consist of 400,000 qrs., against 164,000 qrs., up to the corresponding period last year; and it appears to us, therefore, to say the least, somewhat premature to talk of scarcity.

The reports from the agricultural districts generally speak well of the aspect of the young wheat plant: it is described as healthy, and, notwithstanding the mildness of the winter, by no means too forward. We do not, however, place much importance on the appearance of things thus early, but in the course of another month or two this will tell, and we think the future range of prices will be governed more by the weather and the aspect of the crops in the spring and early part of the summer than by the tenor of the foreign advices, though hitherto the rise has been principally caused by the latter.

The fact that barley has ever since harvest maintained a relatively higher value than wheat tends to confirm what we then stated to be our impression, viz., that the yield of the spring-sown crops would be found to turn out inferior to the produce of wheat; indeed we know, from unquestionable authority, that in many cases farmers have made less by their barley and oat crops this than the preceding season, notwithstanding the comparatively high prices obtained. Supplies of these articles have not increased with the advance in quotations, and the prevailing belief is that the quantity remaining in the growers' hands has already been so much reduced as to render any great increase unlikely. Under these circumstances, and considering that all which can be said respecting the improbability of large importations of wheat, applies with fully as much force to the prospect of supplies of foreign spring corn, we are inclined to think that present prices may be regarded as safe, and we should certainly not be surprised to see a further rise in the value of superior malting barley, that being an article which the continental growers have not yet learned to produce, or, at all events, not in sufficient quantity to affect the value materially in this country.

The growth of oats in England has of late years decreased, and we almost invariably have to depend on Ireland and the continent for a large proportion of our supply. We believe that the quantity required this season will be fully as great as usual, and we question whether it will be possible to obtain what shall be needed except at higher prices than those now current. The oat crop in Ireland does not appear to have proved so productive as was expected at harvest time would have been the case; and the high value of rye, potatoes, &c., over the greater part of the north of Europe, has naturally influenced the value of oats abroad, as also prices of beans and peas; and the prospects are therefore in favour of some improvement here in quotations, more especially as regards oats, prices of which have not hitherto gone up in proportion to those of other articles.

Though the season has imposed no impediments to shipments being made from the near continental ports, and the Baltic has throughout the winter remained almost wholly free from ice, the relatively high value of all kinds of corn and pulse abroad, as compared with prices in the British markets, has prevented foreign holders consigning to England; and there is at present hardly any grain on passage from the continent to this country. We may, however, calculate on receiving tolerably good supplies of wheat and Indian corn from Odessa, Galatz, Alexandria, and other eastern ports, and some quantity of wheat and flour from the United States of America. The impetus which has lately been given to prices here will, we think, have the effect of causing shipments to some extent from the Baltic in the spring, and we are by no means apprehensive of anything like scarcity being experienced.

What proportion of the last crop still remains in the hands of our own growers cannot be accurately ascertained: the deliveries of wheat have certainly been liberal during the autumn and winter, but the yield was large; and though the less wealthy class of farmers may have been compelled by pecuniary pressure to part with the greater part of their produce, others, who were in a position to hold, have no doubt felt great reluctance in selling at the miserably low terms till now current; and our impression is that there is a much larger stock of home grown wheat in the country than at this period last year.

We shall now proceed to give our usual retrospect of the operations which have taken place at Mark Lane during the month.

The arrivals of wheat into the port of London coastwise and by railway have not been particularly small; the weekly receipts by water carriage have amounted to about 3,000 qrs., but a considerable proportion has gone direct to millers without appearing on the market for sale, which circumstance has caused the extent of business to be a good deal diminished. There were no symptoms of excitement in the wheat trade the first fortnight in January, and though the quantity brought forward

by land-carriage samples from Essex and Kent, on Monday, the 5th inst., was decidedly small, some difficulty was experienced in placing the same at an advance of 1s. per qr. on the terms current at the close of December. During the succeeding week a considerable quantity of rain fell, which rendered the atmosphere so damp as seriously to influence the condition of the samples exhibited on the 12th. The millers were consequently exceedingly cautious in their operations on the latter occasion, and the sales then made were at prices scarcely equal to those realized on that day se'nnight. Since then a more favourable view of the probable future range of prices has taken strong hold of public opinion, and sellers have gradually raised their pretensions. With a moderate show of samples from the home counties, and but little offering from Lincolnshire and Cambridgeshire, factors were enabled, on the 19th inst., to exceed the quotations of the 12th by fully 1s. per qr., and on Monday last a further rise of 2s. per qr. was established, making the total rise since our last 4s., and in many cases 5s. per qr. The improvement has been greater on the red wheat from Lincolnshire and Cambridgeshire than on other qualities; and whilst the top price of Kentish and Essex red has not exceeded 43s., as much as 44s. per qr. has been obtained for 63 lbs. red Lincoln.

The arrivals of wheat from abroad have been on quite a moderate scale, and a large proportion of what has come to hand has been from Egypt, a quality not suitable for our millers, and the greater part of which will probably be used for distillation.

The scanty nature of the supply of foreign wheat, and the prevailing belief that the receipts from abroad will continue small for some time to come, have imparted great firmness to holders of granaried samples, more especially as the indifferent order in which the new English has come forward, in consequence of the constant mild damp weather, has rendered a larger mixture of old foreign absolutely necessary. The improvement in the value of the latter has consequently been fully equal to that which has taken place in prices of the former; and when we compare present rates with those current six weeks or two months back, we find that a rise of 5s. and 6s. per qr. has been established on some descriptions. The advance is best shown on really fine and low qualities, the intermediate kinds having excited less attention.

Fine Danzig wheat is now currently bringing 50s. to 52s., and picked lots even higher rates. Superior old Rostock is worth 50s., and other kinds of Baltic red corresponding rates. Meanwhile Polish Odessa, and similar sorts on the spot, have risen about 3s. to 4s. per qr.; and inferior small Russian wheat, which was offered at about 28s. per qr. in the early part of last month, has lately been held at 32s. per qr.

In addition to what has been done in foreign wheat on the spot, a large business has been transacted in floating cargoes, and the upward movement in prices has been equally rapid. Polish Odessa wheat on passage has risen from 35s. and 36s. to 39s. and 40s. per qr., and Ghirka is now held at 40s. and 41s. per qr., cost, freight, and insurance. Egyptian wheat to arrive, which was freely offered at 27s. per qr. when we last addressed our readers, cannot now be bought below 30s. per qr., cost, freight, and insurance; and the Greek houses, who are principally engaged in the trade in grain with the Levant, are likely to come out of their speculations much more profitably than appeared at one time likely.

The top price of town-made Flour, after having remained stationary for a long period, was advanced 3s. per sack on the 5th inst.: previous to this rise, most of the metropolitan bakers bought largely, many of the millers having entered into contracts to deliver a given quantity at stated periods, and, considering the rise in the value of wheat, they (the millers) are therefore not likely to derive much profit from the advance. The first week or two after Flour had been put up to 40s. per sack there was a decided falling off in the demand: but since then the inquiry has improved, and the bakers seem still disposed to continue their purchases, though a further rise of 3s. per sack was established on the 26th inst. Country flour has risen in the same proportion as town-made, and the sale for fresh marks has been free during the last fortnight. Supplies from France have nearly ceased, but we have had tolerably good arrivals from America at this port. French has risen quite 2s. per sack since the close of December, and the improvement on American may be fairly estimated at 1s. 6d. to 2s. per brl. The latter has excited a good deal of speculative attention, and rather large parcels have been taken to hold over. Good sound qualities are now worth 23s. to 24s., and superior 24s. to 25s. per brl.

The supplies of English barley have hardly kept pace with the demand, and notwithstanding the high value this grain had previously attained, a further improvement has taken place. In the early part of the month the maltsters acted somewhat cautiously, and prices did not vary materially till the 19th inst., when 35s. per qr. was realized for fine malting samples. This rise has not only been since maintained, but in many cases the rate named has been exceeded by 1s. per qr. All other descriptions of home-grown barley have moved off rather freely, and we consider secondary malting and distilling sorts quite 1s. per qr. dearer than at the close of last month. The receipts of this grain

from abroad have been principally from Alexandria, from whence one or two large cargoes have come to hand, which will leave the parties concerned a good profit—the price for this sort of barley having now risen to 20s. to 21s. per qr. The arrivals from the continent of Europe have been comparatively trifling; our prices, though high, affording no margin for profit on shipments from thence. We observe that very large purchases have been made lately at Hamburg of barley free on board in the Danish islands in spring, with a view of the English markets. What the result of these purchases may be remains to be seen: but considering that as much as 24s. 3d. has been paid, we are disposed to look upon the speculation as somewhat hazardous—such quality being only worth about 26s. per qr. in the London market at present.

Malt has been influenced by the state of the barley market, and sellers of the former article have gradually raised their pretensions, for moderately good parcels 55s., and for superior lots as much as 60s. per qr. being now demanded.

The weekly arrivals of oats have fallen short of the quantity required to supply the consumption of the metropolis, and the large dealers have had to draw somewhat extensively on their stocks. The knowledge that the quantity held by the dealers is not heavy, and the conviction that the receipts will for some time to come be very moderate, have caused sellers to manifest little anxiety about realizing from on board, and buyers have been obliged to pay enhanced rates for this grain. The unwillingness on the part of purchasers to give any advance has caused the trade to wear a somewhat languid appearance, and the transactions were, in the early part of the month, on a strictly retail scale. An improvement of about 6d. per qr. was established with difficulty on the 5th inst.; and though the tendency was upwards, the following week no further alteration was made in quotations until the 19th, when a similar rise took place. On the Monday following the dealers were evidently anxious to add to their stocks, and the business done was more extensive than previously, though a further advance of 6d. to 1s. per qr. was insisted on. Good English and Scotch feed oats, weighing 38 to 39 lbs. per bush., are now worth 20s. to 21s., fine 22s. to 23s., Scotch potato 23s. to 25s., Irish feed from 17s. up to 21s., and Archangel and Riga 19s. to 20s. per qr. The quantity of English Beans brought forward at Mark Lane since our last has not been large; but having in the early part of the month had very liberal supplies from Egypt, the article became difficult of disposal, and in partial cases a decline of 1s. per qr. was submitted to; this abatement has, however, since been nearly recovered, the upward movement in prices of barley and oats having had more or less influence on the value of all other articles suitable for feeding purposes.

Egyptian beans on the spot, after having been sold at one time at 23s. 4d., are now held at 24s. per qr., and for cargoes on passage nearly as much money is asked, showing that opinion is in favour of a rise hereafter.

Peas—in the value of which the fluctuations were important during the months of November and December—have remained comparatively quiet since. Good boilers have moved off steadily at about 35s. per qr. Maple and grey peas receded about 1s. per qr. on the 5th instant, and that decline has not since been recovered. There have been occasional inquiries for fine large blue peas for shipment to Holland, and the best sorts have realized full terms.

A lively demand has been experienced for Indian corn afloat, principally on Irish account, where, notwithstanding heavy stocks, a considerable extent of speculation has been carried on in the article. The consequence of this state of things has been rather an important rise in quotations. The advance within the last fortnight has been fully 3s. per qr., and good Galatz is not now to be obtained below 30s. to 30s. 6d. per qr., cost, freight, and insurance. Those who were fortunate enough to buy early have therefore now a favourable chance of realizing a good profit. The quantity of Indian corn at present on passage to the United Kingdom is estimated at 200,000 qrs., which, with the 350,000 to 400,000 qrs. held in Ireland, will suffice to satisfy the consumption, which is computed to be at the rate of 32,000 qrs. per week for at least four months.

The position of the grain trade abroad is worthy of attention. The dull state of business in the British markets from harvest time until within the last month or two failed to make the least impression on holders on the continent, and whilst prices were declining here, a gradual advance took place abroad. This could scarcely have occurred had there been no ground for believing that a serious deficiency in the crops of food existed, and we are therefore inclined to give credit to the reported failure of the rye crop in the interior of Germany, &c.; but, at the same time, we question whether the effect of the short produce of rye, and the partial failure of potatoes in a few of the German states, will prove a sufficient cause to raise prices of wheat to any great extent in this country. Thus far it has certainly operated that way, but should the prospects in the spring prove favourable, the excitement of our continental neighbours will probably cool down, and, with an abatement of speculation, prices would most likely give way more or less.

The latest accounts from the Baltic represent the excitement as very great, the late rise here having added fuel to the fire. At Danzig, equal to 40s. per qr. had been paid for very inferior new wheat of 57lbs. weight by speculators from Konigsberg and Stettin; and for good qualities, such as would stand a voyage, though not by any means fine, 45s. to 46s. per qr. free on board in spring was asked; whilst superior old highmixed could scarcely be bought, the holders considering a further rise inevitable. For rye 40s. to 41s. per qr. had actually been paid, notwithstanding which hardly any supplies were coming forward.

From Konigsberg we learn that all kinds of grain and pulse had risen materially in value, and prices there almost rival those recently paid at Stettin. On the 20th inst. highmixed wheat, weighing 60lb., was quoted 46s. 9d.; mixed of 60½lb. weight, 45s.; and red also weighing 60½lb. per bushel, 43s. 9d. per qr. free on board. Rye had met a ready sale at 40s. to 41s.; and barley, oats, and peas were all dearer than in the English market.

The latest advices from Stettin, of the 23rd Jan., state that, after great excitement and much speculation, business had become somewhat more calm; but, considering the height to which the value of all kinds of grain had previously been run up, we are not surprised that buyers should have become unwilling to continue their operations. As much as 44s. to 45s. per qr. free on board in spring had actually been paid for moderately good qualities of red wheat.

From Rostock we learn that further purchases of wheat on account of Hamburg speculators had given a fresh impetus to prices, and that equal to 42s. 9d. per qr. free on board had been freely given for good 61lb. quality.

At Hamburg a large business has been done in all sorts of corn during the last fortnight, mostly from outports and for spring shipment. The latest advices from thence state that large contracts had been closed for wheat from the lower Baltic ports at 42s. 9d. to 44s. 9d., and for barley from the Danish Islands at 24s. to 25s. per qr. free on board.

In the Dutch and Belgian markets the value of wheat has continued to tend upwards, and nearly the whole of what has been shipped from hence has gone to the Netherlands.

In France prices of wheat and flour ran up very rapidly during the early part of the month, but within the last week the accounts from thence have become somewhat more subdued. Quotations are, however, as yet quite as high there as in this country.

Letters from Marseilles of the 19th inst. quote Flour 34s. to 37s. per sack, cost and freight; and for Polish Odessa wheat equal to 36s. per qr. free on board had been paid.

At Alexandria a considerable rise had taken place in the value of wheat, owing to the arrival of a large fleet of vessels, for which it had been necessary to purchase cargoes.

The advices from America are of much the same character as before. The tendency of prices had, it seems, on the whole, been upwards, but there had been no great activity in the trade. At New York good States flour had risen from about 20s. to 21s. per qr. free on board. Few of the English orders (of which a good many had been received) had been executed, most of them having been limited too low.

CURRENCY PER IMPERIAL MEASURE.

	Shillings per Quarter			
WHEAT, Essex and Kent, white	42	to 46	fine	up to 52
Ditto ditto old	42	45	„	52
Ditto ditto red, new	40	43	„	44
Ditto ditto old	40	42	„	44
Norfolk, Lincoln, & Yorksh., red	40	42	„	44
Ditto ditto old, none			„	—
Ditto ditto white new	42	43	„	46
Ditto ditto old, none			„	
BARLEY, malting, new		24		31
Chevalier		34		36
Distilling		24		26
Grinding		24		25
MALT, Essex, Norfolk, and Suffolk, new	53	55	extra	60
Ditto ditto old	45	48	„	51
Kingston, Ware, and town made, new	53	55	„	60
Ditto ditto old	48	53	„	55
Irish feed, white	19	20	fine	22
Ditto, black	18	19	fine	21
OATS, English feed	19	20	fine	22
Ditto Potato	21	24	extra	26
Scotch feed	22	24	fine	26
Ditto Potato	24	27	fine	28
RYE	26	28	old	26 28
BEANS, Mazagan	24	26	„	24 28
Ticks	25	27	„	27 30
Harrow	27	29	„	29 31
Pigeon	28	32	„	30 33
PEAS, white boilers	34	35	„	32 35
Maple	29	31	„	29 32
Grey	29	30	„	28 31
FLOUR, town made, per sack of 280 lbs.	—	—	„	38 43
Country marks	—	—	„	32 36

FOREIGN GRAIN.

	Shillings per Quarter					
WHEAT, Dantzic, mixed	42	to 44	high mixed	46	48	extra 54
Konigsberg	40	42 „		43	46	„ 47
Rostock, new	44	45	fine old	45	47	„ 50
Pomera., Meckbg., and Uckermk., red	43		44 extra	44		45
Silesian „	41		43 white	43		46
Danish and Holstein „	39		41 „	41		45
Rhine and Belgium „	41		44 old	43		45
BARLEY, grinding				22		25
Distilling				23		26
Malting			none	—		—
OATS, Dutch, brew, and Polands				21		24
Feed				18		20
Danish and Swedish feed				18		20
Stralsund				19		22
Russian				18		20
French				17		20
BEANS, Friesland and Holstein	24		26 Konigsberg	28		30
PEAS, feeding	28		30 fine boilers	32		34
INDIAN CORN, white	27	28	yellow	27		29
FLOUR, French, per sack	30	33	fine	34		36
American, sour per barrel	20	21	sweet	21		24

IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS.

WEEK ENDING:	Wheat. s.	d.	Barley. s.	d.	Oats. s.	d.	Rye. s.	d.	Beans s.	d.	Peas. s.	d.
Dec. 13, 1851..	37	5	26	8	18	6	27	2	30	0	30	0
Dec. 20, 1851..	37	7	26	6	18	3	27	4	29	9	29	6
Dec. 27, 1851..	37	2	26	3	18	3	28	1	29	2	29	0
Jan. 3, 1852..	37	2	26	3	17	9	26	11	28	7	28	4
Jan. 10, 1852..	37	4	26	5	17	10	30	1	28	9	28	1
Jan. 17, 1852..	38	3	27	1	18	1	27	5	27	11	28	10
Aggregate average of last six weeks	37	6	26	6	18	1	27	10	29	1	28	11
Comparative avge. same time last year	38	9	23	4	16	11	24	3	27	3	27	11
DUTIES.....	1	0	1	0	1	0	1	0	1	0	1	0

COMPARATIVE PRICES AND QUANTITIES OF CORN.

Averages from last *Gazette*.	Qrs.	s.	d.	Friday's Av.	Averages from the corresponding *Gazette* in 1851.	Qrs.	s.	d.	Av.
Wheat ..	106,669	..	38	3	Wheat ..	79,384	..	38	0
Barley....	102,818	..	27	1	Barley....	95,594	..	22	8
Oats	28,794	..	18	1	Oats	22,468	..	16	9
Rye.....	205	..	27	5	Rye.....	57	..	24	8
Beans....	6,367	..	27	11	Beans....	5,672	..	26	7
Peas	2,323	..	28	10	Peas	1,421	..	26	11

PRICES OF SEEDS.

The Seed trade was firm, and for Canaryseed an advance of 1s. per qr. was in some cases paid. The arrivals of Clover and Trefoil have been tolerably good of late, 1,027 bags and bales, and 52 casks having been received during last week.

BRITISH SEEDS.

Linseed (per qr.).. sowing 60s. to 65s.; crushing 48s. to 52s.
Lin seed Cakes (per 1,000 of 31lbs. each).. £8 10s. to £10 0s
Cow Grass (nominal) ..... £— to £—
Trefoil (per cwt.) ..... 17s. to 21s.
Rapeseed, (per last) new £21 to £23 ..... old £— to £—
Ditto Cake (per ton)..... £4 0s. to £4 10s.
Mustard (per bushel) white 6s. to 7s.; .. brown, 7s. to 8s.
Coriander (per cwt.)..... new 10s. to 11s., old 9s. to 10s.
Canary (per qr.) ..... new 38s. to 40s.; old 38s. to 40s.
Tares, Winter, per bush., 3s. 6d. to 4s. 0d.; Spring, nominal.
Caraway (per cwt.)..... new, 31s. to 33s.; fine 34s.
Turnip, white (per bush.) 6s. to 10s.; do. Swedish, —s. to —s
Clover seed..... red 42s. to 45s., fine 48s. to 50s.

FOREIGN SEEDS, &c.

Clover, red (duty 5s. per cwt.) per cwt. 40s. to 45s., super. 50s,
Ditto, white (duty 5s. per cwt.) per cwt. ..... 40s. to 50s.
Linseed (per qr.) .. Baltic 44s. to 47s.; Odessa, 46s. to 50s.
Linseed Cake (per ton) ..... £6 0s. to £8 5s.
Rape Cake (per ton)..... £4 2s. to £4 4s.
Hempseed, small, (per qr.) 32s. to 34s., Do. Dutch, 34s. to 37s.

HOP MARKET.

BOROUGH, MONDAY, Jan. 26.

The supply of fine Hops on offer is extremely limited, and hardly equal to the demand. Prices remain firm, with an upward tendency.

Mid and East Kent.... 145s. to 240s.
Weald of Kent..... 126s. to 147s.
Sussex pockets..... 112s. to 128s. per cwt.

POTATO MARKET.

SOUTHWARK, WATERSIDE, Jan. 26.

During the past week there have been several arrivals coastwise, and a very large supply by rail. The trade still continues very heavy, at the following quotations:

	Per Ton.
York Regents.....	60s. to 80s.
Scotch.....	60s. to 65s.
Ditto Cups	50s. to 60s.
Kent and Essex Regents	60s. to 75s.
Lincolnshire & Wisbeach	50s. to 65s.

PRICES OF BUTTER, CHEESE, HAMS, &c.

	s.		s.	
Friesland, per cwt.	100	to	102	
Kiel	96		100	
Dorset	100		104	
Carlow ..... new	76		84	
Waterford.... ,,	76		80	
Cork..... ,,	78		82	
Limerick	64		70	
Sligo.....	72		78	
Fresh Butter, per doz.	11		13	
Cheshire Cheese, per cwt.,.....	50		70	
Cheddar do.....	56		68	

	s.		s.	
Double Gloucester, per cwt.	46	to	56	
Single do.....	44		52	
York Hams	64		74	
Westmoreland do.	66		72	
Irish do.....	50		66	
American do.	28		36	
Wiltshire Bacon, green, ...	48		52	
Waterford Bacon..	44		47	
Hamburgh do....	40		42	
American	—		—	

BELFAST, (Friday last.)—Butter: Shipping price, 77s. to 82s. per cwt.; firkins and crocks, 8½d. per lb. Bacon, 40s. to 44s.; Hams, prime, 56s. to 60s.; second quality, 54s. to 56s. per cwt.; mess Pork, 60s. per brl.; refined American Lard, in bladders, 50s. to 52s.; kegs and firkins, 48s.; Irish Lard, in bladders, 50s. to 53s.; kegs or firkins, 48s. per cwt.

Jan.	Butter. per cwt. s.	d.	s.	d.	Bacon. per cwt. s.	d.	s.	d.	Dried Hams. per cwt. s.	d.	s.	d.	Mess Pork. per brl. s.	d.	s.	d.
22.																
1848	88	0	92	0	51	0	53	0	50	0	65	0	70	0	75	0
1849	78	0	82	0	48	0	50	0	68	0	80	0	76	0	77	6
1850	68	0	76	0	38	0	40	0	63	0	80	0	76	0	77	0
1851	80	0	86	0	58	0	62	0	60	0	62	0	56	0	58	0
1852	77	0	82	0	38	0	44	0	54	0	60	0	60	0	62	0

CHICORY, PER TON:—

	£	s.	£	s.		£	s.	£	s.
Foreign root (d.p.)					English root (free)				
Harlingen ..	27	0	28	0	York	8	10	9	10
English root (free)					Roasted and ground				
Guernsey ..	10	0	10	10	English ..	30	0	40	0
Kent & Suffolk	none.				Foreign ..	40	0	50	0

Duty on all Coffee and roasted Chicory imported, 3d. per lb. on Chicory Root £21 per ton.

HIDE AND SKIN MARKETS.

		s.	d.		s.	d.	
Market Hides,	56 to 64lbs.....	0	1½	to 0	1¾		per lb.
Do.	64 72lbs.....	0	2	0	2¼		,,
Do.	72 80lbs.....	0	2½	0	2¾		,,
Do.	80 88lbs.....	0	2¾	0	3		,,
Do.	88 96lbs.....	0	3	0	3¼		,,
Do.	96 104lbs.	0	3¼	0	3¾		,,
Do.	104 112lbs.....	0	4	0	4¼		,,
Calf Skins, light.....		1	6	3	0		each.
Do. full.....		3	6	4	6		,,
Horse Hides		5	6	6	0		,,
Polled Sheep		6	0	7	6		,,
Kents		5	6	6	3		,,
Half breds.....		4	9	5	9		,,
Downs.....		3	9	4	9		,,

BARK.

Per load of 15 cwt.

English, Tree.....	£13	0	0	to	£14	0 0
Coppice	14	0	0		15	10 0

WOOL MARKETS.

BRITISH WOOL.

LEEDS, Jan. 23.—Sales of combing wools this week have not been large. Prices are without alteration. We do not quote any change in clothing wools.

LIVERPOOL, Jan. 24.

SCOTCH.—There is no new feature in the market. The demand for all kinds of Scotch Wool is limited to the immediate wants of the trade at late rates.

		s.	d.		s.	d.
Laid Highland Wool, per stone....		9	0	to	9	9
White Highland	do.....	12	0		12	6
Laid Crossed	do...unwashed	10	9		11	6
Do.	do...washed	11	0		12	6
Laid Cheviot	do...unwashed	11	0		12	6
Do.	do.. washed.....	13	6		16	6
White Cheviot	do... do.	22	0		24	0

FOREIGN WOOL.

CITY, MONDAY.—The wool market is very firm, and holders are not at all disposed to press sales. The expectation is that prices will advance, and the next auctions of colonial are looked for with considerable interest.

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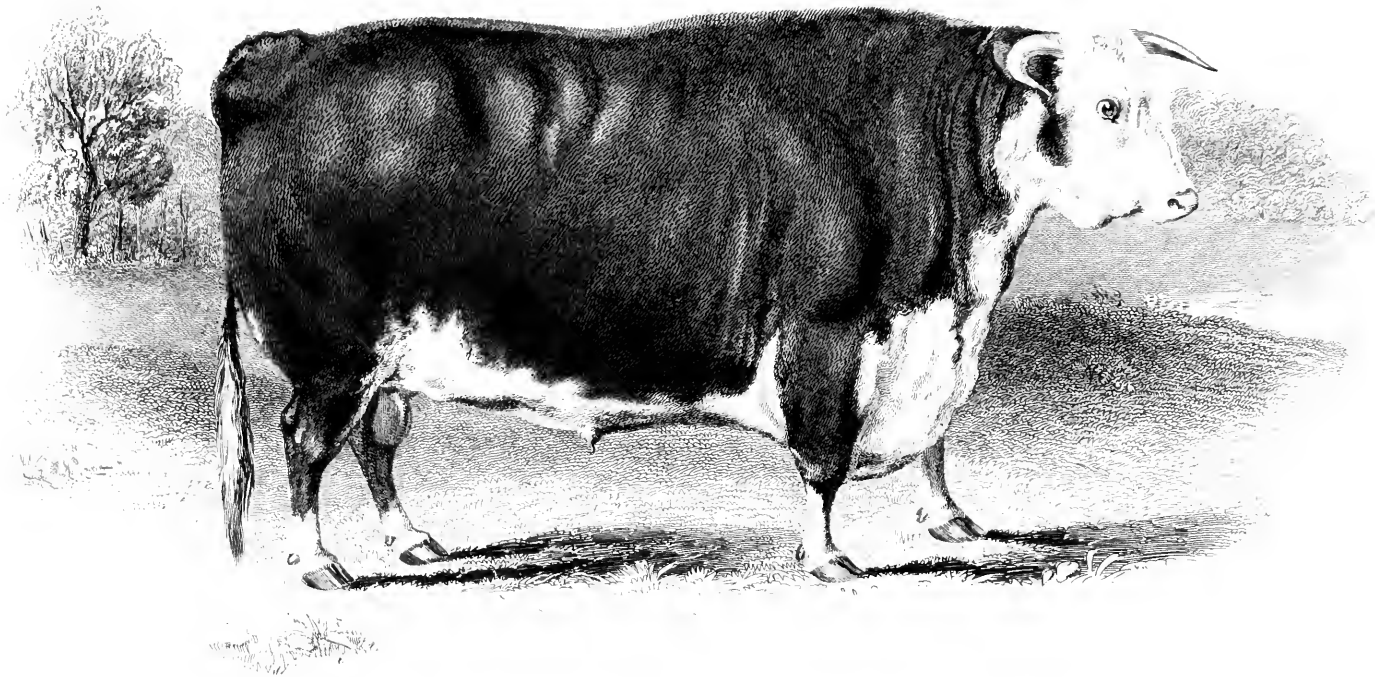
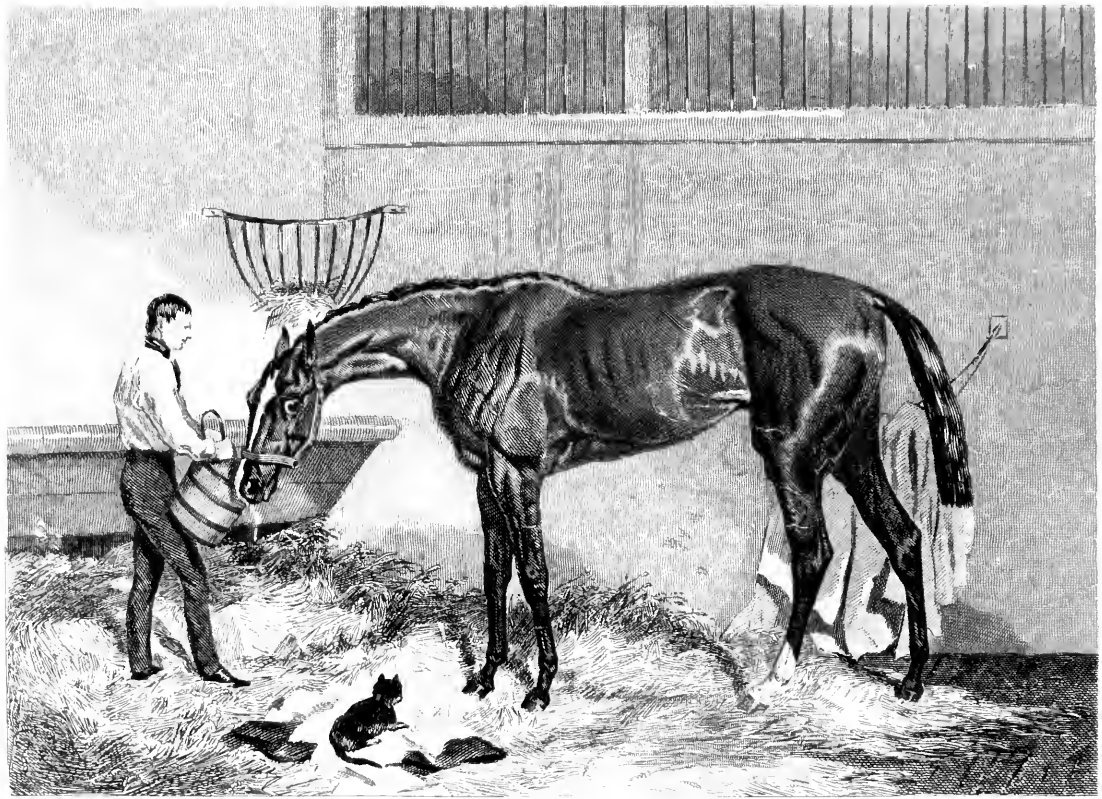




THE FARMER'S MAGAZINE.

MARCH, 1852.

PLATE I.

HEREFORD BULL.

The subject of our first plate, "Walford," is a Hereford Bull, the property of the Right Hon. Lord Berwick, of Cronkhill, near Shrewsbury, bred by Mr. Thomas Longmore, of Walford, near Ludlow, to which the first prize of Forty Sovereigns was awarded at the Royal Agricultural Society's Show, held at Windsor, in July 1851.

In September 1849, at the Ludlow Agricultural Society's Meeting, "Walford" was the winner of the premium for bulls, having been shown with four of his offspring under one year old. In September 1850, at Ludlow, he won the Sweepstakes, with Twenty Sovereigns added by the Ludlow Agricultural Society for stock bulls, which Sweepstakes were open to all England.

"Walford" is by the same sire as the Hereford Ox, the property of Mr. Edward Longmore, of Adforton, near Ludlow, which obtained the first prize of Thirty Sovereigns and Silver Medal at the Smithfield Club Cattle Show, in December last.

PLATE II.

IRIS; WINNER OF THE OAKS, 1851.

(For description see page 203.)

THE EFFECT OF DRAINAGE UPON THE HEALTH OF ANIMALS.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

We are all, I believe, much too apt to take a too limited view of the advantages of drainage. As in most other researches, it is only by degrees that we attain to a valuable knowledge in such great modern paths to comfort and profit. The obstacles we may encounter, however, in such efforts should only encourage us to fresh exertions. Reflections like these have often supported me in my endeavours to improve (I hope not altogether unsuccessfully) the unhealthy condition of the neighbourhood in which I dwell, and I trust they will ever stimulate and support other sanitary reformers.

The history of the oppositions to the drainage of wet and unwholesome districts would present a much more ludicrous story than most persons would believe. The proposal, for example, to drain, two centuries since, the fens of Lincolnshire raised a lusty outcry on all sides. "What will you do for a supply of reeds and rushes?" shouted one lot of persons. "What will our geese do without water? Where will all the wild fowl go to?" roared out a second and third. "Down with the dykes and banks!" exclaimed the mob. And in a minor way, when the town of Croydon was placed under a local board of health, when it was found that there were about 2,500 cesspools in the space of about a square mile, that one large portion of the town stood on ground in which the land water so rested

as to be within a few inches of the surface; that every grave in the churchyard was sunk into water; and, worse than all, when it was found that the Croydon Board of Health were earnestly purposing to remove these sources of disease and wretchedness, then a stout and noisy opposition arose. It is true that this was confined to the most *uncomfortable* persons in the town, but still an opposition it was—and all kinds of arguments were used to stay the drainage of the district. The owners of cottages shouted; the millers, too, were irate: they fancied all sorts of impending injuries. And speaking of water mills, these are far too often, in a sanitary point of view, the curse of the country. Is not the time now arrived when such rude modes of economising labour should be done away with? The progress of steam, it is true, will do this at no very distant period; but still, as long as these water mills are allowed to linger near to well-inhabited places, so long will dams be found, not only impeding the drainage of the valley, but absolutely adding to the mass of stagnant land water with which it is encumbered. Compulsory power should be given to all local boards of health to enable them to take at a valuation all these relics of past and more primitive times.

The good results of improved drainage upon the health of animals are undoubted. The sheep and the horse by instinct get out of the way of low lying wet pastures. You find these, if they have the privilege of choosing for themselves, feeding on the upland pastures, where the air breathes pure over lands which nature drained.

Some recently published papers of the Board of Health on drainage thus depict its influence upon the public health; and although this graphic picture describes its effects chiefly on mankind, yet almost all its sketches apply with equal force to the live stock of the farm.

The board remark (*Minutes of Evidence, p.* 1.):—"Town drainage is two-fold—foul-water drainage and simple-water drainage. The first comprehends sewerage as the term is now commonly used; that is, the removal from within dwellings or from their immediate neighbourhood of all refuse which can be carried off by water. The second—simple-water drainage—is the removal from the sites and suburbs of towns of superfluous water, causing dampness, whether such water be derived from land springs or rain-fall.

"So generally is the latter or simple-water drainage neglected, that it appears from the late sanitary investigations that in town districts which are called drained, the foundations of the houses are very generally damp from the retentiveness, or the water-bearing power, of the soil in which they are built. Water rising from the foundation by capillary attraction renders the floors and the walls damp, in proportion to the absorbent nature of the materials of which they are constructed. When experienced medical officers see rows of houses springing up on a foundation of deep retentive clay, inefficiently drained, they foretel the certain appearance among the inhabitants of catarrh, rheumatism, scrofula, and other diseases, the consequence of an excess of damp. Such diseases break out more extensively and in severer forms in the cottages of the poor who have scanty means of purchasing the larger quantities of fuel, and of obtaining the other appliances which partly counteract the effects of the dampness. Excess of moisture is often rendered visible in the shape of mist or fog, particularly towards evening. An intelligent medical officer took a member of the sanitary commission to an elevated spot from which his district could be seen. It being in the evening, level white mists could be distinguished over a large portion of the district. 'These mists,' said the officer, 'exactly mark out and cover the seats of disease for which my attendance is required. Beyond these mists I have rarely any cases to attend but midwifery cases and accidents.'

"The result of efficient drainage is the diminution or removal of such mists, and a proportionate abatement of the diseases generated or aggravated by dampness. After houses built in the manner described have been inhabited for some time, and especially if crowded, fevers of a typhoid type are added to the preceding list of diseases, in consequence of emanations from privies and cesspools. The poisonous gases, the product of decomposing animal and vegetable matter, are mixed with the watery vapours arising from the excessive damp (such vapours being now recognized as the common vehicle for the diffusion of the more subtle noxious gases), and both are inhaled night and day by the residents of these unwholesome houses. A further consequence of the constant inhalation of these noxious gases, which have an extremely depressing effect, is the habitual use of fermented liquors, ardent spirits, or other stimulants by which a temporary relief from the feeling of oppression is obtained.

"The system of drainage for houses, streets, yards, and covered spaces in towns, which is now found to be the most economical as well as the most efficient for its main purposes—the removal of matters injurious to the public health—consists principally of tubular and impermeable drain pipes. The arrangements hitherto in general use for the purpose consisted of spongy or permeable brick drains, which let in the land springs or the surplus moisture of the site, and when these brick drains were of proper inclinations they slowly carried it away,

notwithstanding the obstacles created by their defective form, material, and construction; but too frequently, on account of their permeability, they let out and saturated the site with the foul water, which it is most important they should keep in and remove from it. Whilst these common brick drains thus let out much of the soluble portions of the cesspool matter, which saturates the foundations of houses, and ascends the absorbent brick walls by capillary attraction, they detain, as sponges or as filters, much of the solid portions of the refuse matter. This accumulates in the drains and sewers, the gaseous products from its putrefaction escape through the permeable brick itself, and still more copiously through openings into houses, and through gully shoots into the streets, and pollute the atmosphere.

"Every one must have remarked, on passing from a district with a retentive soil to one of an open porous nature—respectively characterised as cold and warm soils—that whilst the air on the retentive soil is cold and raw, that on the drier soil is comparatively warm and genial. The same effect which is here caused naturally may be produced artificially by providing for the perfect escape of superfluous water by drainage, so as to leave less to cool down the air by evaporation. The reason of this difference is two-fold. In the first place, much heat is saved, as much heat being required for the vaporisation of water as would elevate the temperature of more than three million times its bulk of air one degree. It follows, therefore, that for every inch in depth of water carried off by drains which must otherwise evaporate, as much heat is saved per acre as would elevate eleven thousand million cubic feet of air one degree in temperature. But that is not all. Air is not only cooled by the evaporation of the water, but is also rendered damp by it, and damp air feels colder than dry air of the same temperature, consequently dampness of the air affects comfort even more than its temperature. It is easy then to understand how local climate is so much affected by surplus moisture, and so remarkably improved by drainage. A farmer being asked the affect on temperature of some new drainage works, replied that all he knew was, that before the drainage he could never go out at night without a great coat, and that now he could, so that he considered it made the difference of a great coat to him. Mr. William Tilley, head gardener to the Duke of Portland, stated to Mr. Lee, Superintendent Inspector of the Board, that the local climate was improving; that in consequence of the drainage of part only of the district there had been a rise of one degree in the temperature of the whole district on the average of ten years. As the evaporation is greatest in the summer, the rise of temperature is greatest at that season. Dr. Madden has observed a difference of 6½ degrees in the summer temperature of drained and undrained land, and of course there would be a corresponding difference in the temperature and dampness of the air. It appears, therefore, that an effect similar to that of removal to a more genial climate may by produced by draining, which is itself a profitable employment of capital, both to the owners and occupiers of the soil."

Of the effect of good drainage upon the health of live stock, the late James Smith, of Deanston, gave the following result of his observations—"In the alluvial clay districts of Stirlingshire, and west of Perthshire, where the drainage was formerly effected by large open ditches, in the Dutch fashion, ague was periodically prevalent, and rheumatism, fevers, and scrofulous affections were much promoted, until the introduction of thorough-drainage, 40 years ago; after which period those diseases began to disappear, or to be greatly mitigated in severity. Few cases of ague now appear. Fevers are seldom known, except in the usual course of fevers which prevail epidemically over the whole country; and it is generally observed by the inhabitants that their cattle or stock are now less subject to diseases. In the undrained condition of those districts they were subject to dense fogs, especially in the autumnal months when much rain had fallen, communicating a chilly feeling to the inhabitants; but since the general introduction of thorough-draining those fogs seldom prevail, unless in a general foggy tendency of the atmosphere of the country.

"On the farm of Deanston, in the west of Perthshire, consisting of about 200 acres, and which was the first farm on which the entire system of thorough-draining and subsoil-ploughing was introduced, there was a marked effect produced. The farm, after periods of rain, used to be covered with chilly fogs, which entirely disappeared after the thorough-draining was effected. The cattle grazing on the farms were much subject to the disease called 'red water;' since the draining there has been no case of that disease. In other parts of Scotland and England similar results have been stated to have followed the introduction of thorough-drainage."

The evidence of several other gentlemen was to the same effect. Mr. Alexander Maccaw, of Ardlochan, remarked:—"As to the health of cattle or stock I have the strongest evidence of the beneficial effects of drainage in many instances. On the lands which I possess, and on several others in the district, a disease called red water prevailed, in some years proving very fatal; but after drainage and cultivation of the marshy parts of the

pasturage the stock has been free of that disease. I may mention that the first and most severe cases of pleuro-pneumonia in cattle that had occurred in this and a neighbouring county were on lands of a swampy undrained character. The surface drainage of sheep walks in every district is well known to promote the healthiness of the stock; and I believe the thorough drainage of a single swamp in any locality will be an important means of improving the health both of the population and stock connected with it."

We may safely conclude, then, that the removal of land water is productive of increased health to the live stock which tenant our farms. This is, therefore, another reason why we should by drainage add to the fertility of the soil. It is not in all cases that the prosperity of the vegetable and the animal world are promoted by the same causes; here, however, we have an instance where defective cultivation in the presence of stagnant water retards the healthful progress of not only the farmer's crops, but of also the stock which consume it. And again, let me remind the farmer, when he is acting upon the conclusions to which I have been referring in this paper, and when he is removing land water, that it will be well if he considers how useful, for the purposes of irrigation, the noxious water may in many situations be rendered. The impurities of such waters commonly partake of the nature of the manures with which the land from which they are removed has been dressed. And where, as in the case of Lord Hatherton's farms in Staffordshire, the water can be collected in a reservoir, in which it can be enriched with the drainage of the farmyard, and afterwards spread over grass land, the profit derived from the irrigation is such as to go far to repay all the outlay bestowed in such drainage operations.

THE ADVANTAGES AND MODE OF GROWING TURNIPS ON HEAVY OR CLAY SOIL.

BY AN EX-FARMER.

When a country has become peopled till mere ploughing and sowing will not be sufficient cultivation to cause its surface to yield enough support for its inhabitants, a temptation is offered which induces those who follow the plough to improve the system which hitherto has been satisfactory in its results; and when a country has become further peopled, that is, when there are several to an acre instead of one, a greater temptation is offered to make its soil yield her increase, as a demand is begotten which produces a reward to the food growers, and they are accordingly stimulated to exertions. Even at this advanced stage of society, a reward must be promised before labour and skill are earnestly applied; for the organization of men is such, that a profit, or the means of improving their position, must be tolerably certain before they, as a body, will apply themselves earnestly in improving the domestic affairs of life. The mind of man is brought to bear on whatever proves itself to be what is commonly termed "profitable;" and without this "profit," this important element or compound of mortals is either diverted from its course, or it retrogrades and eventually sinks into lethargy. Profit at the outset may be so misapplied that it seems to be an evil; but sooner or later it preys upon the natural propensities of men, and the more highly favoured become strong in those powers which emanate from the "agitation of intellect" produced by this stimulant. Humiliating as it may be to those who fancy they labour under the character of philanthropists, there is not such a thing as a constant exercise of body and mind for the sole benefit of mankind. There are a few exceptions to this rule; but they are not fit to live in this world, if they have to contend with its difficulties and contentions; therefore they sink under the denomination of "the unfortunate," unless some representative of the comforts of life has been handed to them by some one who was of the required organization and temperament for taking advantage of things in their legitimate position. As it is with men generally, so it is with men as they are divided into interests and classes; unless they are permitted to have a due reward for those exertions which advanced societies require of them, and thereby have the means to progress or grow powerful by taking advantage of the various institutions and agencies which spring into existence in progressive societies, why they become distanced in the race, and, subsequently, move so inadequately to the work allotted them, that they act as clogs to the onward movement of those societies whereof they are parts. And so soon as this hindrance has begun to be felt, it will become more and more burdensome, till all interests feel its effects; and they are, therefore, checked in that progression which they rejoiced fn when all shared equally in the advantages to be derived from each other.

Although the interest, which more directly represents the most important part of the business of

this life, is, in this country, deprived at the present time of the means which are required to raise, and when raised, keep the mind continually on the ascent, it is to be hoped that its position will soon be changed, and, therefore, that instead of a less number of that interest being able to patronize the agents of intelligence and instruction, an increased number will be able to enjoy these advantages. Those who have something to fall back upon, and can, therefore, afford to purchase such writing, will not suffer the loss it is to be without a knowledge of how the world is moving, even although they may be aware that such knowledge will not receive its reward when carried into practice. Besides, to peruse the thoughts which spring from reflecting men, and to reflect upon detailed experience, begets that reason which will enable the "raw material" to be turned to profitable account when all other circumstances will admit of it. That the following system of cultivation will prove profitable I cannot take upon myself to aver; but that it will prove a productive system where practised I have no hesitation in stating, the which the experienced reader will agree in, when he has given it his careful perusal.

There are few farms in this country which do not possess a portion of land which is not considered to be "turnip land," from its being too much of the character of clay; and there are a great many farms which are composed of this kind of soil to such an extent that there are frequently considerable portions of them fallowed or tilled throughout the summer, because the loss would be greater than the gain to sow them with turnips and mangold, with a view of being able to keep more cattle for the purpose of indirect profit in the shape of manure. But although the ordinary system of sowing and cultivating land for turnips will not answer here in the same way as it does on "turnip land," there are means whereby this heavy land can be made to grow turnips productively, and at the same time improve the soil for the barley crop.

It is the custom throughout most counties to cross-plough land when it is under the fallowing and green cropping part of a course; and when land is of a friable nature it is proper to plough rather deeper than the autumnal ploughings; but on the soil in question, to turn up fresh soil at that season when these ploughings generally take place is the very way to make it impossible, in ordinary seasons, to bring it about so as to make it capable of producing a good crop of turnips. Indeed, it is not necessary to cross-plough this character of land at all, for it is not the depth a plough runs here which does the good, but the art consists of moving it at proper times and seasons. This soil is never too dry, nor is it seldom too solid for plants to thrive in, unless it is poor or devoid of vegetable matter; and when such is the case, to plough deeply is the very way to make it more unlikely to become rich in vegetable matter, for it is necessary that the soil in which plants stand should have considerable proportions of atmospheric elements, or "vegetable matters," as they are commonly called. If, therefore, the subsoil is stirred and mixed with the surface soil, the result is that no plant will grow luxuriantly, not even such as feed principally on the air—tares, turnips, and so on. An ordinary quantity of farmyard manure will besides, under this management, prove inefficient, as it will be "eaten up," as the expression runs, which means, that it will be so completely lost in the quantity of earth wherewith it is mixed, that the roots of green crops cannot take it up at the onset, which thereby receive a check; and when they have managed to grow to a size when they ought to begin to thrive, they have to feed on fluid which contains so much earthy or metallic properties that it is impossible for it to be assimilated by plants of this order; consequently, no atmospheric constituents are assimilated, which is the process whereby green crops enrich the farms or fields on which they grow. If a quantity of four inches of soil be made rich enough, no matter how, for the reception of turnip seed, and an inch of subsoil be stirred, pulverized, and mixed with it, there would be required an ordinary quantity of farmyard manure to make this soil as calculated to grow as good a crop of turnips as it would have been had not this inch of subsoil been stirred; for if the pulverizing is effected by the air, the metallic bases it contained are set free to unite with the soil which *was* fit for receiving the seed; and if the acid in these four inches effect the pulverization, deprivation takes place of that acid, which made it of a proper degree of richness whilst that acid was there. It is the greatest possible mistake to suppose that green crops require a great depth of moulds; and, also, that if this is effected all that is required to be done is accomplished. For a certain amount of acid, or a certain character of carbonate, must be formed in the soil before a plant will begin to grow; and this must be near the surface, for the lateral roots run within two or three inches of it; and these seem to be the ones which absorb the food of plants, as the main roots, or the ones which run perpendicularly in the soil, cannot take up nourishment, for if they did the subsoil would produce crops as well as the cultivated surface. These last roots seem to be a provision of nature to bring up moisture from beneath when the surface has become too dry for plants to luxuriate.

Well, then, if any reader has got fields which he intends to sow with turnips, let his object be not to

try how deeply they can be ploughed, but to see how fine they can be made. It is consistent enough to plough sandy and gravelly land a tolerable depth; but it is ridiculous to plough this heavy land likewise, because the other kinds are the better for it.

And if there be any readers who have any heavy fields, let them endeavour to produce a crop of turnips on them by ploughing no deeper than they have been ploughed, and using the scarifier, harrows, and rollers in preference to ploughing too often; for the latter will be equally efficient in causing the air to act on the soil, and the moisture on the surface may be retained, which is a material point in this case.

It is a fortunate circumstance that that soil which requires to be fed off early in the autumn will produce turnips fit to feed at that time. And it is very singular that the system I am just alluding to should have been overlooked so long as it has been, and in feeding districts too, where it is more necessary to carry it out; for, where there is but little grass land, there is always a scarcity of feed for good sheep whilst the general crop of turnips is growing fit to feed.

Some portion of this land is sown with beet and swede seed on nearly every farm which contains it, and it is quite right to do so to a certain extent; but the great expense attending the cultivation and storing of these crops will not admit of their being cultivated further than any one is obliged to do for the purpose of having green food to tread his straw down by, or rather to give to cattle whilst they effect this important object. Instead, therefore, of extending the cultivation of beet and swedes, where circumstances will admit of more acres of green crops being grown, by adopting the system herein recommended, sow some early kind of white turnip, such as the White Tankard, Red Tankard, and so on, but not any hybrib varieties, as they are invariably subject to mildew, which disease is seldom bred in white turnips, let them be grown as early in the summer as they may. They should be sown immediately after the swedes, or certainly not later than the first or second week in June; and the reason why they have not been grown on this soil more extensively is, because they have not been sown early enough to be so forward that they may be off by the latter part of October, or beginning of November, and thereby admit of the land being ploughed up before winter arrives.

By carrying out this system, there are many advantages gained. Every one is acquainted with the value of a good piece of white turnips at the latter part of September or beginning of October, for then, as I have said, feed for fatting sheep is generally scarce, and pastures are not often overdone with grass at these times; therefore, a few pulled off and thrown amongst the bullocks intended for the yards as soon as the swedes are ready, will be the means of keeping them from wasting, as well as of making them like the flavour of turnips before they are confined to them entirely as green food. And there is not the slightest obstacle in the way of producing a good piece of this character of feed at the times named. As to whether it will be proper to use farmyard or foreign manures depends on circumstances; such as the value of the former for other purposes, and the distance the field or fields lie from the homestead. The cartage of guano is trifling; but to carry farmyard manure to the far end of a large farm involves heavy expenses, besides the time it takes to carry it on at this busy season. By the following paragraph, it will be shown the advantage of applying manures to green crops; and, on the strength of the knowledge I possess in this respect, I recommend the use of that part of the farmyard manure which is made late in the spring on young clover, for the increased value of these crops will be more than if it had been used for wheat, and the next crop of wheat will be as good as if the same value of farmyard manure had been applied directly to it. By-the-by, that land which is to be sown with guano should have it *applied at once;* for not only will there be no loss from the heat of the sun, but it will ferment in the soil, and thereby pulverize it as much as several weeks' action of the air. It is astonishing how strongly it acts: besides, by this action, metallic bases are developed, which unite with it, and form that natural compound which makes plants both vigorous and healthy. It will not wash away, as some self-styled "scientific men" aver; for the affinity it has for earthy matters is so great that it forms itself into a compound therewith, and no power, save that of plants, can disunite it again, as the quantity applied is so small that the attraction of the soil is far greater than the disposition it has to dissipate.

In reference to the effect a crop of turnips like the one in supposition has upon such a soil, why nothing can be obtained to enrich it more, for it is a part of nature itself in its most simple form. When this land is exposed to the air one year in four, it is done with a view to make it tender, and restore the powers it has lost by a course of cropping. This restoration of powers consists of atmospheric accumulation, or a union of air with the soil. What, therefore, must be the value of the manure which is composed of plants, the very functions of which are, the assimilation of air with the compound of earth and air which they suck up? There is no system so cheap as that of manuring by green crops. If foreign manures be used, let

them be applied to green crops. If a field be poor, let it be green cropped till it is rich, and then, by proper management under the usual course, it will maintain its value; for rich land, if carefully managed, is like a rich "estate:" it grows richer every time its affairs are balanced. For the action of the accumulated parts increases the means of action, and thus that which was "floating wealth" (or air) becomes fixed, and aids, or causes more of that which is still "floating" to become fixed, and so it may be made to continue till land is too rich, and requires to be impoverished by adding to our own wealth more rapidly, and this by taking an extra straw or "money-making" crop.

This essay is in season; and those readers who will take advantage of it, and consider how it may be best adapted to their own occupations, will find that they have neither perused carefully nor carried it into practice to no purpose.

SHEEP: THEIR WINTER CARE AND MANAGEMENT.

BY A PRACTICAL FARMER.

"Be thou diligent to know the state of thy flocks, and look well to thy herds."
PROVERBS OF SOLOMON.

It is not to be expected that in a succinct and concise article any clear and full definition can be given of the many modes of management or treatment to which sheep are subjected in the various districts of this country; nor is it necessary. Our aim and endeavour are to make our readers think upon this subject more intently than they have hitherto done. Good we know must then come out of it. The more we can keep alive a spirit of inquiry, the greater is the improvement that will ultimately follow.

The proper care and treatment of the flock during the months of winter, in a country so variable in its climate and geological character as the British Isles, are a subject of transcendent importance. In its farm economy we do not know one worthy of equal consideration. To the flockmaster it is a matter of the utmost consequence, and ought ever to have his eager and constant attention both to its details and in its practice.

The subject is in itself easy and simple enough throughout: there is nothing mysterious or intricate in the management of a flock of sheep—nothing beyond the comprehension of any ordinary mind. What we aim and wish to urge is improvement in practice, rather than the inculcation of knowledge: the great thing is to supply them freely with good nutritious food, dry lairs, warm shelters, and constant, careful attendance. Every animal intended to yield the greatest profit must be kept steadily progressing from its birth. A prudent flockmaster will, to further this end, endeavour to provide a regular succession of pasturage during the summer, and ample supplies of the usual kind of succulent food for the winter consumption; indeed, it is indispensable to the property of the flock that a sufficient supply of turnips, mangold wurtzel, rape, or other similar kind of food, should be provided for their sustenance during winter. We shall suppose this to be provided—nay, we take it for granted that it is so done; and the few observations we would offer upon the subject must be with that understanding.

We do not profess to include in this article the management of mountain-sheep, nor those of any other peculiar district; but merely the regular country flocks under ordinary farm conduct or administration.

The Winter Care of Sheep.—In treating upon this subject we shall first begin with lambs. May we be pardoned for a short digression: we are always at a loss respecting the names of sheep. Lambs have in particular localities various names—the male is called a *tup-lamb*, *ram-lamb*, *pur-lamb*, and *heder-lamb*; after weaning he is called a *hog*, a *hogget*, a *lamb-hog*, a *hoggerel*, a *tup-hog*, a *teg*; if castrated, a *wether-hog*, *&c.* The female, a *ewe-lamb*, a *gimmer-lamb*, a *sheder-lamb*, *&c.* until weaned; and then *hog* takes the place of *lamb*, *i. e.*, *ewe-hog*, *&c.* When these are shorn the names are still more varied and numerous, *i. e.*, *yearling*, *shearling*, *shear-hog*, *two-toothed teg*, *dinmonts*, *wethers*, *wedders*; females, *yearling-ewe*, *shearling-ewe*, *theave*, *two toothed ewe*, *gimmer*, *&c.* Now this is wrong, and not a little perplexing to general readers: it is much to be regretted that one name should not be applicable to the same kind of sheep throughout the kingdom. We do not know any insurmountable obstacle to this generalization.

In this article, then, we shall first speak of the winter management of lambs, or rather "young sheep." The care of "young sheep" should commence very early in the season: they should be put upon their winter food long before the commencement of winter. It is very desirable that they should be taught to eat esculents and edible food immediately on their being weaned, which is a critical period in their short lives. When separated from their dams, we would suggest their remaining for a time on their accustomed pasture. In a week or two, as judgment dictates, let the *stronger ones* be removed, and put on well-grown eddish or aftermath; clover-eddish or tares, if not too luxuriant. Shortly afterwards, the *weaker ones* may follow, and all should be supplied occasionally with cabbage or similar food, and a small allowance of corn or cake. This will prepare them for consuming rape or turnips

without injury. The greatest caution is now requisite, as the strong succulent eddishes are apt to cause a laxative habit of body, which probably a winter care may not subdue. About the latter end of September the *weaker ones* should be put upon rape or turnips, having their allowance of cake, corn, or meal continued to them. In two or three weeks at least the *stronger ones* should follow them; and on no account should any young sheep be kept from such food later than the middle of October. It is highly conducive to their winter prosperity that they become accustomed to their winter provision before severe weather sets in, and it is a considerable time before they eat with avidity either rape or turnips.

In districts where rape is extensively grown, it is always stocked first; next follow the varieties of common turnips; and as spring puts in, Swedish turnips conclude the winter course. This is also the usual course in those districts where turnips only are grown: the common sorts are first stocked.

The usual and most common mode of stocking turnips is to separate the young flock in three lots—first, the weaker of both sexes; next, the stronger males; and last, the stronger females. These take precedence of each other in the folds in this order, the weaker having the first picking. This course is, however, occasionally deviated from, according as the flock appears to progress: and one great reason is this—chemists tell us that the *turnip-top* contains principally that necessary chemical property which goes to form bone, and give muscular power to the animal system; hence the occasion for deviation. Every sheep must have a requisite quantity of these tops, or they will be liable to fail in their shoulders and knee-joints, as is too frequently the case. The folds then will require arranging accordingly, only taking care to provide that the stronger lot shall take the "leavings" of the weaker ones. This is the common practice, and in mild, dry winters will do very well. The chief object in separating the stronger males is, that they being generally designed for early sale or fatting, they of course require more forcing food, and more favourable treatment to push them forward. All should have either corn or cake, but these certainly an extra share. We are strongly impressed with the conviction that this outlay is abundantly repaid, both in the extra weight of wool obtained, and in the improved and healthy condition of the flock, irrespective of all other considerations. The quantity allowed to each need not be excessive: one half-pint of beans or peas, or one half-pound of cake, is amply sufficient for each sheep—indeed, in the early part of the season it is customary in some of the best-managed districts to commence with 2 oz. each of cake, and gradually to increase that quantity, till it reaches half-a-pound. We are quite willing to look favourably upon this method of consuming the turnip crop, as being inexpensive; but we think a much better practice is to cut the turnips and supply them in convenient troughs. This is our own practice: we adopt the separation into lots, as named above; we give corn and cake, and we cut or slice the whole, or nearly so, and give them to the sheep in troughs; we use Gardner's machines—the troughs are from 12 to 18 feet long, made from slit deals, one deal being sawn into four leaves, the bottom being cut from an 11-inch deal, and the sides from 9-inch deals, about ¾-inch boarding being quite strong enough; they are raised upon feet, about 18 inches from the ground, and the feet well set out, to prevent overturning. This prevents waste; the sheep can neither get into them, nor can they throw out the turnip-slices. Our corn and cake-troughs are much smaller, and not raised up; and as soon as the feed is eaten they are turned over, to keep them dry. We have used troughs of various make, but never found any so serviceable or economical as those on feet; besides, they have another advantage, which is not to be overlooked. The sheep whilst feeding are obliged to hold up their heads: this causes them to grow up with better fronts and nobler looks—we like to see sheep look nobly up. The sheep are supplied with turnips about 8 o'clock A.M., 12 o'clock, and 5 o'clock P.M. The chaff and cake or corn are generally given in separat troughs; if not, we give them immediately before the turnips at the *morning and night feeding.* We take care to give an extra quantity of turnips for the night feeding, particularly on moonlight nights, when frequently an additional quantity is consumed. We also provide bean, pea, or wheat-straw, so as to be accessible to all. We either make small *cobs* in each fold, and surround them with hurdles or trays; or we set down close parallel lines of trays, between which we put straw daily, of which much is eaten.

Another very important practice of ours is, in bad winters, to construct shelters, that are both convenient and readily made. We set down at requisite distances posts parallel with each other, or what is better, strong trays or hurdles capable of bearing weight; these are so arranged as to form an oblong shelter of required length. On these we lay poles from tray to tray or post to post. On these, again, we lay transversely any broken trays or hurdles, or anything likely to prevent the covering from dropping through: on these we lay straw or strawy rubbish of any kind nearest at hand; the long sedgy grass from ditch-roadings we generally reserve; it makes a capital covering; a few spits of earth or sods will keep it from blowing away: on the sides we set down trays or hurdles in double lines, between which we cram straw or rubbish, taking care to leave convenient openings for the sheep. This construction, when bedded down with straw or stubble, forms an admirable shelter, and if occasionally supplied with stubble, will keep dry and clean. We frequently contrive these shelters so as to suffice for a whole field. A little attention to these minor matters will do much.

We are so satisfied with the great utility of shelters that we unhesitatingly recommend them for universal adoption. We know objections are made. We have been asked, Why not breed a more hardy kind of sheep, that can do without shelter—a kind that do not require nursing or costly care? We say we are not

acquainted with *any kind*, which, we are persuaded, would not be benefited by comfortable shelter, as well as good lairage, warmth, and quiet. The economy in food will more than repay the cost, besides a deposit of valuable manure on the spot where it is most likely to be required for use, to say nothing of improved condition in the flock. These advantages we have had proof of for many years, and at the risk of being deemed presumptuous and egotistic we again say, that we most unequivocally recommend the adoption of fold-shelters to all flock-masters.

On this point we would direct attention to the course usually—nay, almost invariably pursued by those breeders who aspire after the prizes offered for public competition, or who aim to get up stock for public exhibition; such as ram-breeders and others. Nearly every animal got up for these ends by these breeders is fatted in hovels, or they are provided with secluded shelters in fields—most commonly "housed."

We have seen many field-shelters of various construction: one we will describe—it was made of half-inch boarding or slit deals, on strong framework of wood; the shape was oblong, having one side and the two ends boarded up, except two hanging-doors or flaps, to be opened at pleasure from the top; the bottom was slatted on a strong frame, provided with wheels for easy removal from place to place; the top a boarded common-shaped roof: we thought this a good kind, but expensive. Shelters are of easy make and adaptation; the great aim must be to provide a more eligible and desirable place of rest for the animals intended to be benefited by them.

There are so many methods of wintering sheep practised, that it does appear somewhat presumptuous to profess a decided preference for any given course. Different districts have their customary modes; and it is a faulty notion for a stranger to step in and say, You are wrong here and wrong there. The precise circumstances of the locality must be taken into account. It is a very difficult matter to winter sheep satisfactorily on turnips or rape, on heavy clay land; and on light sands sheep are very apt to take too much sand into their stomachs with their food, to their great injury. Again, where much hay is grown, it is usual to allow a considerable quantity to sheep on winter food; this is either given in racks, or laid upon the ground, and a kind of wicker-work frame put over it, through which the sheep draw their provender. Who is to say this is bad practice? In other districts it is not unusual to turn the whole flock into the turnip-field, and allow them the full scope of it—"to leave them to take their chance"—"*to cut their own meat.*" Now this we venture to say is bad practice; it is useless and extravagant waste. Take the month of November last past; suppose the crop to be partially consumed, and such weather sets in, the crop is inevitably spoilt; much loss was during that month sustained by many growers. A word as to medical treatment. We do not recommend much resort to medicine, if it can be avoided; change of food will do much: of course in fevers bleed freely, and administer purgatives; in scouring cases bleed moderately, and give powdered chalk; if sheep are thriving very fast a little diuretic medicine will be serviceable; for ticks use a weak solution of arsenic; for scab, mercurial ointment; for foot-halt, mild costies and *great attention.*

We shall now make a remark or two upon the "wintering" of yearling or older sheep, and then proceed to our subject—Breeding ewes and the lambing season. "Yearling sheep," or "shearlings:" these should either be pushed forward with the view of fattening them during the winter on turnips or artificial food, or they should be kept in such an ordinary and inexpensive manner as may render them likely to yield a profitable return for the following summer's grazing. Sheep that have been well fed during winter are not good stock sheep for summer grazing, and will seldom succeed on average pasture lands without a liberal supply of artificial aids, as corn or cake. It is by no means profitable to take fatting sheep from turnips or similar food, and place them on common pastures, or even on the best pasture lands, for summer grazing. To make this change advantageous corn or cake must be allowed, and that liberally, according to the state and condition of the sheep—they must be kept progressing. Yearling sheep intended for summer grazing ought to be wintered thinly on grass land, having a supply of turnips or other food allowed them in unfavourable weather, in deep snows, or on bare pasturage. Sheep well fed during winter will require a first-rate pasture to fatten them. Our custom is to separate the inferior sheep from the flock for winter fattening, and place the better ones on grass land preparatory to the summer's grazing. The former are put to turnips, and they will generally make themselves fat during the winter; should, however, the turnips lose their quality, we give corn-chaff and cake. We do not think them good enough for summer grazing; those intended for this purpose, and considered "good grazers," we place thinly on the grass pastures, and, as we judge requisite, give them an occasional supply of turnips or mangolds, or, in deep snows or long blasts, corn or chaff. Our design is to keep up their condition without fatting them. These sheep, thus wintered, we consider the most profitable for summer grazing, and the very kind that every good grazier is anxious to obtain, and would travel far to purchase.

We do, however, strongly advocate the fattening of young sheep. The great object with most breeders is to attain early maturity, and in most breeds this is accomplished, and ought to be taken proper advantage of by feeders. We know many farms upon which the fattening of young sheep (lambs) has been practised for many years; and, with the aid of artificial food, they are usually brought up to great weights, and from their exceeding good quality realize great prices. This course we think worthy of general imitation; but we decidedly object to the practice of getting up these young sheep into high condition, and then put them to common grazing purposes. This is an error which

must be guarded against, and ought to be severely and constantly censured. Graziers cannot be too cautious in this part of their business. The purchase of high fed animals is seldom advantageous. The suitability of the pasture to improve the condition of the stock to be purchased must be the guide, and the grazier will adapt his purchases accordingly. Yearling sheep will unquestionably fatten faster on pasture land than younger sheep; and if the pasture is better adapted for fattening than common-grazing a "growing young stock," by all means purchase older sheep. These minor matter must be left to the judgment of the grazier, and herein consists in a great measure his principal business, and upon its judicious adaptation depends his profit.

Breeding ewes: their management in winter and in the lambing season. On this part of the subject we start from a point at which others may deem it unnecessary to set out. We think that the preparation for a good and safe lambing season should commence immediately after the time of weaning. The ewes, on being taken from the lambs, should be placed upon bare pastures, or such inferior keeping as is most likely to cause the loss or drying up of their milk. At this period their udders must be closely watched, and in every case requiring aid the ewe should be milked and her udder gently rubbed by hand; should soreness, swelling, or inflammation take place, warm water and soft soap ought to be freely applied. Should the milk continue to flow, and the case assume an obstinate aspect, strips of adhesive (diaculum) plaster placed about the udder, and avoiding the teat, will be found of great service. As soon as the milk is dried up, gone, they should be turned to good pasturage, and for a time the faster they thrive the better—they will be earlier prepared to receive the ram—they will take to him more readily, and if care is taken that they do not get too fat a more abundant fall of lambs will be the result. The weaning time being generally about the end of July, or beginning of August, the ewes have nearly two months' rest, and the improvement made during this interval will suffice to prove which are likely to make profitable breeders, and of course qualified to be put to the ram. The others must be put to the best keeping the farm will afford, and sold as draft or cull ewes, or be further carried on and fatted on turnips. The regular breeding flock will have to be replenished from the young ewes; and in making this selection we would recommend great latitude for the first year—a small and ordinary looking yearling ewe will bring up a good lamb, and herself make a better feeder for the following year. The ram may be turned to the ewe at any time between the middle of September and the early part of November—the earlier the better according to circumstances. In this particular the breeder must be guided by his position in reference to locality, climate, the kind or variety of sheep, and purpose for which they are designed, &c.; and much must depend upon the preparation or provision he has been enabled to make for their sustenance and shelter in the ensuing spring. Many like considerations will suggest themselves to every breeder to direct his course. The ram on being put to the ewes should be constantly marked along the belly with red ochre or other marking, so as to enable the shepherd to distinguish the ewes that have been served by him. The ewes ought to have their tails trimmed; and on being served should be marked by the shepherd so as to denote the time or week when thus served by the ram. This will be of use, by enabling him to separate them for lambing; he can by his own private marks distinguish those likely to lamb earliest; and as the time of gestation is about twenty-two weeks he knows precisely the time for lambing, when they ought to be separated from the flock, and will prepare for them accordingly. The ram ought to be with them at least six weeks, so as to give every ewe an opportunity to take him twice, which they will do if not in lamb, at intervals of three weeks. This will insure greater safety; and by this means a protracted lambing season will be avoided, which is very desirable.

It is of great importance that the ewes should be kept to their food with great regularity throughout the winter. If "wintered" upon turnips they should, if possible, be kept to one variety. To winter ewes on turnips is excellent management, and it is most commonly and universally pursued in all turnip-growing districts. The usual course is to allow the heder or male lambs to take the first pick of the field, these followed by the sheder or female lambs, and finished by the ewes. If they are "wintered" on grass pastures they should be kept pretty close to their pastures, and not allowed a change from field to field; but should the pasture become bare, a moderate allowance of mangolds should be carried to them DAILY—we say daily, and not at intervals: indeed, as the lambing season approaches, it is desirable to keep up this supply; as the ewe becomes weaker and weaker, as the lambs she bares become stronger and larger. But it is only in very severe seasons that we recommend corn or cake should be resorted to, at least before the lambing season is over. The great thing is to keep them in fair and proper condition, by no means to make them fat nor give them food tending to make them feverish, neither must they undergo any change likely to affect their constitution or habit of body. A change from common turnips to swedes, or again to mangolds, must be made with great care and caution. The common turnip possesses a strong diuretic property, and ewes fed long upon them are liable to abortion. On such cases appearing the flock should be instantly removed and placed upon other keeping, having hay, chaff, or similar dry food given to them. The affected ewes should also be separated; for such is the power of animal sympathy, aided by the above and other predisposing causes, that more are sure to follow. Sometimes a considerable proportion of the ewe flock is thus affected, and every care must promptly be taken to avert the danger. Quiet and composure are the surest remedies. Bleeding is also recommended; it is indeed indispensable to their

general health and their welfare during the lambing season that they should, by kind treatment, be made docile and gentle; no dog, or other alarming cause, should be allowed to disturb them. If repeatedly frightened they become wild and restless. The writer of this paper has unfortunately had full proof of this: some years ago he suffered a loss of nearly forty ewes, owing principally to some greyhounds playfully racing amongst and then running after the flock, causing them long and exhausting gallops when heavy with lamb. Numbers of lambs presented themselves wrong: we had some cases of abortion—our difficulties were great, often very perplexing, as well as the loss and annoyance; besides, the series of alarms they were subjected to made them so restless and wild that much care was required in approaching them to render aid in lambing, and we had much trouble to make them abide with their lambs; in the night many ewes quitted their lambs immediately after lambing, and numbers in consequence died. They cannot be kept too quiet and free from alarms either during the period of gestation or the lambing season. Every attention ought to be paid by breeders to this department in the management of a breeding flock, as much depends upon it. We love to see docility and gentleness the characteristic of a breeding flock.

The most important part of this subject, however, is *the lambing season*. We will then suppose the ewe flock to have been wintered with every requisite care and attention—that they are in fair order and proper condition for lambing—neither too high nor too low, and free from feverish fears and alarms—if so we calculate upon a favourable lambing season. Many are the preparations and contrivances to ensure comfortable folds, warm lairs, and good shelters for the ewe flock at this period. To attempt to enumerate such would be superfluous: they almost equal the number of breeders, each having their own peculiar conveniences. Be these of whatsoever construction, it is absolutely requisite to provide them. It is also desirable to provide suitable paddocks, and in one of these those ewes first served by the ram should be put, as they will first need the shepherd's attention; but when these have for the most part lambed, he will find the general flock coming on so fast as to set aside any need of selection, and his attention must now be divided between the whole flock.

To enter upon any lengthened detail relative to their management at this season would occupy too much space; we will, therefore, content ourselves by giving an outline of the course we have for many years pursued. The "*ewes times being up*" they are collected into a convenient field, at one corner of which stands the shepherd's dwelling-house. Adjoining it a temporary fold of sufficient extent is made, by setting thorn faggots as closely together as possible around it, so as to break off the wind. At the northern end of the enclosure a number of small pens are also made—these are made with trays or hurdles; the trays are set in double rows, so as to allow the sides being well stuffed with stubble or strawy material, not likely to be eaten or pulled out; and the tops being covered with straw, they form very warm and comfortable shelters. In the field we make many small pens, they are just large enough to contain a ewe with her lambs; these are made with trays closely wattled with straw, and are placed in suitable situations about the field, in order that any ewes about to lamb may with the greatest facility be conveyed to them, or they are in cold weather put in immediately after lambing; both these and the fold we endeavour to keep as clean and free from taint as possible, lest putrid matter of any kind should affect the ewes by coming into contact with any sores or lacerations they may have about the bearing and shape. This is a point well worth the best attention. It is very important that the fold and pens should be carefully watched, and no gangrenous matter be allowed to remain; by this means serious injury is averted, and putrid fevers mainly prevented. If the weather is fine and open, and the nights moonlight, we do not use the fold unnecessarily; but at other times the ewes yet to lamb are gently driven into it at dusk hour, and a few roots of mangold wurzel thrown to them to satisfy and quiet them for the night. Mangold wurzel is almost the only food supplied to them during the lambing season, and for some short time previously; if the weather is very cold or wet we give them hay or chaff. The mangolds at this season (March) we think equal to any food that can be supplied to them, and as it is a crop yielding an abundant supply of food, and that of a quality highly productive of milk, we give it our highest recommendations for this purpose. The shepherd's duty is to be in constant attendance upon his charge during the whole season, to supply them plentifully with food (mangolds and chaff), and to watch closely every case, and only render aid when imperatively required. We do not approve of early interference with the natural efforts of the ewe during parturition. Our practice is to examine each ewe to ascertain if the presentation is all right, *i.e.* the fore-feet just lying under the head and near to the bearing or shape, and then leave her pretty nearly to her own natural efforts. Should, however, she prove incapable of bringing forth her lamb without extreme exhaustion, we then render such assistance as appears really necessary. The shepherd with all gentleness approaches the ewe, and, having caught her by the neck with his long crook, proceeds with every care to lay her on her right side, and then with a firm and gradual effort draw the lamb away. Should a false presentation occur he summons help, and having taken the necessary precautions just named, he commences by inserting his hand into the vagina, and endeavours to change the position of the lamb—this will generally require pushing back into the womb and there turned right. The ewe will continue paining; and as he withdraws his hand, still keeping the lamb right, it will soon come away. Occasionally the lamb is found to be dead and decaying; it must then be drawn away either by hand or instrument. If decayed it can only be got away piecemeal, for which the instrument (to be described) is best.

The lambs should be made to suck as soon as possible after lambing—one "good sucking" will sustain them a long time and prevent many casualties. The udder should always be examined to see that it is right, and to take off the wool likely to interfere with the suckling, or to be drawn into the stomach of the lamb, many dying from this cause. The ewes as they lamb are drawn out and placed on pastures had in reserve for their special service, and if needful have mangolds given them.

The shepherd is provided with the following amongst other requisites, which he uses as his best judgment dictates, *i.e.*, a crook, a bottle of gin, a phial of laudanum, a pound or two of Glauber's salts, a small packet of ginger, a sort of long-handled button-hook and a cord, a small drinking horn and spoon, a little lard, and a bottle of warm milk. The crook wherewith to catch the ewes. The gin is for administering to both ewe and lamb when required; a table-spoonful or two given in hot water or warm milk, with a pinch of ginger, will do much to revive an exhausted ewe, and a tea-spoonful or two of the same mixture given to a starving lamb will often restore it to warmth and vigour, and clear gin is effective for wind cholic. The laudanum we generally give to a ewe immediately after a very severe and protracted labour: a table-spoonful given will often cause her to cease her paining, and give temporary rest, during which time the irritated parts become relieved, and the distressing pains frequently subside altogether; in a few hours afterwards we give salts with the nip of ginger, followed in due time by a cordial fever drink or gruel. The cord is to tie the legs of the ewe when necessary whilst under examination, or during the process of taking away the lamb, and also in a difficult case of parturition to attach to the feet of the lamb if needful to push them back in order to bring forward the head, &c. The instrument (a kind of button-hook) is for insertion into the womb for the purpose of removing any portion of decayed fœtus or dead lamb. The drinking horn, for the cordials, &c.; the lard to lubricate the hand or wounded parts in and about the bearing; and the bottle of warm milk for both ewes and lambs—in ungenial weather when the ewes are short of milk we use much from the cows, the shepherd having continually to apply his bottle to every needy lamb.

These are the main points of our practice. We don't say that it is the best that can be adopted, or that our treatment of the ewe is not open to objection; but we do say that our experience has been satisfactory, and therefore we feel disposed still to follow it. We have known many cases of terribly severe and protracted parturition, followed by incessant paining, speedily relieved by a strong dose of laudanum; and before the effect of the dose has gone off, the womb and affected parts near it have in a great degree recovered their tone. We have given as much as two large table-spoonfuls without any perceptible injury to the animal. The salts and cordials as above soon take away all bad effects, and are we consider a corrective remedy for any evil that might arise from the inordinate use of laudanum. The lambs should be castrated about ten days after lambing, and their tails cut, leaving a stump about four inches long—the ewe lambs equally short—this has a tendency to improve their rumps, as in bad lairage during the ensuing winter their tails become clothed with soil and dung, and the weight thus accumulated draws down the rump. During the summer great care is required to keep the ewes on such food as is most likely to cause their milk to flow freely. Fattening pastures are not generally good for breeding flocks—good seeds on land of moderate quality and pasture lands of medium quality are preferable. This department of their management requires close and unremitted attention, as upon the summer thriving and the proper rearing of the lambs depends mainly their winter's prosperity.

NEW ZEALAND.

BY J. TOWERS, MEMBER R.A.S., H.S. OF LONDON, ETC.

That interesting little book, "The Emigrant's Manual," published last year by Messrs. Chambers, contains several passages on the qualities of soil in those fine islands, from which the following extracts are collected, in order to introduce a few observations (founded upon chemical research), which it is hoped may obviate or remove certain difficulties that may present themselves, not only to settlers, but to other persons elsewhere, who occupy land of quality similar to that herein alluded to.

"There are two kinds of agricultural lands—the forest and the fern. Fresh fern land has one marked peculiarity, called 'sourness,' by which is meant some property hostile to the growth of crops put in directly after the breaking up. The probable cause of this is the absence in the new soil of such promoters of vegetation as the ammoniacal gases, readily absorbed from the atmosphere when the soil is loosened and exposed; although, if sourness arose entirely from this cause, it would appear strange that the bush land also is not subject to it. If a piece of the finest fern land be cleared, and sown at once with wheat, the yield would probably not exceed 15 bushels per acre; the same piece prepared nine months beforehand might yield from 35 to 50 bushels, but on timberland this would make no difference. In cultivating fern land the first operation is to clear away the fern,

which is best done in some dry month. Choosing a gentle breeze, the fern is fired. If it burn well, all the thick and matted dead stuff at the bottom, with the leafy part of the live fern, will be consumed, leaving only the shrivelled tutu" (a peculiar plant, so called), " and the cane-like fern stalks, which, as softened by the fire, should be cut at once with a strong hook or short scythe, and the 'tutu' slashed down with a bill-hook. Lying a few days to wither, the stalks are loosely raked up and burned with the 'tutu' branches; and the 'tutu' stumps have then to be taken up, and carted into a heap, or carried off."

The question implied in the foregoing is one of pure chemistry; and the answer to it must be sought in the results of those experiments which first were detailed in a luminous article from the pen of Mr. Rowlandson, that appeared several years ago in "The British Farmer's Magazine." I have on many occasions referred to those experiments, whose fidelity I then proved beyond the possibility of doubt. These experiments demonstrated the paramount specific affinity of pure lime for that decaying vegetable matter which ultimately produces humus; and, if redundant, that peculiar condition of the land which is called " sourness;" I therefore offer the following remarks, as relevant to the subject. Dr. Voelcker, of Cirencester College, writing on the chemistry of soils, stated that " humus is composed of a great many organic acids and products of vegetable decomposition." Admitting the correctness of this theory with the qualification that the term " acid-oid" might be more correctly employed as parallel with that of " alkaloid" when applied to the " vegeto-alkalies." I observe that humus is found abundantly in rich vegetable moulds, and particularly in the black remains of an old dung-heap composed of tree-leaves or spray, combined with stable manure. The nature and quantity of those organic acids have been investigated by analytic chemists, who have shown that two of them, called " crenic" and " apocrenic" acid, can be extracted by simply boiling humus in distilled water; a third—the humic acid—by treating the residue of the former process with boiling solution of carbonate of soda; a fourth by treating the humus which remained insoluble under the former processes with a solution of caustic potash. However, passing over minutiæ, if a portion of black reduced manure, wood earth, peat, or even of rich old garden earth, glutted with dung, be boiled in rain-water for a few minutes, a certain quantity of colouring matter will be extracted. Upon adding a small portion of any of the alkalies to the mixture, the colour will become more intense. The fluid so obtained may be styled " humate" or " ulmate" of soda, potash, or ammonia, as the case may be. When decanted off the dregs, and left at rest to deposit its feculences, the clear liquid will be discharged of nearly all its colouring matter if some clear lime-water be added to it. As a converse of this treatment, let a teaspoonful or two of powdered quicklime be incorporated with about an ounce of old spit dung, black peat, or old decayed wood, and it will be seen that a hot solution of any of the alkalies in water will fail to extract colour, even though a boiling heat be kept up. Lime, therefore, is thus proved to be the agent which specifically attracts and fixes the humic principle, or, in other words, those extractive substances that exist in vegetable mould, and produce the sourness that is the subject of complaint.

The difficulty which presents itself in reference to the broken-up fern land of New Zealand must depend upon the physical condition of the fern plant itself. If it closely resemble our native fern called " brake" (Pteris), the ash will contain a very high per-centage of potash, an alkali which, as was shown, dissolves humic matter and retains it in the form of a brown liquid. In this case quick, or fresh slaked lime would attract and fix the humic acid, and at once act remedially; for humate of lime is a compound which is very slowly, if at all soluble, and thus cannot act injuriously upon any growing crop.

Lime also, under the hitherto-undetermined circumstances, must be the only certain corrector of injurious vegetable matter, and might be safely applied to fresh fern land; which, if I do not mistake, it would render fruitful by the first application without any loss of time.

The " chemistry" of the foregoing remarks is available in every locality where superfluous vegetable matter exists; for it is by the agency of lime (not chalk) that our inert and barren peat bogs can alone be reclaimed.

IRIS; Winner of the Oaks, 1851.

Iris, bred by her owner, the present Earl of Derby, in 1848, was got by Ithuriel, out of Miss Bowe, by Catton, her dam (Tranby's dam) by Orville, — Miss Grimstone, by Weazel, — Ancaster, Damascus Arabian.

Ithuriel, bred by Lord Derby, is by Touchstone, out of Verbena (also Uriel's dam), by Velocipede. He was a good racehorse at two and three years old; and for some time a leading favourite for the St. Leger. A leg, however, gave way, and he was turned over to the stud. Like Orlando, the sire of the Derby winner of this season, Ithuriel has had but a short trial here; though with Azeth, Flash,

and Pirouette, in addition to the Oaks mare, already proclaiming his merits.

Miss Bowe, bred by Mr. Townroe in 1834, after only a moderate career on the turf, was put to the stud in 1839. She is the dam of Bowstring, Archery, Crossbow, Strongbow, and others, all bred by Lord Derby, into whose possession the mare passed soon after she came out.

Iris is a reddish chesnut mare, standing sixteen hands high. She has rather a coarse head, but with long ears and an expressive eye; she has a light neck and splendid shoulder; is very deep in the girth, but a little flat sided; has rather ragged hips, with quarters very good from the hip to the round bone. Her hocks are good, and arms fair sized; though she is somewhat short and light in her thighs, as well as rather small in the bone below the knee. Iris has a white heel (near side) as well as a blaze in her face; with a tail (a little on the curl) that she carries well away from her. The Oaks winner is altogether a strong, powerful, but by no means handsome filly, of very high courage; though not of the most amiable temper, either in the house or out of it.

Summary of Iris's Performances.—In 1851 she started four times, and won three—A produce Stakes, at Newmarket Craven Meeting, value clear £175; the Oaks Stakes, at Epsom, £3,370; a produce Stakes at Liverpool, £600; total, £4,145.

There are few names stand higher in the records of the turf than that of Lord Derby, and none who will do the title more honour than the present holder of it, the noble owner of Iris. Few men, we believe, really enjoy a race more, or afford more legitimate patronage to that sport which the family has so long and so becomingly supported. From one Lord Derby, the breeder of Sir Peter Teazle, the great Derby race took its name, as did its companion the Oaks from his seat in Surrey. The last Lord Derby was not so keen a turfite; for though horses for some years ran in his name, they were almost altogether under the control of the present Earl. Notwithstanding this being the first of the "great races" Lord Stanley has yet succeeded in winning, some very good horses have still occasionally served under the black-and-white livery: amongst others, Verbena, Parolles, Amurath, Charlatan, Velocity, Rhodanthe, Ithuriel, Archery, Uriel, Legerdemain, Strongbow, and that rare mare Canezou.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Monthly Council was held at the Society's House, in Hanover-square, on Wednesday, the 4th of February: present—The Earl of Ducie, President, in the chair; Duke of Richmond, Earl of Chichester, Viscount Hill, Lord Berners, Lord Portman, Sir John V. B. Johnstone, Bart., M.P., Sir Robert Price, Bart., M.P., Colonel Austen, Mr. Barnett, Mr. Raymond Barker, Mr. S. Bennett, Mr. Bramston, M.P., Colonel Challoner, Mr. Evelyn Denison, M.P., Mr. Druce, Mr. Garrett, Mr. Brandreth Gibbs, Mr. Grantham, Mr. Hamond, Mr. Fisher Hobbs, Mr. Law Hodges, M.P., Mr. Hudson (Castleacre), Mr. Jonas, Mr. Kinder, Mr. Langston, M.P., Mr. Miles, M.P., Mr. Milward, Mr. Pendarves, M.P., Mr. Pusey, M.P., Mr. Shaw (London), Mr. Shelley, Prof. Simonds, Mr. Thompson (Moat-hall), Mr. C. Hampden Turner, Prof. Way, Mr. Jonas Webb, and Mr. Wilson (Stowlangtoft).

Finances.—Mr. Raymond Barker, chairman of the Finance Committee, laid before the Council the report on the accounts of the Society to the end of the previous month; from which it appeared that the current cash-balance in the hands of the bankers was £3,491. He also laid before the members the quarterly statements of income and expenditure, and of funded capital and liabilities.

Prize Essays.—Mr. Pusey, M.P., Chairman of the Journal Committee, reported to the council the following adjudications by the Judges of Essays and Reports, since the last meeting, namely:—

I. To William Bearn, of Handley Farm, near Towcester; the prize of £50, for the best Report on the Farming of Northamptonshire.

II. To Thomas Rowlandson, of Brompton, Middlesex; the prize of £10, for the best Essay on the Production of Butter.

Animals exhibited.—On the motion of Mr. Miles, M.P., seconded by Mr. S. Bennett, Mr. Barnett's motion, "To take into consideration the number of animals, or in the case of sheep or pigs the number of pens of the same denominations, to be shown in each class by the same person, with a view to restricting the number," was referred to a Committee consisting of the past and present Stewards of the Cattle-yard, including the mover and seconder of this resolution.

Appointment of Judges.—Lord Portman brought under the consideration of the Council the whole of the important question of the future selection of Judges for the Country Meetings of the Society. The Council adopted the preliminary propositions of his Lordship, reserving the remaining propositions for consideration and final decision at their next Monthly Meeting.

Veterinary Inspection.—On the motion of Mr. Thompson, seconded by Mr. Shelley, the whole question of the veterinary inspection of animals exhibited at the country meetings of the Society was referred to a committee, consisting of the Duke of Richmond, Lord Portman, Mr. Hamond, Mr. Fisher Hobbs, Mr. Miles, M.P., Mr. Milward, Mr. Shaw (London), Mr. Shelley, and Mr. Thompson.

Steward of Cattle.—On the motion of Mr. Milward, seconded by the Duke of Richmond, Mr. Barnett, of Stratton Park, Bedfordshire, was appointed one of the Stewards of the Cattle-yard at the country meetings of the Society, in the place of Mr. Stokes, who retires this year by rotation.

The Council then adjourned to their weekly meeting, for practical communication and discussion, on Wednesday, Feb. 11, at 12 o'clock, when all members of the Society would, as usual, have the privilege of attending.

A WEEKLY COUNCIL was held at the Society's House, in Hanover Square, on Wednesday, the 11th of February; present Colonel CHALLONER, Trustee, in the chair; Sir Robert Price, Bart., M.P., Mr. Raymond Barker, Mr. Henry Raymond Barker, Mr. Batley, Mr. D. Burton, Mr. Dyer, Mr. Foley, M.P., Mr. Fuller, M.P., Mr. Fisher Hobbs, Mr. Majendie, Mr. Rowlandson, Mr. Shaw (London), Mr. Shelley, Prof. Simonds, Mr. Slaney, M.P., and Prof. Way.

STEAM PLOUGH. — Mr. Batley (of the firm of Messrs. Hodge and Batley, engineers, Adelphi), submitted to the inspection of the Council the model of a steam plough, invented by Messrs. Callaway and Perkiss, of Putney, the construction and peculiarities of which he explained to the members present, by reading to them a paper on the subject.—The Chairman thanked Mr. Batley for the trouble he had kindly taken in bringing this invention under their notice; but at the same time wished him to understand distinctly that the Council, as a body, never expressed any opinion on the merits or otherwise of objects thus introduced from time to time to their notice. At the country meetings of the Society the implements or machines entered for exhibition had the opportunity of being tested by actual trial in the yard or the field, and of having an opinion expressed on their performances by the judges of the Society.

DRAIN PAVEMENT. — Sir John Stuart Forbes, Bart., having called the attention of the Society, as one of its members, to the advantages of the bricks manufactured at Newark Works, in Aberdeenshire, for constructing floors, into the grooved channels of which liquid matter was received and carried off by a transverse gutter at the lower end, Mr. Forbes, their inventor and manufacturer, attended this meeting for the purpose of explaining the peculiarities of these bricks, and the construction of the flooring of cattle stalls, pig-styes, wash-houses, breweries, or other places where much liquid was received and had to be conveyed away. The bricks had each a longitudinal cylindric groove through their centres, which communicated with the upper sides by means of an open slit, half an inch wide; through this groove the liquid was received from the pavement, and conveyed to the transverse gutter at the bottom, and carried away. The grooves were kept clear of accumulation, by means of an iron claw which passed into them through the open slit, and drew the obstructing substances along with it, to the lower end of the pavement. Mr. Forbes cited dryness and comfort to the animals, economy of construction and in the saving of litter, and durability of wear, as the advantages of this pavement over flooring of the ordinary kinds in use in farm buildings. — The Chairman referred to the coarse red material of which the bricks now before the Council were made, and which he thought might advantageously be superseded by clay of a better quality; he also referred to the economy with which the York stone could be laid down for flooring.—Mr. Fisher Hobbs had found that pigs did not do well on red earthen flooring.—Professor Way thought the cross-gutter receiving the liquid should be completely below the level of the pavement.—Mr. Slaney, M.P., hoped that in the manufacture of these bricks such reduction would eventually be made in the price at which they could be supplied to farmers, as had been made in tiles for draining and in other similar articles; a reduction, he remarked, that he believed from improved means of manufacture and the greater demand, had always been found as advantageous to the manufacturer as to the customer.—The Chairman thanked Mr. Forbes for the explanations he had offered to the Council.

AMERICAN BARROW.—Mr. Slaney, M.P., having seen in the Great Exhibition last year, in the American department, a cheap and simple contrivance for easily removing earth from one part of a field to another, or from ditch bottoms, old hedges and headlands, for the purpose of filling up hollow places, he had purchased the article in question, in order that he might submit it to the Council, and if found efficient that it might prove useful to the members. He hoped this might be the case, for in a conversation he had held with a practical American farmer from Kentucky, he found that a similar contrivance had been frequently used by him with great advantage, both in gardening and farming operations. Though the same in its object, this implement differed in some respects from the Flemish Mollebart, of which the late Rev. Mr. Ilham had given the following account in the Journal of the Society (Vol. II., p. 61):—

"The Mollebart, the use of which in the levelling of newly-trenched land has been before mentioned, is an instrument peculiarly Flemish or Dutch. It is simply a very large wooden shovel, in form like the tin dustpans used by housemaids, with a stout long handle. The bottom, which is convex, is covered all over with thin iron plates; and a stronger piece of iron forms the edge. The handle is 6 or 7 feet long, firmly fixed to the shovel, and so placed that, when the end is raised 5 or 6 feet high, the only part of the instrument which touches the ground is the edge. When it is held 3 feet from the ground the shovel rests on the convex bottom, with the edge rising a few inches above the ground; and when it is pushed quite down, and it drags on the ground, the instrument rests on the hinder part of the bottom. The width of this shovel is about 3 feet, and the length from the insertion of the handle to the sharp edge is nearly the same. Sometimes it is wider than it is long. In the middle of the border on each side are strong iron hooks, which are connected with the iron on the bottom. It is drawn by chains fixed to these hooks, and united into a large link a little before the edge of the instrument. To this link are attached a common whippletree and bars, to which two horses are yoked abreast. Attached to the end of the handle is a strong rope of the size of a man's little finger, 14 or 15 feet long. This the driver holds coiled in the same hand which holds the handle, the reins being in the other. It is now ready to begin its operations. The man depresses the handle so that the edge of the shovel rises upwards, and directs the horses towards a heap or an eminence to be removed. As soon as they reach it the handle is raised, the edge of the instrument enters the ground or the bottom of the heap, and it is soon filled with loose earth. The handle is immediately depressed, and the whole load slides on the bottom of the shovel over the sandy surface, until it arrives at the hollow which is to be filled. The handle is then raised suddenly as high as the man can reach; the edge catches the ground, and the whole machine is overturned forwards, the handle striking on the whipple-tree; the load is thus left behind. The rope, of which the workman kept the end fast in his hand, now comes into use, and by pulling it the instrument is again reversed, and proceeds empty for a fresh load. All this is done without the horses being stopped for a moment. A skilful person will spread the earth at the same time that he deposits it; this is

done by holding the rope so that the handle shall not fall over at once, but remain for a short time in an erect position. The earth is thus delivered gradually, and laid level by the edge of the instrument scraping over it. It is astonishing how much labour and time are saved by using this instrument instead of carts. It takes up about 5 cwt. or more of earth each time, and this load slides along with the greatest ease to the horses; in returning they generally trot. More complex instruments have been invented to answer the same purpose, some of which are extremely ingenious; but the simplicity of this, and the small expense at which it may be made by any common wheelwright or carpenter, or even by the farmer himself, strongly recommended it; and we do not hesitate to assert that, with a very little practice, any common labourer who can manage horses will do as much work with this simple instrument as he would with the more perfect and ingenious machine which obtained a prize from the Highland Society some years ago."

The American barrow consisted of a strong iron shovel about one yard square (sharply bevilled at its front edge, and furnished with a strong iron rod draught-handle attached to its sides), mounted with a pair of strong oaken handles; the whole forming a hand-barrow without wheels, to be drawn along the ground on its bottom surface like a sledge. It was chiefly used in America as a road scraper. Various modifications had been proposed of this implement: some having reference to convenience in tilting up the load of earth and regaining the handles without stopping the horses, by adjustment of the line of draught, or contrivances to effect the object by complicated mechanical appendage; others, as adopted in Norfolk, he believed, by Mr. Hammond, to reduction of friction in the transport by means of two very small wheels under the shovel; and one which he, Mr. Slaney himself, thought might perhaps be worthy of consideration, namely the escape of manure, in rows, through regulated longitudinal apertures in the barrow, on the surface of land, according to any particular object in view. —Col. Challoner had employed a similar implement for twenty years with great advantage, in clearing out old hedge-rows, and taking off the top surface from soil. It was made of wood, and was larger than the American barrow then exhibited, had longer handles, and was drawn by horses attached to strong whipple-trees at the side; the load being pitched over while the horses were going on.—Mr. Rowlandson remarked that a similar implement had been long in use in Lincolnshire.—Mr. Fisher Hobbs had found great advantage in the use of a tip-shovel, similar to the one used for removing earth on railways. It was simple, and worked on a pivot, and was capable of holding nearly a cubic yard of earth, which was tilted out by lifting the handles, while the horses went on. He had found it a great saving in clearing headlands and filling up ponds or hollow ways. With one man, a boy, and a pair of horses, as much clearance might be effected as with three carts, three horses, and men. The Chairman expressed his thanks to Mr. Slaney for the kind trouble he had taken in bringing this subject before the Council.

Communications were received—From Mr. Nesbit, giving further details of his mode of estimating the market value of guano. From Mr. Gregory Watkins, on "the necessity of trying to encourage the invention of simple and portable machines for crushing and breaking flax-straw without any previous preparation, and so reducing its weight and bulk that it may be sent to distant retteries at a small cost of carriage; the refuse, by such process, being left on the farm as food for cattle, or for manure: flax, in his opinion, provided the seed is also consumed, thus becoming, under a good rotation, an improver and fertiliser of the soil, instead of an impoverisher of it." From Mr. Nolan, of Dublin, on recently-imported specimens of Cochin-China fowls. From Mr. Dolbell, on preservation of potatoes; and from Mr. Harris, on suggestions of agricultural improvements—for which the Council ordered their usual acknowledgments.

The Council then adjourned to Wednesday, Feb. 18.

A Weekly Council was held at the Society's House, in Hanover-square, on Wednesday, the 18th of February. Present: Mr. Raymond Barker, Vice-President, in the chair; Mr. D. Burton; Dr. Calvert; Col. Challoner; Mr. Dyer; Mr. Foley, M.P.; Mr. Fuller, M.P.; Mr. Brandreth Gibbs; Mr. Fisher Hobbs; Mr. Majendie; Mr. Nicoll; Mr. M. Paine; Mr. Parkins; Mr. Pendarves, M.P.; Mr. Chandos Pole; Mr. Rowlandson; Mr. Sandbach; Mr. Shaw (London); Mr. Shelley; Professor Simonds; Mr. Reynolds Solly; Mr. Stansfield, M.P.; Mr. R. Trench; and Professor Way.

Mr. Lister Maw communicated the results of his experience in the cultivation of the Potato and of the white Belgian Carrot; and in the employment of means for the raising and distributing of liquids in operations of draining, irrigation, and manuring.—Mr. Majendie presented to the Council, for trial by its members, a supply of a new variety of Spanish winter Bean for garden purposes, earlier and of more delicate flavour than the Windsor Bean.—Mr. Digby, Secretary of the Russian Agency in London, informed the Council that the Imperial Agricultural Society at Moscow had transmitted, for the Royal Agricultural Society of England, several models of agricultural machines, as well as samples of farm produce, which now awaited the instructions of the Council as to their disposal.—Professor Way having, last year, received from Mr. Manning a single Potato from a supply transmitted to this country from Lima, he had made a chemical examination of one-half of it, and reserved the other half for setting in his garden. The plant proved to be of unusual size, and the tubers, on being boiled, were found to yield a large quantity of light mealy substance; he would bring to the next Council a few of these Potatoes for distribution.

The Council ordered thanks for the favour of these communications; and adjourned, over Ash-Wednesday, to their Monthly Meeting on the 3rd of March.

NEW MEMBERS.

The following new Members were elected:—

Ackworth, Nat. Brindley, The Hook, Northaw, Middlesex
Beaumont, Wentworth Blackett, Bywell Hall, Newcastle-on-Tyne
Bruce, Lewis Knight, Keston, Bromley, Kent
Brutton, Charles, Northernhay, Exeter
Cole, Capt. Wm. Willoughby, Auchaurigh, Lochgilphead
Deane, Wm. A., Glen Cottage, Great Torrington, Devon
Dickson, William, East Wickham, Welling, Kent
Fraser, James B., Reelick, Inverness
Gales, Richard Norman, Holland Farm, Kensington
Hemming, H. K., Lismore Castle, Waterford, Ireland
Leeds, Robert, West Lexham, Litcham, Norfolk
Macdonald, Major J. H., Dancer's-hill House, Barnet, Herts
Mace, John Ellis, Ashford-road, Tenterden, Kent
Martin, John, Ferristown, Truro, Cornwall
Martin, William, Kilchoan, Lochgilphead, Argyleshire
Rooper, J., Nascott House, Watford, Herts
Russell, John, The Wyelands, Chepstow, Monmouthshire
Simpson, Edward, Pigwell Farm Dairy, Dalaton, Middlesex
Squire, William, Barton Place, Barton Mills, Suffolk
Thomas, Rev. W. Jones, Caer Howell, Montgomeryshire
Thomas, Evan, Ffynonau, Brecon
Thompson, George A., Kirk House, Brampton, Cumberland
Whiteway, Wm. R., Kingabridge House, Ashburton, Devon.

The names of 32 candidates for election at the next monthly meeting were then read.

LONDON FARMER'S CLUB.

"GUANO; ITS APPLICATION, SUPPLY, AND ADULTERATION; WITH DETAILS AND STATISTICS COLLECTED FROM ORIGINAL SOURCES."

We give below a full report of the discussion at the monthly meeting of the London Farmers' Club, on Monday, Feb. 2nd. The subject, "Guano; its application, supply, and adulteration; with details and statistics collected from original sources," was introduced by Mr. Haslewood of the Stock Exchange, a gentleman who, from his knowledge of Peru and his connexion with the Peruvian Government, might fairly be presumed to possess exclusive sources of information. It was stated in the resolution passed at the close of the discussion, that "the value of guano as a manure is well understood and appreciated," and as a general proposition this may be properly asserted, the cases in which it is reported that guano has failed to be productive of benefit being perfectly exceptional. The great cause of dissatisfaction is the price, it being known, as stated in a letter from Mr. Odams, which appears in another column, that the cost of freight has been reduced from £4 10s. to £2 per ton, without a corresponding reduction having been made in the price of the article. Mr. Odams states that the price might be reduced to £6 per ton, and which he has "no doubt would double the consumption, prevent adulteration, improve the interest of the bondholder, give an impetus to shipping, and (what is much wanted) confer a boon upon the agriculturists of this country": in which opinion we are inclined to concur. Mr. Odams expresses his regret, in the letter referred to, "that the public are to be saddled with an additional impost upon another manure (next in importance to Peruvian guano), viz., superphosphate of lime"; an attempt having been made, (and which, unless a determined resistance is immediately offered, promises to be successful), to prevent any person from making superphosphate of lime from coprolites, even if found upon his own land. How can we with fairness call upon or expect the Peruvian Government to give up the monopoly of guano if we allow such an odious monopoly as this to exist in our own country? Our readers will recollect that we announced the fact some time since that Mr. Purser had successfully resisted the attempt to monopolize the manufacture of superphosphate from coprolites, and that the manure dealers and a few other friends had presented a testimonial to Mr. Purser, in approbation of his manly and independent conduct. We are, however, given to understand that legal proceedings have been again commenced against that gentleman; and being, we presume, wearied with the anxiety and expense of litigation borne single-handed, he has made an arrangement submitting to the monopoly. Since the termination of this affair, it is stated that legal proceedings have been instituted, some time since, against another manure dealer, and it is intended to pursue the course adopted by a class of operatives, to enforce their own regulations, to take the firms one at a time, and so to coerce the whole. If the landowners and agriculturists stand by, and permit such a monopoly in respect to the application of an article the produce of our own soil, let them hold their peace as regards the monopoly of Peruvian guano.

The usual monthly meeting took place on Monday, Feb. 2, at the Club Rooms, Blackfriars. Subject of discussion, "Guano; its application, supply, and adulteration; with details and statistics collected from original sources." The chair was taken by Mr. Thomas, the chairman for the current year.

The CHAIRMAN, in opening the proceedings, said he could heartily wish that the committee had selected, to fill that post, some one more competent in every respect than himself; but having, by the kindness of the committee, been placed in the situation of president, he would endeavour to conduct the meeting, as far as possible, in conformity with those rules which had hitherto led to such beneficial results. He congratulated those present, who were, like himself, tillers of the soil, on the improved appearance of the state of agricultural affairs. He could not prophesy that they were on the eve of better times, or assert that they had arrived at the commencement of a more prosperous period; but he would earnestly express a hope that such would prove to be the case (Hear, hear). He must also congratulate them that the subject set down for that evening was one of a practical nature, and if they should learn from the gentleman who was about to introduce it any practicable means of increasing their produce and of diminishing their expenses, they would not have listened to him in vain. He was very much struck with some remarks which he had met with, in looking over a speech of their friend, Lord Berner's, delivered at the last annual dinner of the club. His lordship said, "he thought the discussions which took place at that club, and at many kindred clubs, were of the greatest possible advantage. If he might be allowed to give an opinion with regard

to the subjects selected for discussion, it would be this, that they should be rather of a practical and scientific than of a theoretical nature." In that opinion he (the chairman) most heartily and fully agreed; and he believed that if they confined themselves to matters strictly of a practical nature, the attendance of farmers from different parts of the country would be much larger than it had been. It would, he confessed, afford him great satisfaction to see more of those farmers whose energies in the pursuit of agriculture were unrivalled, and who had displayed to the eyes of their countrymen and of foreigners large tracts of land in the most beautiful state of cultivation as the result of their own efforts; while, moreover, it was satisfactory to know that their balance-sheet was neither a delusion nor a snare (Hear, hear, and laughter). He believed there was an impression abroad—he was very sorry to say this; he considered it, on the whole, erroneous, but still he believed there was an impression—that that Club had sanctioned many of those absurdities and ridiculous rodomontades which had been put before the public without sufficient scrutiny, and which had been found to be in the long run altogether delusive (Hear, hear). He did not wish to enlarge on this subject, especially as perhaps such things were not likely to occur in future. He had now the pleasure of calling upon Mr. Haslewood, to introduce the subject of the evening. If, as he said before, they could learn anything by which they could profit, such a result would be satisfactory; but he was old-fashioned Englishman enough thoroughly to believe that nothing could compensate the people of this country for depending on foreigners for the bread which they daily ate (Hear, hear).

Mr. E. Haslewood then said:—The subject for discussion this evening is "Guano, its application, supply, and adulteration, with details and statistics collected from original sources;" and I propose literally to adhere to the subject, and discuss it in the order laid down. Genuine Peruvian guano (and I do not consider that guano from any other part of the world is worth more than a passing notice) contains one most important element—the ammonia—which stimulates the early growth of the plant, and another element, the phosphate of lime, which is absolutely necessary for the formation of the seeds, as without that ingredient in the soil it is impossible for the plant to arrive at full maturity. Our farming interest readily acknowledge the value of genuine Peruvian guano, not only on their wheat and turnips and clover, but are also ready to believe in its efficacy in many other cases; and can now, after witnessing its effects in this humid, sunless land, readily comprehend that on the arid sands of Peru, by the aid of irrigation and a tropical sun, guano can raise from the soil three successive crops, being potatoes, French beans, and Indian corn, in twelve months, from the same patch of ground; and our farmers can now easily believe that the rice growers of Italy are looking for it, and that the vine dressers of Germany, France, and Spain are anticipating that it will restore fertility to their worn-out vineyards. We shall not have done our duty as respects this important manure until we have tried, by a series of experiments, its effects upon irrigated meadows; its effects upon different crops in connection with other artificial manures—for it appears, under some circumstances, to act upon latent manures, causing them to put forth wonderful powers of reproduction—also its effects in combination with carbon, either as soot or charcoal; also its effects on marsh lands, on the Downs, and on the old pastures, with the proviso that its application must be followed by rain in abundance, for without water in some shape the application of guano is pure waste not only of money, but of time and labour, besides disheartening the farmer, and discouraging him from further experiments. In the eyes of foreigners we are extremely wasteful of our manures; they judge of us by comparison with themselves. Our farmers would be surprised at the avidity with which the little imps of children on the Italian roads seize and carry off the droppings of the horses on the public roads. To such an extent is the system carried, that apparently each section of the road has its own proprietor. No one who has travelled through Switzerland can for one instant forget the care which the Swiss peasant takes of his manure heap, generally placing it directly in front of the principal windows of his dwelling, the pumping of the liquid manure on to it forming one of his chief occupations. Count de Cavour, the Minister of Finance in Sardinia, assured me, during a personal visit to his estates, that he used always 4 cwt. to the acre on his irrigated meadows, and also that he wasted many a cwt. before he discovered that without the power of applying water his guano, comparatively speaking, was a useless commodity. Tobacco itself might be grown in this country by the aid of guano; but first it will be requisite to get the law altered, which prevents the production of that plant by the British farmer, lest it interfere with the Customs' duties. Of all the legislative follies, surely the worst is that which denies the use of the earth to the labour of man. Perhaps its application has not in any country been marked with such great beneficial results as in the coffee districts in Brazil, where it has invariably restored the fertilizing powers to many a coffee-tree which had been deemed barren, worthless, and exhausted. As soon as the Brazilians obtain their railroads from Rio de Janeiro to the interior a demand will spring up for an enormous quantity. It is only restricted now by the fact that it costs five guineas to carry a ton a distance of only 50 miles interior, because it has to be conveyed on the backs of mules; the nature of the sandy roads, although the ground is level, forbidding the use of wheel carriages. I have seen coffee trees in Brazil barren for years together; they will be so no longer. From my own observation, I can corroborate that there are in Virginia and the two Carolinas large farms in the Alleghanies, which are now deserted, and known by the name of "Old fields." To these healthy districts I would rather turn the steps of the emigrant farmer than to the Far West; because it is now discovered that these fields need only the application of guano to restore them to their pristine fertility, as before a ruinous system of cropping them in tobacco, and tobacco only, drained them of their nutritive powers. The emigrant would find

the land cleared to his hand, at no great distance from the railroads, in a healthy spot, plenty of wholesome water, and a settled community; none of which will be find in Iowa or Illinois. Considering that there are in this country as many as 50,000,000 of acres under crop or pasture, and that the farmers would be too happy to give to every acre some guano, then 150,000 appear indeed but a small amount, as it is only a hatful to the acre; and yet the guano trade of Peru to these islands employ more tons than any other single article, excepting coal, timber, sugar, and cotton, while it beats wheat or flour, metals, or coffee. Unfortunately for this calculation, I am obliged to take the statistics of only eleven months of this year: the returns of the exports and imports of the entire year will not be published until next week. Most of the scientific works teem with old analyses of all sorts of guano, whether it is the effete guanos of Ichabee, Patagonia, or others from similar wet localities, now known not to be worth even the freight of £3 10s. per ton, or the genuine Peruvian guano; and it is much to be wished that future writers on this subject would discriminate the difference by omitting to repeat what is no longer of any value. It is also to be regretted that no one will inform us at what distance from the farm the ordinary farm-yard manure is not worth fetching, even as a gift. I come now to the question of the supply. The superiority of the Peruvian guano over all others is now fully established, and it is not likely that any other locality will be discovered producing a guano of so high a value, because, first, it must be where there are large shoals of fish, to form food for the birds; secondly, it must be far from the usual haunts of men, or else the birds would be frightened; thirdly, it must be on a coast where the rains are unknown, otherwise the ammonia will be washed out, and only the phosphate of lime will be left; fourthly, it must be on an island, or else it will be mixed with sand and earth; and fifthly, it must be easily accessible to shipping. If the locality does not possess all these points, it cannot compete with the guano of Peru, which possesses them in a very eminent degree. Senor Francisco de Rivero, the representative of the Peruvian Government at the Court of St. James's, has a thorough knowledge of the guano islands, and of the other deposits on the sea coast. In a report made by him to his government he estimated the quantity on the three islands alone at 18,250,000 tons; and though such an amount appears enormous, still we are not the only nation who buy it: contracts have just been entered into for the United States and for France, and others are under consideration. On the other hand, we must not forget that the birds are but little disturbed, and are therefore still engaged in elaborating small fish in valuable manure for the agriculturists of all nations. The guano islands are entirely devoid of the smallest appearance of vegetation; not a tree, not a blade of grass, not a lichen enlivens the spot. The earth, if there is any on the rocks, is buried at least thirty feet in guano. And yet these islands enjoy their own peculiar blessings under the hand of the Almighty, for a short residence on them speedily relieves sufferers from the gout, gravel, urinary complaints, and particularly those horrible diseases the scurvy, leprosy, and king's-evil. Many wonderful cures are on record, occasioned by a residence there, doubtless owing to the atmosphere being at all times saturated with ammoniacal particles. Perhaps the medical world will look to this, and determine the cause of this effect. In the supplement to the Rev. Mr. Rham's "Dictionary of the Farm," is the best description I have met with of the Guano Islands, and of the general history of the manure. Not only is it correct as to its local facts, as far as my knowledge of the subject will permit me to judge; but it is also written in very readable language, which is a great comfort when studying such a dry and, to the general reader, uninteresting subject. Regarding the future supply, I am happy to inform you that there does not exist the smallest shadow of doubt in the minds of those best informed on the subject, that the quantity of guano is almost inexhaustible, and that, at the present rate of consumption, there is ample for the next three generations. So anxious was the Peruvian Government on this particular, that it was not until a very elaborate survey had been made of the Guano Islands, that the government decided on allowing any enlarged export of this manure, because in that country it is regarded as a direct boon from heaven, as without it the sterile plains of sand which constitute the principal part of the sea coast could not be cultivated; but under its influence, combined with irrigation and a tropical sun, three distinct and separate crops are taken from the same fields. The Indian Incas preserved the guano with religious care; the Spanish conquerors more zealously followed in their footsteps; and their descendants of the present day, in their turn, act up to the same strict rules, and neither permit the birds to be disturbed, nor the guano to be removed, even by the Peruvians, without a special licence. At one period it was death to disturb the birds during the breeding season—a very good proof that the natives knew the full value of the birds. The demand for guano on the continent of Europe, and in the United States, estimated at 44,000 tons, was, in the year 1851, larger than had been imported into this country only five years ago. This is a very significant fact. Let us look at the steady growth in the import of the genuine Peruvian guano, commencing with the year

	Tons.		Tons.
1845	14,101	1849	73,567
1846	25,102	1850	93,080
1847	59,430	1851	150,000
1848	64,191		

And I am happy to add that, thanks to the increasing number of steamers now employed between California and Valparaiso, and consequently to the demand for coal as fuel, the amount of tonnage seeking a return freight from the west coast of America is largely increasing. A regular business is springing up, limited to carrying out coals and bringing back guano. It is one in which the shipowner can perhaps with more safety calculate the ultimate result than on any other description of freight. The surest method of obtaining the guano unadulterated is for the farmers in each locality to club together, and buy at once thirty tons of it direct from Messrs. An-

thony Gibbs and Sons, and thus obtain it at £9 5s., and get the allowance of the discount of 2½ per cent., thus reducing the price in reality to £9 0s. 5d. And be it observed that any one who has purchased thirty tons at once is regarded as a wholesale dealer, and fully entitled to obtain a smaller quantity at the minimum rate of £9 0s. 5d., provided that the application for it is made in the course of a few weeks afterwards. The nature of guano is now much better understood than it was a few years ago. Attention in the smallest degree to the properties of guano would do much to put a stop to the nefarious practices being carried on in the adulteration of guano. One of the simplest is that of Mr. Nesbit, and I beg to repeat it, although it is not two months ago since he himself placed it before you:

METHODS OF DETECTING ADULTERATIONS IN GUANO.

Procure from any druggist a common wide-mouthed bottle, with a *solid* glass stopper; one known by druggists as a wide-mouthed 6-oz. bottle will do very well. Let this bottle be filled with ordinary water, the stopper inserted, and the exterior well dried. The scales to be used ought to turn well with a couple of grains. In one pan of the scales place the bottle, and exactly counterpoise it in the other by shot, sand, or gravel. Remove the bottle from the scale, pour out two-thirds of the water, and put in four ounces avoirdupois of the guano to be tested. Agitate the bottle, adding now and then a little more water; let it rest a couple of minutes, and fill with water, so that all the froth escapes from the bottle; insert the stopper carefully; wipe dry, and place the bottle in the same scale from which it was taken. Add now to the counterpoised scale 1½ ounce avoirdupois and a fourpenny piece; and if the bottle prove the heavier, the guano is, in all probability, adulterated. Add in, addition, a threepenny piece to the counterpoise; and if the bottle and guano prove the heavier, the guano is certainly adulterated. By this simple experiment a very small admixture of sand, marl, &c., is distinctly shown.

Another test is by fire; and it is the one I have always used myself. Burn in an open ladle, at any common fire, half an ounce of guano, at a red heat, for ten minutes, carefully stirring it during the time. After it is cold weigh the ashes, and if their weight much exceeds one-third of the original weight of the guano, then there has been roguery. In the absence of weights I employ as substitutes three light shillings of former reigns to weigh the guano with, and a heavy one of this reign for the ashes. This test has not yet deceived me, and yet I cannot tell by the eye guano which has been adulterated with half its weight of prepared clay or sand, from the genuine unadulterated article. All this proves the necessity for the aid of the practical chemist; and really it does appear to me to be perfect folly to invest a large sum of money in guano, in order to insure success to all the different labours of the farm, and then grudge the guinea to the chemist for certifying that the guano supplied is unadulterated. One thing, however, is certain—that if the seller parts with his guano for less than £9 per ton, he sells it at less than he gave; or, what is much more likely, it has been played tricks with, and probably is not worth half the money: and in some cases it has been found not to be guano at all, and worth nothing. So much for saving a guinea. (Hear, hear.)

It may be mentioned, as having a curious bearing on the question of price, that genuine Peruvian guano is cheaper in the interior of England than it is one hundred miles from the sea coast in Peru, being a remarkable illustration of the effect of civilization over a new country. Ships and railroads can convey guano 5,000 miles at a less expense than it can be carried 60 miles by boat and 100 miles on the backs of mules over rough and broken lands. In conclusion, I trust that I have shown you, first, that the application of guano is capable of a much wider range than is generally supposed, and in much larger quantities; secondly, that the supply of the genuine Peruvian guano is ample for a much longer time than this generation; thirdly, that the adulteration may easily be detected by the farmers themselves, if they will only take the trouble.

Mr. AITCHISON said that having been requested to speak on the present subject, he would first of all thank Mr. Hazlewood for the varied and interesting details he had given the club, and also congratulate his brother agriculturists at large on the prospect of their having an endless supply of a very important, if not the most imporant of artificial manures. As Mr. Hazlewood had not gone into the question of the practical application of guano in this country, he (Mr. Aitchison) would endeavour to explain as briefly as possible some experiments which he had made with great care and attention, as regarded its application to wheat and grass crops, leaving to those who might follow him to explain its effect on other cereals and roots. In the autumn of 1840, he had three casks of Peruvian guano sent him, containing three cwt. each, to be tried on the estate of a London merchant, and was informed that one-and-a-half cwt. per acre would be found sufficient for any crop. Seeing the small quantity to be distributed over an acre, he immediately determined to apply double that quantity; and having at the same time a nine-acre field of clean fallow, he made the following experiment:—On the first three acres he put 120 loads of well mixed dung and mould (twice turned), or 40 loads per acre. Next three acres, three cwt. of guano, sown broadcast, and well harrowed in with drag harrows. Remaining three acres, 120 bushels of hot lime per acre, also well harrowed in as soon as spread. The whole was drilled on the same day and finished alike. The limed portion came up two or three days before the guano, and the guano the same number of days before the dung and mould. Through the winter there was no observable difference; but having a mild March, the guano took the lead, and kept it on to harvest, being ripe fully one week before the two other portions of the fields, whilst the straw from guano was three inches taller than either of the others. The produce was—

	Qrs.	Bush.			
From dung and mould..	4	7	per acre—	weight	61½lbs.
From guano	4	6	,,	,,	61½lbs.
From lime.....	4	2	,,	,,	62½lbs.

In April the field was sown with clover and early grass. The whole took well; and in the following summer, when mown, there was no observable difference in bulk. The following spring the field was ploughed and dibbled

in with beans, the whole hoed and treated alike, and the produce was—

	Qrs.	Bush.
From dung and mould.....	4	2
Guano	4	3
Lime	3	6

The cost per acre for manure :—	£	s.	d.
40 loads dung and mould, cartage, spreading, &c., per acre, at 1s. 9d.....	3	15	0
Guano, 3 cwt., at 9s., carriage, spreading, &c.	1	12	6
Lime 120 bushels, cartage, spreading, &c...	4	2	0

Thus showing in favour of guano a saving of £2 2s. 6d. per acre over the dung and mould, and £3 7s. 6d. per acre over the lime. (Hear, hear.) Thus a very great saving was effected in the cost of production, at the same time that the returns were nearly equal. In concluding this statement he ought to say that the fourth year the whole field was sown with Tartarian oats, and produced an average crop. (Hear, hear.) The second experiment he would call their attention to was the application of guano to grass land. A few years ago, about six acres of underwood was grubbed up, cleaned, and prepared for a crop of oats, and thrown into a gentleman's park. Permanent grass seeds, clovers, &c., were then sown, and for two years they took well; but the third year the coarser grasses overpowered everything, and the cattle refused to eat it. His advice was asked as to what could be done with it, and the following course was adopted :—It was first of all mowed very closely, and put on hay-stacks as toppings. Crosskill's clod crusher was then run over it both ways, and 4 cwt. per acre of Peruvian guano applied, and rolled down with a heavy roller. The result of it was that the finer grasses and clover returned; this bit of land became the best portion of the park, and when afterwards pastured, the cattle always exhibited a decided preference for it. As a further illustration of the benefits of guano to that grass land, he might state the following circumstances :—The lady of the house complained that from six cows she did not get butter and cream enough for the household (this was in the beginning of October), and that the dairymaid was only making 18 lb. of butter per week, although the cows were good. They were then turned into the further part of the park, and only the second day after an increase commenced, and each cow averaged 5lb. per day, or 35lb. per week, for three weeks afterwards. This he mentioned to show how greatly cowkeepers and dairymen might improve their after grass, and receive an immediate return. (Hear, hear.) He could say more as to the application of guano to other crops, but would leave those points to gentlemen who were more qualified than himself to do so.

Mr. Nesbit observed, that having very recently had the honour of lecturing before the club in reference to the adulteration of guano, he had very little to say that evening; he would, however, make a few general observations. As the use of guano for various crops had been spoken of, he would first point out those crops to which he considered it most applicable. There was considerable difference in the different varieties of manure as regarded their applicability to land. Manures might be divided generally into ammoniacal and mineral; and when there was a certain amount of mineral ingredients in the soil, the amount of ammonia applied was almost an exact measure of the growth of the plant. The experiments of a well-known professor had clearly proved that such was the case upon grass land. This gentleman applied ammoniacal manures conjointly with a great variety of mineral manures, and he found by the result that the increased growth of grass was entirely dependent on the amount of ammonia applied, quite irrespective of the mineral ingredients which accompanied it. With respect to grass lands generally, there could be but one opinion as to the value of ammoniacal manures, amongst which guano stood pre-eminent. One of the greatest sources of benefit in irrigation was the absorption by the land, in winter, of the slight portions of ammonia in the water. In spring and summer the use of ammoniacal manure was attended with great benefit on pasture lands, even without irrigation. A friend of his had during the past year applied two cwt. per acre to some grass land in the vale near Blandford, and had in consequence been enabled to keep more stock there than at any previous period. The application of guano to the wheat crop required a considerable amount of care, without which the crop would be thrown down through excessive luxuriance, and a loss of course sustained. He would recommend that the luxuriance of the straw should be arrested or checked by the use of salt. As regarded turnips, there could be no doubt that upon heavy lands guano was the best artificial manure that could be applied. As to the lighter qualities of land, he always recommended that guano should be applied broadcast rather than drilled. The drilling system had, he thought, in many cases been carried too far. In connection with these remarks upon the application of artificial manures, let it be understood that the farm-yard manure should be applied on the land to the greatest possible extent (Hear, hear), and that it was only in default of that that artificial manures should be resorted to; except, indeed, in the case of hilly lands, where the expenses of cartage prevented the use of farm-yard dung (Hear, hear). Another crop for which guano might be used with advantage was mangold-wurtzel; it might be applied more safely perhaps in that case than in any other. He had seen enormous crops of mangold-wurtzel grown without using any other manure than guano. In the case of rape, ammoniacal manures in general, conjoined with phosphates, were the best that could be used. There was one crop—the flax crop—which he could not refrain from mentioning in connection with guano. It had been stated by many persons that the flax crop was a very exhausting crop, taking too much from the land; and on this ground many landlords had strictly prohibited its cultivation on their estates. In truth, it was no such thing. The simple fact was, that the flax crop took the nitrogenous matter from the land; but if that element were again supplied, no injury would be sustained. In the case of what was termed the four-course shift, he would much prefer manuring with guano to manuring with oilcake. Many persons considered it indispensable to the land to

have a spring fallow; but he thought that with proper attention the couch grass could be kept sufficiently under to allow, for example, of the growth of a flax crop. If the flax were grown from 2 feet 6 inches to 3 feet apart, a very good crop might be produced. For leguminous plants, probably guano was not very beneficial, because by means of their leaves such plants had the power of obtaining ammonia from the air. As regarded the adulterations of guano, having so recently exposed them in that room, he would not then enter into the subject further than to observe that he thought a chemist would have no great difficulty in devising a method of eluding the fiery test mentioned by Mr. Haslewood.

Mr. SHAW said the subject for discussion that evening, as expressed on the card, was so large as to admit of a wide field of discussion. Their friend, Mr. Aitchison, had congratulated them on the very large supply of guano; and they had been informed that, if not inexhaustible, it would last for at least three generations. He must say, however, that it appeared to him that British agriculturists were very nearly in the position of that individual of whom they had all read in early life, yclept Tantalus, who was compelled to endure eternal thirst, the water being brought near his mouth and not permitted to come within reach of it (laughter). They were thirsting for guano at less than £9 5s. per ton; and when he heard that the quantity was inexhaustible, and that there were birds enough to produce it *ad infinitum*, he could not help feeling that those who had the control of it ought to let them have it at a little less cost (Hear, hear). Finding that they were promised that day information derived from original sources, he confessed he had indulged a hope that they were about to be informed of some spot whence they might obtain guano independently of Peru. While upon this subject he could not help saying that, though it might be out of their power to prevent a monopoly abroad, he hoped they would have too much spirit to submit to an attempted monopoly of another valuable manure at home. He said that in the presence of some gentlemen who know very well to what he alluded; and he could not but regret that the most effectual steps had not been taken to prevent the evil which he deprecated. He had no practical information to offer with regard to the application of guano; nor would it become him to dwell on that point in the presence of so many persons who were better acquainted with its use. No one now doubted the value of guano when judiciously applied: the only question was, how it should be applied and how it could be obtained both cheap and genuine. There was one part of Mr. Hazlewood's introduction on which he desired some explanation, knowing how prone many persons were to receive false impressions. He had told them that in South America, by the application of guano, three crops were grown in the year. It was not improbable they might be told by some persons that as that was done there it ought to be done here, and therefore he would be glad to hear how and under what circumstances three crops were produced (Hear, hear).

Mr. ROBERT BAKER had used guano for a succession of years, and he had always found that for turnips and green crops the more it was manipulated and worked into the soil, the greater and better would be the result. The custom was generally to sow the guano and harrow it in at the time of sowing the turnip; but if dry weather followed the operation, a very large portion of the guano would be lost, by the escape of its ammoniacal qualities, and thus diminished benefit was derived of the crop. He had mentioned this at a former meeting of the club. Subsequently he had sown a field with Swede turnips, and the result of his experiments was, that in that portion of it where the guano had been incorporated with the soil before sowing the turnip-seed, the crop was as good again as where it had been applied simultaneously with the seed. It struck him, therefore, that it would be advisable to plough in the guano a week or two previously to sowing the turnips. He and others had ascertained that the application of guano to green crops was not always to be depended upon; and it had often occurred that much more harm than good had been done by its application to these crops. Never in any instance ought more than two cwt. to be applied to the acre, and perhaps one cwt. would be nearer the mark. The fact was that in the use of this manure, very much was dependent upon the weather and climate (Hear). And he had known guano often applied without producing any effect whatever. He had applied it in the autumn at the time of sowing the wheat, and he thought the best plan was to put it in with a shallow furrow, and then to drill the wheat on the surface. On light land his process was to take tares or rye, or some other early green crop, before turnips; but he must say that he had experienced great difficulty in getting a good crop of turnips after tares or rye. Turnips require that the soil be well manipulated and reduced to a state of perfect friability. Guano was exceedingly useful to green crops in wet seasons, but its use was always attended with hazard in dry. To grass crops, however, its application was highly beneficial, but even there a moist season was not less necessary.

Mr. H. PURSER, having been called upon by the Chairman, said he could throw very little light either on the nature or on the supply of guano. He was quite aware that the adulteration of it was carried on to a very great extent; but, though a very great part of the blame was, of course, to be laid on the shoulders of dealers, still he must say that there were as upright and as honest men to be found in the guano trade as in any other (Hear, hear). A great deal of the adulteration was attributable to farmers, who came up from the country and told him and others that they could buy guano at Reading, Guildford, and other places at a less price than he could buy it for of the importers (Hear). He was obliged to tell such persons that they could not, and then to leave them to go and be victimized by other parties. Messrs. Gibbs had taken every opportunity of explaining that guano could not be had under £9 5s. per ton. They (the dealers) felt no hesitation in putting in their pocket 4s. 6d., and had as little hesitation in saying that if any one supplied guano for less than £9 5s., it was not genuine. (Hear, hear.) He did not know how he could assist farmers in this matter. If the farmer were determined to have things at a lower price

than they could be sold for, he must expect to suffer; at all events, no blame could be thrown on those who offered to supply the article at a reasonable rate. (Hear, hear.)

Mr. SIDNEY said, the gentleman who opened the discussion had remarked that guano was only formed in regions where rain scarcely ever fell. Now, if they examined a good map of physical geography, they would find a considerable region where rain did not fall; and he would recommend the club to suggest to the government the offering a reward to persons who would search for guano in some new locality. The prize in view was so great that, without a reward, it would almost answer the purpose of enterprising parties to send out ships to prosecute the search. It was not often that farmers went to the government to ask for any favours; and this was one of those cases in which, if the matter were brought properly before the government, there was a great probability of success. At any rate, the attempt was worth making.

Mr. CHOWLER said he had tried experiments with guano in two separate seasons. He first tried it for a turnip crop, mixing it with burnt ashes. The experiment was made in alternate rows with nightsoil, one row of each. He could not perceive the slightest difference in the result. The next spring he made the same experiment for clover, and again there was a complete failure. That concluded his experiments with guano. With regard to the flax crop, he doubted whether it was worth anything to the farmer. He had seen a flax crop grown in his immediate neighbourhood by the landlord, for the express purpose of showing the tenantry whether it could be grown with benefit to the farmer, or not. He paid particular attention to the result. The crop was said to be a fair one. There were no flax mills in the immediate neighbourhood—the flax had to be sent to Leeds; and a short time ago he was informed that the expense of labour, carriage, and so on, would absorb the whole amount that could be realized. This showed that the flax crop was not worth consideration; in fact, he doubted whether it was not a real nuisance (laughter).

Mr. HOBBS quite agreed with Mr. Purser that farmers did not pay sufficient attention to the quality of guano. The returns showed that the entire supply to this country was not a fifth part of what was sold, so that a great proportion must be almost worthless. He had used guano to a considerable extent, and could not agree with Mr. Baker, that it was of no use for cereal crops (Hear). It was always hazardous when applied to either cereal or root crops, particularly in the dry climates of the eastern counties; but he must say that he had seen more benefit arise from it when applied to cereal crops, with an admixture of salt, than when it was applied to root crops. When applied in the spring of the year as a top-dressing to wheat or barley, it had only a tendency to increase the luxuriance of the straw, without giving any beneficial, but sometimes an injurious, effect to the crop; but when laid on in the autumn at the rate of 2 cwt. per acre, with 2 to 3 cwt. of fishery salt, the guano costing 20s., and the salt 3s. per acre, he had found it more beneficial than when 3 or 4 cwt. was used with farm-yard or any other manure. He believed that the use and value of guano were not yet fully understood by the British farmer. When too copiously applied to root crops it increased the bulk but not the quality; and therefore he felt persuaded that if a proper admixture were made of mineral with ammoniacal manures it would come into more general use. But unless it was thought desirable to reduce the price, and take more care to prevent adulteration, the farmer would be compelled to economize his own manure, and (as it was stated to have been the case during the last three or four months) there would not be such a demand for guano as in former years. He had heard from manure dealers that they could not understand why, during the end of the winter and the commencement of the spring, when farmers generally gave their orders for guano and other artificial manures, they had not done so this season. It was because they feared, generally speaking, that they would have an adulterated article, and also because they considered they had not been fairly met by the Peruvian Government upon the subject. He trusted, therefore, humble as he was, that such a remark coming from that Club would have some effect in calling attention to the subject; for he was thoroughly satisfied that if the price were reduced by 20s. to 40s. per ton, the demand would be much greater, if not double. He quite agreed with what Mr. Nesbit had said respecting the advantages of guano and salt combined for mangel wurzel, but did not at all agree with him that, by growing flax and turnips together there could be obtained a good crop of turnips, or from three to four quarters of flax per acre (Mr. Nesbit: "It has been done"). He had not been a great grower of flax, but he thought that 21 bushels, or three quarters, was a large growth for flax alone (Mr. Nesbit: "I said three"). It was something like the crops they were encouraged to grow by the Duke of Beaufort's agent—mangel wurzel and carrots. He hoped the result would be successful, but he did not place very great confidence in the experiment. He considered that the gentleman who had opened the subject had fully adhered to his promise in giving them original information upon it; and no doubt it would cause an increased anxiety on the part of those who used the guano to have it in a pure and unadulterated state.

Mr. NESBIT, in explanation, said that a great deal depended upon the different times at which the two crops were growing—the one growing for a long period in the spring, and the other for a long period in the autumn; so that they were together a very short time.

Mr. PAULET used guano a great many times a few years ago. He generally threw it broadcast over the top of the land, or drilled it in with the seed for turnips; but he could not find any good result from it. Last year, however, he had some land in stetches that were ridged up for turnips; and he had the guano strewed broadcast before the land was ploughed the last time, and the seed was drilled in upon the top. The land had been previously manured, but the guano was put in at the rate of about 2 cwt. per acre. Upon measuring the land and the turnips this year, he found that he had about two tons and a half where the guano was applied,

to about one ton where it was not. He tried it for mangel wurzel, and found something like the same result. He also tried it last year for wheat, and it gave an advantage of about a bushel per acre. But he never found guano pay for itself. Perhaps his site was not so well adapted for the use of it as some sites; but he could not find any beneficial result arising from it, as far as he had proved it.

Mr. BAKER said, in reference to a remark he had made, upon guano not being on the whole beneficial to cereal crops, that he believed it would be beneficial under peculiar circumstances—under others it would not; but that it was highly productive of turnips and mangold-wurtzel he was quite satisfied. He made a very extensive experiment last year, upon seventeen acres of mangold-wurtzel. Upon one portion he put twenty tons of good farm-yard manure, and upon a large portion ten tons of farm-yard manure and two tons of guano. On two acres in particular he doubled the quantity of manure, and put twenty loads on one acre, and four hundred-weight of guano on the other; and this grew very much faster than the other part, and was very much better, though there were evidences in the next crop of the twenty loads of manure being more beneficial. But, so far as the mangold-wurtzel was concerned, the portion of land to which the four hundred-weight of guano was applied produced as much as that which had the twenty tons of manure; and he had no hesitation in saying that he could obtain the same result again upon a full description of land.

Mr. HAZLEWOOD: At what do you value the twenty tons of manure?

Mr. BAKER: We could not cart it over the land at less than £8.

Mr. HAZLEWOOD replied. He came to learn, as well as to teach; and he was certainly not in any way disappointed, as he had learned several things, or they had at least been brought before him in a new light. Mr. Aitchison had said, that on very bad grass land guano restored the clover and better grasses, and got rid of the worst ones. If no other benefit were to be derived from guano in this country, that alone would be a very great blessing. The Americans complained bitterly that with all their appliances they could not get their grass to grow as it did in England, on account of the superiority of our climate, which they maintained to be one of the main sources of our riches. Mr. Nesbit had stated that the autumn was the best time for the application of guano; whether or not it was from the fact that the guano lying on the ground ameliorated there, he (Mr. Hazlewood) was confident that the autumn was the best time for its application; and if he were, as a farmer, to apply guano in any large quantity, he would do so then. In reference to a remark of Mr. Shaw, he would say that the order of the Peruvian Government was to sell the guano at £9 5s. per ton; and so far there was an end of the matter. Mr. Shaw also remarked, that he could not get three crops with it out of the same spot in one year. He (Mr. Hazlewood) never said that he could: he merely observed that it was done in Peru; but in Peru there was an unlimited amount of guano, an abundance of irrigation, and the advantages of a tropical sun—and these three points, particularly the last, made all the difference. Mr. Baker had been kind enough to point out the benefit to be derived from guano incorporated with soil. Among the experiments which were yet to be tried was that of the mixture of guano with pure virgin earth. In nine cases out of ten, where he (Mr. Hazlewood) had stumbled upon anything remarkable, he had found that virgin earth had something to do with it; but farmers should not buy the mixture—they should make it themselves. Mr. Purcell had found advantage from the use of Ichaboe guano; still, that was a long way off from the really valuable article—it was something like a glass of brandy-and-water without the brandy, and it was very much to be questioned whether farmers would look at it now, even if it could be bought. Mr. Chowler had said that he mixed the guano with ashes: were they wood ashes or coal ashes?

Mr. CHOWLER: They were ashes of sods, head-sides—principally vegetable matter.

Mr. HAZLEWOOD: Did any rain follow your application of the guano?

Mr. CHOWLER: Quite sufficient for a crop of turnips; but mine is gravelly land.

Mr. HAZLEWOOD: You see, if you are right, you cut the ground from under us. Here is a single case in which the thing has not been successful. What steps did you take to ascertain whether the stuff you bought was guano or not?

Mr. CHOWLER: Mr. Denison, a member of parliament, living in my immediate neighbourhood, was anxious, four or five years ago, to have guano introduced, not only to his own farms, but to those of others. He requested me to try the experiment, and said that he had a whole cargo of it. I fetched some from the vessel, and tried it. I can give you no other information.

Mr. HAZLEWOOD continued. Guano might be tested by burning it in a common fourpenny ladle, at a read heat, for ten minutes; and if anything remained which was not of a perfect whiteness, or if any variety of colour were observed, it might be depended upon that there was tampering somewhere. Mr. Hobbs had said that he approved of mixed manures, and he (Mr. Hazlewood) trusted that a variety of experiments would be made with guano and mixed manures. Mr. Hobbs had also told them that if the Peruvian Government lowered the price of guano 20s. or 40s. per ton, they would sell double the quantity. They would be obliged to do so to obtain the present revenue. But would every one present undertake to purchase double the quantity they had hitherto done, providing the price were thus reduced? (Hear). Let persons say what they would about guano, it certainly furthered the harvest three or four days, and if the produce of this country was worth three hundred millions, one fine day was worth a million.

Mr. BAKER: It rather retards the ripening of the crop several days, although it quickened the vegetation of the straw.

Mr. HAZLEWOOD had found it to be exactly the contrary. It produced a heavier crop, and much facili-

tated its ripening. Mr. Paulet had said that he did not get his pound back for his pound; but he remarked that his land was possibly of that character which did not require it. It could not be supposed that a certain set of rules could be laid down which would be sure to succeed; but he (Mr. Hazlewood) was watching in every corner where he found the experiment unsuccessful.

The CHAIRMAN: Perhaps you will allow me the privilege generally accorded to the Chairman, of saying a few words at the close of the discussion. I have much pleasure in saying that I have not been at all deceived in my expectations; that I have not only been much gratified, but much instructed by coming here. The discussion has been opened in a clear, clever, temperate speech from my friend, Mr. Hazlewood; and the remarks which it has elicited from various parts of the room must have been instructive to us all. I have used guano three times to a considerable extent; and my case has been precisely the same as Mr. Paulet's. It has been utterly useless to me; but I can thoroughly understand the reason why; and I am not, therefore, disposed to disparage the very great value which guano is supposed to possess. I did not use it in three consecutive years; but the three years in which I did use it happened to be years of peculiar drought. It was applied on burning sand-hills: and the reason why I used guano was because it was more concentrated and easier carried than other manure; but, unfortunately, after each application, drought set in; and I could not, in those fields of turnips—each experiment was upon 14 or 15 acres—perceive the slightest improvement in the crop. Possibly, had it been applied in the form of liquid manure, the result might have been very different; for I find, from examination into those crops of turnips which are grown in various parts of England, that guano is beneficial in exact proportion to the wetness of the climate, and that in Cumberland, where turnips are seldom grown without it, and in some parts of Scotland, the effect is most extraordinary. I, therefore, come to the conclusion that, on sandy and dry land, it is rather too doubtful and expensive a manure to be much relied upon for the growth of turnips, but that in moister climates it is invaluable. I believe, however, that in the eastern parts of England we shall find in superphosphates a more valuable manure. I do not know that the remarks which have been made this evening will elicit any more from me, unless it be one which fell from Mr. Baker, and which finds a thorough context in my own experience—that, after crops of rye and tares, your turnip crops will always be inferior. I have never found it the contrary, because I know how well the land requires to be manipulated in order to ensure a heavy crop of turnips. Although I was a large grower of swedes when in Hertfordshire, I never lost an acre by the fly; and the reason of this was that I took peculiar care to have the land manipulated, which could not have been done if it had previously grown crops of rye and tares.

Mr. SHAW then submitted the following resolution for the consideration of the meeting:

"That the value of guano as a manure is well understood and appreciated; but, taking into consideration the immense extent of the supply, the reduced price of produce of every description, and the cost of freight, which enters largely into the price of the article, this club is of opinion that the price of guano is more than is necessary to afford a reasonable profit to the vendors and consumers, and might, advantageously to the interests of the Peruvian government, be reduced, inasmuch as it would lead to a much larger consumption."

A discussion ensued, in which Mr. Hazlewood proposed an alteration, whereupon,

Mr. SHAW said he was warranted in asserting that guano could be sold at a much lower price, and yet yield a sufficient profit. He was aware how disinclined the Peruvian government had been to attend to the question of reducing the price when they had been applied to; but he did not want it to depend on individual application; he wished the club, as representing the British farmers, to express what they thought upon the subject; and no doubt it would be found that the Peruvian government would not lose money by reducing the price, but, as in other cases of monopoly, a reduced price would lead to an increased consumption, and consequently to a larger profit.

The resolution as proposed was adopted unanimously.

Votes of thanks to Mr. Hazlewood and the Chairman were then passed, and the discussion ended.

STAINDROP FARMERS' CLUB.

Meeting held in the club-room, Staindrop; the president, T. F. Scarth, Esq., in the chair; subject for discussion, "The Advantages of Hinds as Farm Labourers," treated by Mr. W. Watkin as follows:—

Mr. President and Gentlemen,—The subject for our consideration this evening is not one of those which at first sight may arrest the attention, or appear of paramount importance compared with other subjects which have from time to time been so ably brought before this meeting; but I do say that although we have had some very important discussions—there are none which should command so much of our attention as the question—How may the labour of the country be beneficially employed? For labour is the machinery by which the capital or the wealth of this country is increased, especially by that which is of a productive character. How important is it, then, that we should take a clear and distinct view of the division of labour with which we are immediately connected, even in its minutest details—for the produce of labour should not only pay its own wages and the *profits* of the stock which employs it, but the rent of the

land upon which it is engaged. Under such circumstances, it is obvious that whatever contributes profitable employment of labour, likewise tends to improve the condition of the other two classes connected with agriculture, thus uniting them in one common interest, which to neglect is alike detrimental to all. But I am sorry to say there are two great obstacles to its profitable employment. First, there is not that permanent security for the outlay of capital in the soil that there ought to be, in order to enable the farmer to employ his capital in labour with advantage; and secondly, prices are so low, and profits so diminished, that labour now cannot always be employed to advantage. Having pointed out the value of labour, I will come to the more immediate subject for discussion, viz:—"The Advantages of Hinds as Farm Labourers," The provincial word *kind* signifies a married man, who engages himself and his wife to do agricultural work for the term of one year, and so on from year to year, at *fixed money wages*, with the exception of a house (rent free), which gives his employer the privilege of removing the family from the house and farm (after due notice) without any law proceedings, such as an ejectment, &c. Sometimes they have a quantity of potatoes and wheat at a fixed price per bushel; the wages are generally paid fortnightly or every month. Having explained the term of hind as applied to married men engaged for the year, I shall endeavour to prove to you not only the necessity of having such servants, but also the advantage to be derived from having them in lieu of others who must of necessity fill their places. But I will first bring before your notice the wages and expenses of keeping a servant in the house. It has been a very common practice with many farmers to engage young boys into their houses, who must consequently be inexperienced in all kinds of work, and who can scarcely be entrusted with the care of horses and cattle on the farm, and certainly ought not to be sent from home with horses and carts. Such boys as I have alluded to, may be hired for from £8 to £10 per annum—their food, board, and washing costing as much as that of a man; amounting altogether, with wages, to nearly £30. Men from 18 to 21 years of age may be hired for from £13 to £15 per annum. Such of course are able to do some kind of work very well, such, for instance, as attending their horses and cattle, ploughing, and a few are able to stack; but scarcely one can use a spade or cut a hedge. Such men will cost from £32 to £35 per annum—some people may feed them for a few pounds less. I shall, in the last place, I think, have little difficulty in proving to you not only the advantage of hinds as labourers in preference to house servants, but the absolute necessity of having such servants upon every farm, in order to conduct the business of such farm in a proper, husbandman-like, and advantageous manner. (I am sorry at present I cannot add "profitable" as well.) I think that every person occupying 300 acres, with a fair proportion of tillage, say one-third grass and two-thirds tillage, should have three hinds, and for every extra 100 acres not less than one man in addition; consequently a man farming 500 acres would have five hinds; and probably some of those men may have sons capable of going with a pair of horses—if not, you will require two men in the house, being as many, nay, I may say more, than any farm house is constructed to hold (if I might venture to scrutinize the manner in which servants of both sexes are provided with sleeping apartments). When the aforesaid number of men have not cottages upon each farm, the occupier is obliged to have recourse to *datal* men, who may, and often do, leave him at the busiest season of the year; this shews the uncertainty of such labourers, and they generally have as much per week as hinds, besides the privilege of earning more at piece work in hay and harvest time. The wages, in money, of hinds, in this district ranging from nine to eleven shillings per week, house, garden, coals led, and a few potatoes, is, as you will perceive, less than house-servants cost, and also less than datal men; but what is of still greater importance, they are for the most part able and more skilful to perform the work they have to do, and you have their services two hours each night and morning when you cannot have datal men—consequently stock are properly attended to, and work conducted on a systematic principle; and likewise you have their wives and families to go out at a few minutes' notice, instead of sending a distance of probably two or three miles. In Northumberland, the hinds are chiefly paid in grain, with the exception of about £1 per annum in money—the son (if they have one) is paid very frequently half money and half grain. A very common wage is about £15 in money and the remainder in corn. The value of the wages being regulated by the price of grain, may make those of young men range from £24 to £26 per annum. Living, as they do, with their parents, they have the advantage of parental advice and instruction; and when the family is large, the young men's wages united with their father's is a great advantage to the support of the family, which might not be so properly applied when young men are left to their own resources. There is also the opportunity for young men, when boys, to be always employed on the farm at such work as they are capable of performing; and observing the work done by the men makes them generally expert at their business on arriving at manhood—a decided advantage over boys brought up in a village, and having all to learn when they

should be able to make themselves useful. Whatever may be the opinions on this subject, it is certain there are instances to prove, from the long periods many hinds have served under one master, that the result is of the most satisfactory character. I believe there are different members of this Club who have hinds living with them now who came to them when they first commenced farming, or even held the same situation under relatives before them. Gentlemen, it certainly must be a pleasant thing to see those who are brought into daily and hourly contact maintaining that good understanding for so many years which ought ever to exist between the employer and employed. But let us not forget that this good understanding could never have been brought into operation if the inheritors of the soil had not taken a deep interest in their mutual welfare, by building cottages on the different farms belonging to them, and we have a noble proof of this in his Grace the Duke of Northumberland having ordered 1000 cottages to be built on his estates in Northumberland. Although much remains to be done in the way of building cottages, yet we may rest assured that as their value becomes better known, they will increase in proportion to the interest that landlords feel in the welfare of both tennant and labourer, and as they are impressed with the fact that now, more than ever, wealth must go hand in hand with industry, to keep pace with the requirements of agriculture.

The Rev. L. Sedgwick begged to express his thanks to Mr. Watkin for the manner in which he had adverted in his able paper to the moral and social bearings of the question. From his own observation of the defective accommodation for farm-servants, he thought nothing could tend more to their demoralization.

The Rev. H. C. Lipscomb also tendered his thanks to Mr. Watkin.

Mr. Bell said the subject was of great importance, and as such Mr. Watkin had treated it. It must be a great advantage to the farmer to have labourers located on the farm as hinds; knowing, as I do, something of the working of both systems, I certainly prefer married labourers to having young men in the farm-house. There is much greater interest felt by the servant when home and family are on the farm, than can be expected from young men; the married men having no inducement to leave the place, can be relied on morning and evening for attending to his horses, cattle, &c. Where a part of the labourers come from the village, especially such men as work a pair of horses, there is such a disposition to get done at a set hour, that work is imperfectly done, or horses improperly driven. There is also so much going on in the village in the shape of amusements in the evening that the labourer is kept up till a late hour, unfitting him for the duties of the day, and, on coming in the morning, he has so much to rehearse, as to lose valuable time, and not unfrequently engenders a spirit of dissatisfaction in the minds of the young men residing on the farm with their situations. The relation between master and servant ought not to be a disjointed one; when the master attends to the comfort and happiness of his servant, the servant will be sure to look sharply after the interests of the master. There is always so much time lost in changing young men, which very frequently happens twice a year, that it is a great inconvenience and loss to the master, and very undesirable to have so many changed drivers for horses. The hinds were also much cheaper to the farmer, more especially as they were engaged in Northumberland—being paid chiefly in kind—and in every respect the hind is the most desirable kind of servant. The children of the hinds being also valuable at little work, and when grown to manhood could perform the kind of work required of them; whereas the young lads brought up in the village learned nothing useful, and, when hired as farm-servants, were just a pest to their employers.

Mr. Heaviside could add very little to Mr. Watkin's observations—all of which he most cordially approved.

Mr. Raw thought there could not be two opinions as to the advantage of having hinds—the only obstacle in the way was the deficiency of accommodation.

Mr. Graham agreed with Mr. Watkin in all his remarks, but thought a change ought to be made as to the time at which it was the custom for hinds to be hired—the first week in March. The disadvantage was that from that period to May-day the hind became indifferent to his work, at so important a period of the year. He thought if the interval could be limited to a month it would be better.

Mr. Bell and Mr. Seymour concurred in thinking that the interval was not too long for a married man to change his home, and the latter said that if a man neglected his work there were ways to make him do it. Mr. Bell remarked that such an objection would not be heard if hinds were the rule and not the exception.

Mr. Hawdon could not see how such an establishment as his could be carried on with young men; there would be disadvantage to the farm and no comfort in the house. The Duke of Northumberland had set a noble example. Good cottages were necessary, for you could not expect a good hind to go into a bad house. He thought paying part wages in grain &c., was advantageous to both

master and servant; it saves marketing expenses, and to the hind intermediate profits.

Mr. NELSON felt gratified to hear such a paper as Mr. Watkin's read before the society, especially at a time when increased labour was imperative.

The PRESIDENT, in conclusion, observed: Much has been said in the discussion of this evening about the obligation landlords are under to provide cottages for hinds on the farms of their estates, and that little has been done in that respect on the large estates in this county, and the brilliant example of the Duke of Northumberland is adduced, who, report states, has ordered 1,000 cottages to be built on his property in Northumberland. Where farms are large and require such accommodations for the labourers employed on them, I quite agree that the tenant should be assisted by the landlord in their erection, and I have no hesitation in saying, on the part of the Duke of Cleveland, that his Grace would authorize such an outlay, the tenant paying 5 per cent for the money expended; or he would furnish materials for the buildings, which is equal to two-thirds of the whole expense, the tenant defraying the expense of workmanship. On what terms the cottages to be built on the Duke of Northumberland's estates are undertaken I know not, but it appears to me very improbable that so large an expenditure would be incurred without some return to his Grace. On opening the subject for discussion this evening, Mr. Watkin stated the necessity of the tenant having perfect security for any investment made on his landlord's property. In that remark I fully agree. When a tenant is not satisfied with a tenancy at will, and has ability, with sufficient capital to manage his farm, a lease ought to be granted; and I speak the sentiments of the noblemen for whom I have the honour to act in saying, that a lease under such circumstances would not be refused him; but as proof of the security his Grace's tenantry feel in their tenancy at will, the security of which I think has been amply proved by the long continuance of the present tenantry on the estate, where leases have been offered they have been declined, and the old system of tenancy at will performed. Mr. Nelson has stated that the accommodation for farm laoburers in some parts of the south is so defective that they are obliged to ride on asses to the farms on which they are employed. I am much in the south, but such an occurrence has not come under my observation. In the midland counties many of the farmhouses are in villages, where the farmer has the facility of locating his hinds or labourers near him without the necessity of erecting cottages. The irregular conduct of single men as farm servants residing in their master's house has been much commented on; but that I think may, in some degree, be attributed to the want of proper precaution on the part of the farmer when hiring them. Why should not a farmer ascertain the character of the servant, as a gentleman does, before he admits him into his house? Why do not farmers require testimonials of good conduct of a servant from the last place he has left, instead of hiring him indiscriminately at a market hiring? If that rule could be established amongst farmers, and well acted up to, it would prevent many of the complaints now made.

CURE OF BRAXY IN SHEEP.

We have been favoured with the following valuable communication upon this disease, so fatal to young sheep, the result of long experience and careful observation, by Mr. James Aitcheson, overseer at the Home Farm, Kilmory, Argyleshire, the seat of Sir John P. Orde, Bart. Mr. Aitcheson is well known through a large district as a skilful farmer and improver of the breeds of cattle and sheep:—

It is well known to breeders of sheep that braxy is a very prevalent disease among hogs, from the month of October till the end of December: and in the first place I shall attempt to point out what seems to me the cause. It is also well known that it seizes on the fattest of the flock, the reason for which is, that when an animal is in high condition it is then easier hurt, particularly by any disease in the blood. Braxy always affects the hogs at that season when they are confined to pasture on old grass; and if it has been reserved through the summer and autumn so much the worse, as some of the grass has died by age, and other portions have been killed by frosty nights. This kind of food is very confining to the bowels of the sheep, and hard to digest; and when the derangement takes place in the stomach, blood cannot flow long healthily through their veins.

To prevent the disease I have adopted pasturing the sheep on young grass after the corn has been cleared off the fields, and when this was done I never had a single case of the malady. When it is necessary to take them off the young grass, not to over eat it or damage the plants, I put turnips into the most convenient field of old pasture, and drive them into it every night till they have all learned to eat the turnips. Then by giving them a few turnips

every day, they may be kept on pasture that otherwise would have killed the finest of the flock. Housing the hogs at night will not prevent the disease, as is supposed by some parties. I had about three score housed at night in a well-aired house, and pastured out during the day on such old pasture land as I have already described. They were housed before any disease commenced, and before there had been any frost; and after frosty nights came on, I never allowed them to get out till all the frost rime was off the grass. They continued to do very well for some time, till about Martinmas, when I used to find one or two dead or dying in the house every morning. There was good hay put into the rack every night; they very soon came on to eat a large quantity. After I had several cases I removed them to an open shed or yard, where I kept them in day and night, and fed on hay and turnips; but not having learnt to eat turnips while at grass, it was some days before they all began to use them, and during the first eight days I had three cases of braxy. From this I concluded that however rapid death came on after being seized with the disease, they might have eaten the food which caused it eight days before it took effect.

Some of my neighbours may with justice say, What can we do when our whole farm consists of sheep pasture, and we have neither young grass nor turnips? I would recommend parties so situated —as I had never seen a hog, that had met with anything to check its condition, ever take braxy, and as I have remarked already, as it is always the fattest that are seized—to take all their hogs into a fold or house, and handle them all over, bleeding all the fat ones. I find from several experiments that a fat sheep, from sixty-five to seventy-five pounds weight, has, at an average, six pounds of blood, and consequently would expect a hog, however good, to have less; and that taking two pounds of blood from them would check their condition, and would prevent the braxy during the season when they are liable to it. I prefer bleeding with phlemes instead of a lancet, and pursue the following method:—I lay down the sheep on its side, pull a small quantity of wool off the jugular vein, and draw a string tight round the neck so as to make the vein rise. I use the smallest phleme of a case of three; and recommend the performer to kneel at the back of the sheep's neck: if he has another person to steady the sheep so much the better.

I have cured many by bleeding after they had been seized; and never failed when I caught them in time, so that the blood would run. I have even bled them when the blood was as thick as the grounds of coffee, and had them recover. I would recommend all shepherds, having the charge of young sheep, never to go without their phlemes in their pockets; if they have to go home for them, or for some person to bleed the sheep, when they return there is every chance of their being a post too late, as it is well known to all who have the charge of sheep in a highland country, that they are but a very short time ill ere they are dead, and that all that are seized die, if the disease is not stopped. To effect this, I know no other remedy than bleeding.

I have seen recommended, in a well-written article on the subject, putting the sheep into a hot bath, and administering salts and many other things to it. But this can seldom be attended to, as they are generally far from any house, and before getting it home it would probably be dead. I never succeeded in curing any till I commenced to bleed; and would conclude these remarks by advising every farmer or stock-master to see that his shepherd is provided with a good set of phlemes.—Greenock Advertiser.

EAST BERWICKSHIRE FARMERS' CLUB.

The following subject was discussed at the meeting in December last.

CULTURE OF WINTER AND SPRING TARES.

The committee having fixed on this as the subject for discussion, had previously requested several members to send in written reports of their views on the following seven points:—1. The best time for sowing; 2. The quantity of seed used, and whether in mixture with rye or other grain, and in what proportions; 3. The preparation of the land, and the manure used for said crops; 4. The place occupied in the rotation—that is, what crops should they follow and precede; 5. By what kind of stock consumed; 6. What soils are best adapted for them; 7. Are the crops liable to failure, and from what cause? In reply the committee had received eight communications, which were then read as follows:—

Mr. MURRAY, Marygold, in his reply said: I have much pleasure in stating the result of our experience in the cultivation of tares; the winter variety we have only sown for one year. In answer to query 1st, regarding "the best time of sowing," I consider that ought to be as soon after the preceding crop is removed as can be accomplished, not only that the plants may acquire strength before severe weather sets in, but to have food early in summer and to make way for a crop to succeed.

The spring tares we sow in the months of March and April, in order to have a succession of green food; and to insure this as far as we can, we intend sowing a proportion of the winter variety next spring, expecting a weightier crop; and that will extend a supply of soiling over a greater portion of summer. 2.—"As to the quantity of seed, how mixed," &c. Last autumn we sowed 7 acres with 15 bushels of tares and 3 of wheat, which answered so well that we have sown this year about the same proportions, viz., 32 bushels of tares and 6 of wheat upon 15 acres; we sow from 2 to 3 bushels per acre of spring tares according to circumstances, and mixed with oats or beans. 3.—"The preparation of the land, and the manure used for said crops." We sowed on the stubble furrow after a crop of oats, the land previously having been four years in grass, with a top dressing of guano one of the years, so that we did not think manure necessary. 4th—"The place occupied in the rotation, that is, what crops should they follow and precede?" We have sown spring tares both after lea and oats; last year we sowed after oats, which system I prefer; we had the field in portions of potatoes, beans, spring tares, and winter tares; we reserved part of the winter tares for seed, cut a part twice, and the remaining part we sowed with rape, which is now consumed, and the field all manured and sown with wheat, which we intend following with a turnip crop to be succeeded with barley sown down with seeds. This rotation obviates in a great measure the objections of some that you cannot have a full crop of turnips after tares, and they thereby assume that they are not equal to that crop. In adopting this rotation, or in submitting this rotation to your perusal, I would keep in view not the plenitude of a redundant crop of swedes, with the concomitant expenses, but rather the deficiency which often occurs in the second and third year's grass, which on second rate soil is far from profitable, not producing nearly the quantity of food that the same land would do in green food. But not to digress from the subject, I shall turn to query fifth. 5th—"By what kind of stock consumed?" By horses, cattle, sheep, and swine. They were given to the horses in the stable, and to the cattle and sheep they were spread out on a grass field, as by that means we found there was not so much waste as when they were confined and given in racks. 6th—"What soils are best adapted for them?" They will succeed upon almost any soil, provided it is fresh or well manured. 7th—"Are the crops liable to failure, and from what cause?" Our winter tares last year were a good crop; and in Yorkshire, I believe, they are considered a safe crop even at a considerable altitude. The spring ones generally succeed; I have seen them much injured with the grub worm, and with a small white snail—they are more liable to this after lea.

The next communication was from Mr. Nicholson, of Lennelhill, which was read by the Secretary in that gentleman's absence. Mr. Nicholson said—I may state in the first place, that after four or five years' experience, I have not found this crop, the winter tare, to come forward for use more than 8 or 10 days sooner than the common tare sown in the beginning of March; a result in which I have been much disappointed, and which I attribute to the cold and exposed situation of this farm. Upon warm and low-lying lands, a better result may be looked for. The crop of winter tares should be sown as soon after harvest as possible; I believe the sooner the better; the quantity of seed not less than 2½ bushels. I have not mixed the tares with any other grain, but I have no doubt that rye would be very beneficial. This crop may follow a white crop of any kind, and if the land is clean and in high condition, may be followed by another. From farming in the fifth shift, I make turnips after the tares, to keep the rotation unbroken. If a piece of land in good condition is taken for this crop, I think manure is not necessary, but might rather be injurious by causing too great a growth of straw. Upon one occasion I top-dressed with soot, but without any marked benefit. All kinds of stock thrive well upon this food. The principal use I make of it, besides feeding horses in the stable, is to give it to fattening cattle in the pastures in August and September, when the bite of grass is insufficient, and also to sheep, which feed remarkably fast upon it, given in moderate quantities, not as their only support, but to assist short pastures. In many situations where there is a difficulty in putting down straw, tares consumed in the foldyards would be an excellent method to improve and increase the manure of the farm. I think crops of tares do not often fail; they may be lessened by great drought or rotted by continued rain. I will not trouble the committee with any observations about spring tares, a crop which has been cultivated amongst us time immemorial.

Mr. Cockburn, of Harelaw, said—I confess, gentlemen, that it is with reluctance I venture to comply with the wishes of the committee, and address you on the subject proposed for discussion, viz., "The Culture and Use of Winter and Spring Tares," both because it is a matter deserving of greater interest and investigation than I have been able to give it, and because my experience, especially in the cultivation of winter tares, has been limited to too small an extent, and confined to too short a period, to enable any one to place future reliance upon the practical results. I beg to add also, that in treating the subject I shall confine myself

strictly to the few practical experiments which it has been in my power to make, and am only sorry that you will not find them so satisfactory as I could wish. The points to be alluded to respecting the use and culture of winter and spring tares are all comprised in the seven questions proposed by the committee. I propose answering the first two of these together; but before doing so, I may here state that I have been regularly in the habit of sowing spring tares to the extent of about four imperial acres annually for seven years past; but it was not until two years ago that I was inclined to try the cultivation of the winter variety, and have done so only in the following proportions, viz., three acres in 1849; two acres last year; and I have increased the quantity this season to nearly three acres again. In the autumn of 1849 I sowed the winter tares on 23rd October; being quite aware that this was too late, I took the precaution of giving more seed than usual, *i. e.*, three bushels per acre, in order to foster a more rapid growth. In the season of 1850, I sowed the tares on 18th September, and they were above ground by the beginning of October; on this occasion applying only two bushels of seed per acre. This year the tares were sown on the 13th September, and at the rate again of two bushels per acre, mixing for the first time, however, with a little wheat in the ratio of a bushel of wheat to five bushels of tares. Respecting spring tares, I have confined myself to what is commonly called the Scotch variety, sowing at the rate of 2½ bushels per acre of good clean seed, mixed with a quarter bushel of oats. I now believe beans to be as good a substitute, affording a greater chance of carrying the tares up off the ground. The time, or rather times, for sowing found best are the last week of March, the middle of April, and second week of May, thereby enabling one to have the tares fresh at various periods. I now come to the third question viz., "The preparation of the land and the manure used for said crops;" and may state, that before sowing winter tares, I had the ground well fallowed and thoroughly cleaned, but no manure has been given till spring, when each of the two seasons I applied, to half the quantity sown, two cwt. of Peruvian guano—the other half, by being allowed to remain longer in the ground, nearly equalling the former at last. For spring tares, I have prepared and sown the land in the same manner as the oat crop, generally selecting for the purpose the weakest and most sandy soils, and applying with the seed two cwt. of guano per acre. The fourth question is "The place occupied in the rotation, that is, what crops they follow and precede." My winter tares were sown for the first two seasons after barley and oats; but wishing this year to get them sooner put into the ground, I sowed them after early cut spring tares. Being late, as previously mentioned, with sowing in the year 1849, I followed the tares next season by a crop of turnip seed; but last summer I got them all consumed in time to have a crop of white turnips sown with the usual manure on the 24th June, which turned out a good average yield, and were ready for using early enough to enable me to succeed them with wheat on the 14th November last. The spring tares have always been preceded by grass, and followed with turnips, in the same manner as the oat crop. In answer to the 5th question, "By what kind of stock consumed?" I may add, that the winter tares have been principally given to cattle summer feeding in stalls; spring tares being consumed during the summer and autumn months by cattle and horses; each variety being also found most profitable in its season for pigs. I am quite aware that to no stock are tares more beneficial than to sheep, but from the small quantity sown, I have never been able to spare any for this purpose—having delayed until I could hear of some experiment pointing out the best system of giving the food, and the profit attending it. 6th, "What soils are best adapted for tares?" I think that light soils are best suited for both varieties—winter tares requiring, in order to be followed by turnips during the same season, to be put upon the richest, best, and most sheltered situations which the general rotation of farming will afford. Respecting the seventh and last question, "Are the crops liable to failure, and from what cause?" I can only say, that spring tares have never proved a failure on my farm, and also that both of my crops of winter tares have succeeded admirably upon the best croft land—being equal, and I could almost add, superior, to any crop of spring tares that ever came under my observation. Whether a severe winter and an exposed situation may alter the matter, you will easily see I am unable, from too short an experience, to testify. The result of the present crop, sown upon worse land, and upon a more exposed situation, will in all probability answer this question.

The Secretary then read the following paper from Mr. Hamilton, of Riffington, who was not present. Mr. Hamilton said—I will endeavour to state, as concisely as the subject will permit, my experience and opinion upon the cultivation and uses of the winter and spring tare, adhering to the seven points stated by the committee. I may, however, premise that the tare is exempt from one of the greatest obstacles to the cultivation of many of our most useful varieties of plants and roots, namely *climate*. This is no bar to its growth. Although, of course, it does not come to perfection quite so rapidly in this northern locality as in a

more southern temperature, yet it is found in every county of Great Britain both in a wild and cultivated state, and is supposed by many to be a native of this country; being, however, found growing luxuriantly in Japan, China, and even Siberia. My own experience extends over three counties, on totally different soils, and different temperatures; first, on the Cotswold Hills of Gloucestershire; secondly, on the strong clays of Shropshire; and, lastly, in this district. The best time for sowing, if only one sowing of each is intended, for the winter tare October, for the spring tare March; but if for a forage crop, the sowing of each kind should take place with intervals, according to the weather, as near as possible, of three weeks, and make three sowings, commencing with the winter tares as soon as harvest is over, and with the spring tare as early as the ground will work, by which means you have a regular supply of nutritious food as you may require it; whereas if all sown at once, part of the field will be too ripe and heating for stock before it can be used, and as exhausting to the soil as a corn crop. When grown for *its seed*, 2½ bushels per acre are plenty to sow; but when grown for fodder, from 2½ to 3½ bushels are requisite—the first sowing not requiring so much as the later ones; a good deal must, however, depend upon the condition of the land and its freedom from dirt. A mixture of either rye or oats is necessary and very beneficial, preventing the tares lying on the ground and rotting, at the same time making it more easy to cut, and less liable to rush any animals when first put on them. In the south of England, they use either rye or the black oat for the winter tare, the latter being better able to stand frost than the common oat; 1 bushel of rye or oats to 3 bushels of tares is abundance. In this locality, as a general rule, the crop will occur on an oat stubble, which may be either too stiff for turnips or requiring a change from that crop. The best method, if you can spare it, is to give the stubble a good dressing of fresh dung, ploughing it in with a good furrow, then sowing the tares or else ribbing them; the latter is decidedly the best, especially for the winter variety, as it affords them a better protection from frost till they gain strength, at the same time that it allows you in the spring, if occasion permits, to hand-hoe them, which is a great assistant to their growth; I have myself given them a stroke with the seed harrows with good effect. When you cannot spare the dung, or have not time to lay it on, give them in the spring a top dressing. I have used guano, gypsum, nitrate of soda, and soot. Soot, in my opinion, when it can be obtained reasonably, is decidedly the best; guano next. The important points to be observed in preparing land for tares, either winter or spring, is to have the ground deep ploughed, a good tilth and clean; and tares always grow well were lime is present in the soil. It is difficult to state any particular place to be occupied by the tare in the rotation of crops, as so much depends upon circumstances and localities. In this district it must almost invariably fall upon the oat stubble, unless the landlords make some concession to the tenant, allowing him to make such alteration as may not interfere with his full quantity of saleable produce, and undoubtedly the system of green cropping is as beneficial to the landlord as the tenant, acting upon the soil like a change of food upon a hard-worked horse, by refreshing its condition, without drawing upon its powers. Last autumn I sowed a few acres of oat stubble with winter tares; these were cut for the horses during the month of June; in July the tare stubble was ploughed and sown with white mustard; upon this the ewes were netted the end of September till they were all tupped, and this was very rapidly done; the ground was then ploughed for winter wheat. Tares are a good preparation for wheat, provided they are not allowed to ripen; for if any seed falls and germinates with the wheat, it is injurious to the flour, the seed of the tare being black and having a bitter taste. As a general rule, tares may precede or follow any crop with success, except peas or beans, which are strictly of the same order and similar constitution. I knew a farmer in Shropshire who had two fields of a strong clay loam situated on a hill difficult of cartage, a good distance from the onstead, and unproductive; he drained and fallowed them, sowing one winter wheat and the other winter tares at intervals; the latter he ate with sheep on the ground during the following summer, then ploughing it for wheat and sowing the other field with tares. For some years he thus worked the two fields, alternately tares and wheat, and most excellent crops of each he had, between sheep and corn paying well, but this of course was under local circumstances, and might not answer elsewhere. I have seen stock of every kind fed upon tares with advantage. I have myself fed cattle in boxes on tares during the early part of summer, selling them fat off after grass; they throve well, making a lot of excellent manure. Sheep thrive well provided they are put on in small quantities and before the tares are too rank; it is, however, better to net the sheep on the bare ground, cutting the tares and putting them in hacks. It is my opinion that for horses, cattle, and pigs, tares are excellent, and will repay the labour, but I do not think so much of them for sheep. Respecting horses, I have invariably remarked that those which have been fed during summer on tares, always keep better condition and health during the ensuing winter. I have, when ever supplied with tares, cut them,

allowing them to remain for a week on the ground till about half withered, then carted them, forming a stack, every alternate layer with good wheat straw and a sprinkling of common salt, which in the following spring was used as fodder for horses proving excellent meat, the superfluous pieces of the tares being acted upon by the salt, and absorbed by the wheat straw. The soil best adapted for the growth of tares is a good clay loam with a dry subsoil; but except on a very light sandy soil, or very wet clay, with moderate care and attention, I have never seen the tare fail where the ground was moderately dry and not poverty stricken. The only disease I ever experienced as injurious to the tare was mildew, and this only twice, slightly proceeding, no doubt, from atmospheric changes. I do not mean to infer but what the tare, like all plants, is liable to fail, for instance, on a high gravelly knowe, or in an undrained slack in a wet season; but I consider it as free from casualities as any plant in common cultivation, and more so than most of them. There is one point that must be constantly borne in mind—*sow real seed*, not spring tares in winter, or *vice versa*. The only way to be sure is to grow your own. I send a sample of the real winter tare for inspection; and allow me, in concluding the subject, to express my conviction, that with the present depressed prices of corn, when artificial manures weigh so heavy on the farmer, the system of green-cropping is a most useful, and to a certain extent economical substitute.

The next paper was from Mr. HOGICK, of Hutton Mains, in which he replied *seriatim* to the several queries of the Committee, as follows:—1st, From the middle of September to the middle of October: when everything suits, I prefer September. 2nd, I have been in the habit of sowing about two bushels to the imperial acre; mixing a little red wheat, of the kind called creeping, not exceeding half a bushel to the acre. 3rd, I generally sow my winter tares after a white crop, and after the land has got one furrow. If the land is friable, I give it a single harrowing before sowing. After sowing, finish and harrow in the usual way. If the land happens to turn up stiff and rough, I then harrow completely, and rib with the small plough, making the ribs about twelve inches apart; sow with the hand, and single or double harrow as may be required. As to manure, about the middle of April I top-dress with about 1½ cwt. of guano to the acre, which is best done in showery weather. I then take the first opportunity to roll, so as to make the surface even for mowing. The land on which I sow winter tares is of the first quality, being a rich black loam, on a clayey bottom. I find it best to top-dress only *one-half* of the quantity sown, which half is to be first cut, beginning about the first week of June: about the middle of July the untop-dressed gets fully strong enough for use. I find when I top-dress the whole that, when coming near perfection, the tares are apt to get too strong, and then there is danger of considerable waste from rotting at the root, &c. 4th, That part of my land on which I sow tares being, as I have already said, of first-rate quality, I farm in the following rotation, which may be called a four or eight shift:—1st, turnips; 2nd, wheat or barley, I prefer wheat after turnips when the weather is favourable for sowing; 3rd, beans; 4th, barley or wheat; 5th turnips; 6th, wheat or barley; 7th, broad clover; 8th, oats. I sow my tares after the barley or wheat, so as to come in the same rotation as the beans. The land on which I sow my tares and beans is particularly clean, being only once in white crop after fallow. I have, in my experience, found it quite impossible to keep land clean with either tares or beans, unless it is thoroughly cleaned before sowing. 5th, I begin to cut about the first week of June for my work horses, giving them tares in the stable (fitted up for the purpose) between yokings, and again from 6 o'clock to half-past 8. They are then turned out to pasture for the night. They are kept the whole of the Sunday in the stable on tares. I also give my milking calves tares in a small field near the steading: I find the want of a shed in this field operates against their feeding—the tares would be kept fresher under shade, the calves would not be so much annoyed with flies, and would be more comfortable in a wet day. I also had this year two yearlings, a young bull and his twin sister, kept wholly on tares, after the Swedish turnips were finished. They were just a year old when put upon tares (having been calved on the 8th June). My other yearlings were turned to grass about the middle of May—they were in excellent condition when put to grass, being about three months older than the two which were kept in; they had thus a considerable start on the two kept on tares, and yet when the yearlings returned from grass, the two that were fed on tares were completely a-head of them, both with regard to condition and size, although three months younger. I must say, however, that the pasture was not quite so good as I could have wished. Three acres of tares kept nine horses, nine calves, and two yearlings, from the first week of June till the 22nd August, the horses going out through the night, and the calves having the benefit of the small field of about one acre. 6th. I consider rich loam on a clayey bottom the best soil for tares. The field should have a good exposure, and be, if possible, well sheltered. 7th, In the course of my experience I have never had a failure in winter tares, with the above treatment;

and with regard to spring tares, I generally sow them after one-year-old lea, when I sow my oats, being the first succession. The second I sow about the beginning of May, trying to do so after a shower, when the land is hard and dry. My *first* succession I begin to cut when the winter tares are finished. They are then in perfection, viz., in August. I go on with them till my *second* are ready, which is generally about September, leaving the remainder of the *first* for next year's seed. My *second* generally serves till all the corn is in the stackyard, being used by the horses whilst leading in the crop. I may be allowed to remark that part of my land is well adapted for spring tares, being a stiff clay, and not too growthy, so that the tares pod well, and *do not rot at the root*. I have had the misfortune to lose a steer by swelling, from the tares being too ripe: when he was cut up, his paunch was found to have burst. I have ever since taken care not to give them to my cattle in so forward a state. With regard to the horses, I have always found them thrive well on tares, and that they can do more work on them than on any other kind of green food. When the pods of the tares get full, I take the oats from my horses. I have also a small field of about two acres, which I don't keep in regular rotation, and on which I have been in the habit of sowing winter tares, having them all used by the middle of July, and afterwards sowing turnips for seed. This I find to answer well on a small scale, but on a small scale only.

Mr. Wilson, of Cumledge, sent the following communication:—In reply to yours of the 8th current, I shall be happy to note down, as requested by the Committee of the East of Berwickshire Farmers' Club, the result of my experience on the cultivation of tares, and in the first place I shall answer your queries in their order. 1. The best time of sowing. —Winter tares, I think, should be sown in the end of October; spring tares in March and April, at different times, for a succession—the earlier the better, if the land is in proper condition. 2. The quantity of seed.—This must depend upon the richness of the land; from two to three bushels. I do not think a mixture of grain is of any benefit. 3. The preparation of the land.—For winter tares, if the land is clean, it answers very well to give the land a good, deep, close-laid furrow, after a crop of oats or any other grain; if manured so much the better, with farm-yard dung, or any other; but if guano is used, I think that is better applied as a top-dressing in wet weather in spring. The ground may be harrowed before as well as after the tare sown, and then well rolled, to prevent throwing out. This last I consider to be a very essential point, and may be repeated early in spring with advantage. This year I have sown them after a crop of hay, when the clover plants have been thrown out, and at present they look well; the ground has not been manured, but I shall give a top-dressing of guano in spring. The cultivation of spring tares is so well known that little need be said upon that head. The principal aim of the club in bringing this matter under discussion, I conceive would be, to induce its members to adopt a more extended cultivation of this useful description of green food than they have hitherto done. 4. The place occupied in the rotation.—This, of course, must depend upon the rotation followed. To the extent that it may be prudent to cultivate winter tares in this climate, they may be sown after any other crop in October, and be off the ground in time for sowing turnips in June, and in that case would not interfere with any rotation. Spring tares might often be sown with propriety in place of a second year's grass, especially where the clover plants have failed, which often grazes little, and tares might yield a much greater quantity of food, and there can be little doubt that a much better crop of oats or any other grain would be obtained after them than Holcus, and other inferior grasses, which take possession of the land when the finer sown grasses fail. 5th. By what kind of stock consumed.—Tares are excellent food for all kinds of stock. If the land is poor they should be eaten on the ground with sheep, and this answers admirably in fattening off clipped hoggs after the turnips are finished, especially with a little addition of oil-cake or grain; but when the land is rich and in good condition, it may answer as good a purpose, and perhaps better, to soil cattle and horses in the house with them. 6th. What soils are best adapted for them. For winter tares, in this climate there can be little doubt that a sharp dry bottomed soil, and well sheltered, is the best; but they will do in any well-drained soil. I would consider soft inadhesive land the worst, being apt to throw out the plants during winter. 7th. Are the crops liable to failure? I do not think that spring tares are more liable to failure than many other crops, but when they do fail the greatest cause I have found to be from slugs eating them: for this, salt is a cure, if applied when they are out creeping on the surface. All recent writers on high farming strongly urge a more extensive cultivation of grain crops for summer use, and soiling cattle in the house. I believe it would be found beneficial to adopt this system to a greater extent than it has hitherto been done in this district, and a more extended cultivation of tares is the best means of enabling us to attain this object.

Mr. Crosbie, Hutton Hall Mill, sent the following communication:—In reply to yours respecting "the culture and use of winter and spring tares," I beg to say that I will briefly dispose of the spring

tares, by stating that the only quantity we grow of them, is sown on a part of the land intended for beans, and at the same time that the beans are sown, the quantity of seed used being two bushels of tares and half a bushel of oats. They are cut during the summer, and are consumed by horses and cattle in sheds and curtains, before commencing with the second cutting of clover. I will now proceed to give you the result of my experience of winter tares, by answering the questions in the order in which they stand. And "1. The best time of sowing?" As the tares are invariably preceded by a grain crop, the land in most seasons cannot be cleared sufficiently early, to make any mistake by sowing too soon. We prefer the middle of September. They may, however, be sown any time during the month, but not later, with any prospect of having the advantages of early cutting than the first week of October. "2. The quantity of seed used, and whether in mixture with rye or other grain, and in what proportions?" Three and a-half bushels of tares and half bushel of wheat per acre. We have tried a mixture of rye, but prefer wheat, as we find rye, although eaten at first, that during the last week or two of its growth is refused by cattle; not so with the wheat, it appears to be as much relished as the tares. The reason of giving such an apparently liberal allowance of seed is, that by doing so we find that the crop grows more rapidly, and is much sooner ready for cutting. "3. The preparation of the land, and the manure used for said crops." Twenty cartloads per acre of good well-prepared dung is evenly spread on the stubble. It is then ploughed in with a furrow of moderate depth, well harrowed, then made up into drills, or ribs of 12 inches in width, the seed sown by hand and covered in by harrows in the usual way. It is thus left during the winter, and as soon as vegetation has fairly commenced in the spring, the land is all hand-hoed; after which we give it a top-dressing of 40 bushels of soot per acre. With this treatment we generally commence cutting the first week of May. "4. The place occupied in the rotation—that is, what crops should they follow and precede." With us they have always occupied a part of the turnip quarter, and have followed wheat, barley, and oats; and as soon as the tares are all cut the land is prepared for turnips, and the turnips are sown with 2 cwt. of guano per acre. We have at present growing on the tare land a full crop of white globe turnips. "5. By what kind of stock consumed?" They are consumed by horses, milch cows, and young cattle. It may not be considered out of place for me to state here, that our crop of the past season consisted of only 2 acres. We commenced cutting the fifth day of May. 5 horses, 6 two year-old cattle, 4 year-olds, and 2 milch cows, were sparingly supplied with the tares for the first week; and from that time up to the 30th of June they had all a full allowance. The cows during that time had nothing but the tares, and with which they did uncommonly well. The one and two-years-old cattle respectively had each in addition a daily allowance of 2 and 3 lbs. of bran, and with this feeding they made great improvement. "6. What soils are best adapted for them?" To this question I regret being unable to give a definite answer, as my experience, although extending over a period of five years, has been too much confined to soils of a similar quality to enable me to speak with any degree of certainty, and which for the most part consists of deep gravelly soil, with a gravel subsoil; but I should consider any good dry, early turnip soil as well adapted to their growth. "7. Are the crops liable to failure, and from what cause?" I am not aware of any failure we are liable to, never having seen the least symptom of any, but may remark that we have been much more successful in their growth for the last three years, since adopting a thicker system of seeding.

Mr. DICKSON, of Whiteriggs, in reply to the circular of the Committee, said—I received yours of the 8th, containing queries on the subject for discussion at the next half-yearly meeting of the East of Berwickshire Farmer's Club. Had I been able I would have had great pleasure in answering them very fully; and as I consider the matter to be discussed an important one, I would like to have stated the result of my experience of feeding stock on tares for the last four years, and also to have pointed out what value they are of, in comparison with turnips and rape. During the time I have used them it has been to my complete satisfaction; my stock has thriven uncommonly well upon them, and I find my grass very much benefited wherever they have preceded it—a result I fully anticipated, and which I recollect I stated at one of our meetings when the cause of the failure of the red clover was gone into, and I promised at an after period to mention if my predictions were verified. The introduction of tares breaks up the monotony of the four and five-shift rotation as practised generally in that district, and with so good an effect that I am certain, when their advantages are better known, they will be extensively used. I will now endeavour to reply to your queries, and I trust the reason I have assigned will form a sufficient excuse for my doing it in so brief and imperfect a manner. "1st—The best time of sowing?" I have never sown winter tares, being afraid of the effects of the season on the crop. They may thrive in such a mild winter as the last; but I am afraid if the weather were severe they would not succeed, and most likely in the long run prove inferior to a spring-

sown crop. I begin sowing whenever the land is dry—in February, if possible; and continue at short intervals until the middle of April, and use the different breaks in succession. In this way the first sown are quite ready for stocking by the first of July, and the remainder will last until the middle or end of September; a season when they are most acceptable, from the grass then losing much of its feeding qualities. "2—The quantity of seed, and if mixed?" I sow tares unmixed, excepting with a few beans when they are to be eaten by sheep, as I find when rye or oats are added they are rejected by the stock. The quantity of seed I use is from 2 to 2½ bushels per acre. "3rd—The preparation of the land, and the manure for the crop?" The land is ploughed from stubble in winter, and the seed is either sown with the drill, or the ground ribbed with a small plough, but it will succeed equally well broadcast. My reason for drilling is to extirpate any annual weeds that may grow with the crop. If the land is in good condition no manure is requisite; but to the first sown portion I generally give a little guano, in order to push on the crop, and have it ready by the 1st of July, from reasons I shall afterwards state. I do not think it advantageous to manure heavily for tares, for when too luxuriant they are apt to become rotten at the bottom of the stalk, and their value is lessened. "4th—The place occupied in the rotation?" What it should be depends much on the views of the grower; for if he can successfully raise the winter variety, then he may both have a tare and a turnip crop in one year. The mode I adopt is to make the tares take the place of the grass in the rotation, and sow them on a wheat or barley stubble, ploughed in autumn. I take oats after them, the same as if the previous crop had been grass: but either barley or wheat might succeed them if considered more remunerative; but I always find my oat crops, after consuming the tares with sheep, remarkably abundant, and fully of as much value as any other. The land I have grown the tares on has generally been farmed on the four-shift rotation; where it has to remain two years in grass, the grazing upon secondary soils is often very inferior the last season, and I am convinced it would be much better to plough up a portion of it after it as lain one year, and sow it with tares, and follow them with oats, which crop, if the tares are eaten with sheep, would be much better, and the land in superior condition, than if it had remained all that time in grass. "5th—By what kind of stock consumed?" Unless for the supply of the work horses during, and for a short time after harvest, I consume all my tares on the ground with sheep. They are a most valuable food for this description of stock, and I never found any thing to equal it for lambs when newly weaned. They are very fond of them, and eat them most readily. The great advantage the tares possess is, in keeping the young animals perfectly free from those diseases of their bowels which are so common, and so frequently fatal at that critical period; and if farmers were to grow them for no other purpose, they would be amply repaid; they would find their lambs strong and in excellent condition for putting on turnips, and thoroughly prepared for encountering the hardships of the coming winter. This mode of treatment is, in my opinion, vastly superior to the plan very commonly practised, of sending them to board, and earn a scanty subsistence on some moor at a distance from home, where they not unfrequently, from being mixed with other stock, contract diseases and lose condition, which they are long in recovering; besides they have the advantage of being under the eye of their owner, who must be much gratified at the rapid progress they make. When I first grew tares for grazing sheep, I mowed them, and put them into small cribs set in a field; but I found this both a very troublesome and bad method, for I had them all to cart, and the stock pulled out, and wasted a great quantity, where the cribs stood; besides, the land was unequally manured. When I was last in England, I was advised by a gentleman there to make the sheep eat them through low sparred hurdles, placed in a sloping position against the tares. I have since tried it, and find it a most admirable plan, as no portion of the crop is wasted, and the land is equally gone over, and if the hurdles are properly constructed they are easily shifted from time to time, when necessary. They are generally made of wood; but I think iron would be better, as when of that material they will scarcely ever break, and cannot be upset in very high winds, as wooden ones sometimes are. The difference in price is not very great, and of course those made of iron last much longer. If the owner of the sheep thinks fit to give them a little cake along with the tares, I need scarcely say he will find both his stock and the succeeding crop much the better for it. I generally treat my late small lambs in that way, and their progress is wonderful. "6th—What soils are most suitable?" Any soil that is clean, and in good condition. "7th—Are the crops liable to failure?" I have never experienced any. I hope the few remarks I have made will meet the approval of the club. I only regret that I am unable to have the pleasure of being present at the meeting.

The noble PRESIDENT said the meeting had now heard all the papers which had been sent in to the committee; but valuable as these were, it might be desirable to hear the opinions of

other gentlemen who had not given in written reports.

Mr. CLAY, of Wynfield, rose and said—Not having tried the growing of winter tares, I am unable to offer any opinion on the subject; as I have always thought that our heavy lands were unfit to grow a crop of winter tares with as much profit to us as those sown in the spring. Therefore my experience has been confined to the spring tares alone, which I have grown successfully for four years past. The first three years I grew them for nothing but horses and cattle, but more especially for the cattle. The tares always came in for use about the middle of July, when grass on our heavy land seems to give up growing all at once. I found that the cattle throve much better by spreading the tares thin on the ground of a lea-field then if you put them into hacks; the cattle are apt to pull so many over, and waste them among their feet. Having had a few sheep going along with the cattle, the sheep seemed to devour the tares greedily, and fed fast upon them. I was led to think that if I could manage to feed my lot of *dinmonts* on tares when my grass failed, it would be a great profit, and of immense benefit to the land. I this year went more fully into the system, by sowing ten acres after lea. The tares are in the place of two-years-old grass, which is so often of such little value in this district. My first sowing was in the middle of March; second sowing was the 1st of April; last sowing the 20th of April. I do not like to continue the sowing so late as the beginning of May, as some of the papers just now read recommend. I give the first sown 1½ cwt. of guano, to get them forward in time for use; they are then ready by the 20th July, when I put my sheep upon them. Having a small piece of ground cleared at the top of the field to give the sheep room to fall back until they had time to eat way for themselves, with the assistance of Mr Wilson, Edington Mains, I contrived a hurdle which answered the purpose with great effect; it is nine feet long, by three feet high, one rail on the top, and one on the bottom, to which there are upright spars nailed, ten in number, which admit of the sheep getting through their heads and necks, to eat the fresh meat as it is put forward by the man that attends them. The first week the sheep did not like to be confined upon them, neither did the man like the shifting of the hurdles; but ere a week passed over, both the man and the sheep got expert at their business of shifting and eating. The man took about two hours to shift the hurdles at first, but by the finish of the tares he could accomplish the shifting in about half an hour. The last thing he did at night was to shift the hurdles close up against the growing tares, so that the sheep had meat enough, if they felt inclined to eat. Early in the morning when the man came that attended them, the tares were all bared as far as the sheep could reach through. The first thing he did was to give them a little fresh meat, by cutting a swarth close to the post which the sheep had bared through the night. He took it forward in small quantities, which they devoured with great rapidity; all day long he continued to feed them in the same manner. Every hour the sheep took about a quarter of an hour to feed, when they all went and lay down to feeding time again, which they all knew well by the rattle of the scythe. The hurdles were 48 in number, which reached across the whole break, so that 10 score of sheep got fothered with great comfort. Any one that saw the sheep before they went on to the lea, would not have known them when they came off, they having made such rapid improvement. When the butcher handled them he was struck with their firmness; therefore the quality of the sheep was of the first class, which was proved by getting the top price in the market by per lb. I calculated the sheep at 5d. per week for the time they were on the tares, which was a very moderate calculation for such feeding; at that rate the tares eat at £4 4s. per acre, which is much better than the grass that I could have grown, and the land was left in three times better condition. I have now got it sown in wheat and looking well. I am so much taken with the system, I intend to carry it out to a greater extent next year, as our two-years-old grass on our heavy land is such a ruinous affair, we are obliged to try some system to move forward with the present times.

Mr. WILSON, of Edington Mains, said that the reports which had now been read having been put into his hands as Convener of the committee, with a request that he should draw out a short summary of them, he begged now to lay it before the meeting, merely premising that he was giving no opinions of his own, but simply an abstract of the various papers which had been sent in. I think that I am warranted in congratulating the club on account of the important and interesting information which this day's discussion has been the means of drawing forth. Our proceedings to-day are well fitted to confirm us in the practice of substituting written for oral discussions, and afford a good illustration of the service which such associations can render to agriculture by collecting and publishing professional information of a trustworthy and useful character. How difficult it would have been for any of us to have obtained by personal inquiry the same amount of information on the subject under discussion which had been presented to us in the papers just now read. These communications go also to confirm the impression which has

steadily been gaining ground amongst us, that we must bestow far more attention than heretofore upon the cultivation of forage crops. Although we have been in the habit all our days of growing tares, most of us probably feel that this is a more important crop than we have been aware of, and that we have much to learn about its proper uses. In passing through the country in several directions during the past summer, I was struck with the greatly increased extent of land under this crop in the present as compared with former years; and I have no doubt that the publication of these reports will give an impetus to the movement which has already begun. I shall now endeavour to collect the evidence supplied to us by the gentlemen who have favoured us with their reports, upon each of the heads of inquiry, in the order in which they were adressed to them. "1st. As to the time of sowing." For winter tares, most of the reports recommend September, or more generally, as soon after the preceding grain crop has been removed as possible. Mr. Wilson specifies the end of October as the best time; but Mr. Crosbie, who has had longer experience, says expressely that they cannot be grown so as to secure the benefit of early cutting if they are sown later than the first week in October. Mr. Stark, with a yet longer experience to guide him, sows in August whenever it it is practicable. (Mr. Wilson here explained that before this discussion was resolved upon he had privately obtained informa ion of a similar kind to that contained in the reports, from Mr. Stark, at Mellendean, who has grown winter tares for many years.) For spring tares a majority of the reporters say March and April. Mr. Dixon makes his first sowing in February, if the land admits of it, and sows at intervals till the middle of April. All approve of a succession of sowings, which two extend into May. "2nd. Quantity of seed." From two to two and a-half bushels per acre is the quantity specified by a majority of the reporters, who also approve of mixing wheat with the tares to the extent of from one-quarter to one-half bushels per acre. Several prefer beans for this purpose, but all who have tried rye object to it. Mr. Crosbie uses three and a half bushels of winter tares, with one half bushel of wheat in ad lition; and adds a *nota bene* to his report, that since he began to seed thicker, he has grown the crop with decidedly better success. He is fully coroborated in this by a writer in the *Agricultural Gazette*, of the 20th September last, who recommends three bushels per acre for winter tares, and four bushels for spring tares. "3rd. Preparation of the soil and manure." One ploughing after a grain crop is the usual practice. A majority advise to harrow well; after this, furrow, and to rib the land before sowing. Mr. Stark remarks upon the advantage of depositing the seed rather deeply, that the plants may be well rooted previous to top growth. Ribbing or drilling is also recommended, in order that the crop may be hoed in the spring. Several of the reporters consider it unnecessary to manure this crop, at least when the land is in good heart; but those who seem to have grown winter tares most successfully are decided in recommending a liberal application of farm yard dung at the time of sowing, as well as a top dressing of soot and guano in spring. "4th. Place in the rotations." Winter tares, in nearly all the instances reported to us, have been grown as a catch-crop, and followed by turnips in the same season, without interfering with the established rotations. It is evident I think, unless this crop is so managed as to have it ready for use in May, and the land on which it grew cleared and sown with turnips before June expires, that the peculiar benefits are in a great measure lost. Mr. Crosbie deserves much credit for his judicious and successful management of this crop. From a casual remark in his paper, it appears that he follows a regular system of soiling by means of winter and spring tares and clover; and hence his early sowing, thick seeding, and heavy manuring of his winter tares, are parts of a well-concerted plan for securing a regular succession of green food from May till October. Several of the reporters are of opinion that on poor soils a crop of spring tares is preferable to second year's grass, both because the tares produce more and better food, and leave the land in better condition for bearing a crop of oats or other grain. Mr. Dickson's practice, however, brings out some totally distinct features of great practical importance. He confines himself to spring tares, for reasons which he states; but instead of substituting them for second year's grass, he puts them (for one revolution of the course) in place of grass altogether, and by this means—as he very happily expresses it—breaks the monotony of the four-course rotation and yet without deranging it. By this plan the interval betwixt the recurrence of clover and grass seeds is lengthened from four to eight years. The tares are grown at the cleanest stage in the rotation, and when there is least risk of their being injured by grubs. Their consumption on the land by sheep is an excellent preparation for the succeeding grain crop, and Mr. Dickson assures us that when clover is ultimately sown, he finds it do well after this variation in the course of cropping. When thus referring to Mr. Dickson's report, I cannot refrain from expressing the gratification which it has afforded me, not only by its intrinsic merits, but from the evidence which it bears to the improved health of its author, whom we all so much respect, and whose lengthened absence has

been such a loss to this club. "5th. Disposal of the crop." When grown on rich soils, the most approved plan of using tares is to consume them at the homestead by horses, cattle, and pigs; and in the case of poorer soils, to have them eaten by sheep on the land where they grow. Some practical difficulty is experienced in so managing this process as to avoid waste, and various expedients have been resorted to for this purpose. That described by Mr. Dickson is probably the best. It requires, however, a frequent shifting of the flakes as the sheep can only get at so much of the crop as can be reached by pushing their heads betwixt the bars. Mr. Clay, at Wynfield, informs me that after trying this plan for some time, he had a few swathes of the crop mown parallel to the flakes, and forked close to them as required, and that in this way one shifting of the fence daily sufficed. I have been told that when tares are given to sheep in racks, they are apt to break their teeth in pulling out the tough stems. "6th. Soils best adapted for tares." Mr. Hamilton has noticed the important fact that the tare is indigenous to this country, and that it thrives under the greatest diversities of soil and climate. This is curiously corroborated in these reports, where we find most of the writers expressing the opinion that such soils as their own farms consist of, are best adapted for tares, while we know that they are as diverse as well can be. I can only say that the best crop of tares which I have had was upon Edington Hill Moor, where I also observed that the wild tufted vetch grows freely. "7th, Causes of failure." The chief risk of failure seems to be from grubs, when the crop is sown after lea. Much difficulty is experienced in preserving winter tares where game and wood-pigeons are numerous. Upon the whole, it appears that tares are liable to as few casualties as any crop ordinarily cultivated. Before closing these remarks I wish to call attention to the data with which Messrs. Hosick and Crosbie have furnished us, for ascertaining the value of a good crop of winter tares—

Mr. Crosbie's 2 acres kept			
5 horses for 7½ weeks, which at 3s. per week, is	£ 5	12	6
6 two-years-old cattle, do. do.	6	15	0
4 one-year-old do., for 7½ weeks, which, at 2s. per week, is	3	0	0
2 milch cows, for 7½ weeks, which, at 3s. 6d. per week, is	2	12	6
	£18	0	0
Mr. Hosick's 3 acres kept			
9 horses for 12 weeks, at 3s.	£16	4	0
2 one-year-old cattle, do., at 2s.	2	8	0
9 calves, do., at 1s.	5	8	0
	£24	0	0

In fixing upon these rates, I have kept in view that Mr. Crosbie's cattle have a few pounds of bran, and Mr. Hosick's horses and calves some grass along with the tares; but still I believe that I have stated them at less than could have been obtained for the board of similar kinds and ages of stock on the tares alone. The time mentioned by Mr. Crosbie is eight weeks; but as his stock did not receive full feed the first week, I have called it 7½. From this calculation, it appears that a really good crop of tares will afford as much food as the best crop of turnips, and of a more nourishing quality. It has been customary with us to adopt some resolution, embodying the opinion of the meeting on the subject discussed. Now, however, that we have the benefit of well considered written reports, I think it much better that these should be left to speak for themselves, and I therefore decline proposing any finding.

The Earl of HOME said that they were all very much indebted to Mr. Wilson for his able summary. This was certainly more satisfactory than any attempt to pronounce at the moment a deliverance on the important topics brought under their notice.

The meeting then separated.—Berwick Warder.

TO THE EDITOR OF THE BERWICK AND KELSO WARDER.

SIR,—As the estimations which I gave of the money value of the crops of winter tares grown by Messrs. Hosick and Crosbie, in the remarks addressed by me to the East of Berwickshire Farmers' Club, were unaccompanied by any statement of the outlay involved in the production of these crops, and may, on this account, be thought by some to present an exaggerated view of their value, I shall feel obliged by your allowing me space for a few words of explanation.

When winter tares are grown successfully, they are cleared from the ground in time to be followed by a crop of turnips in the same season: or, if grown on clay soil, to admit of the space occupied by them being prepared for wheat along with the bare fallow. As stubbles must be ploughed in autumn, at any rate, and as many farmers winter-dung a portion of their intended turnip-break, it is evident that all the additional labour expended, in consequence of sowing winter tares on a portion of it, is the ribbing and harrowing of the land at the time of sowing, hand-hoeing of the crop in spring, cutting and carting home the crop, and one additional ploughing, with its accompanying harrowings, in addition to what would otherwise have been necessary to prepare the land for turnips. Now, as we cannot suppose that these gentlemen employed any additional horse or manual labour in conse-

quence of growing these few acres of winter tares, but must simply understand that they varied a little the distribution of the work of their ordinary complement of men and horses, it would be quite unwarrantable to put down a money estimation of the ploughing, &c., connected with this crop, inasmuch as they did not spend a farthing more in labour or rent than they would have done although the land had lain bare all winter, and been sown with turnips in the usual way. The actual outlay is, therefore, limited to the cost of the seed, and of the top-dressing applied to the tares in spring, and to the deficiency in the value of the turnip crop from its being later sown than it would otherwise have been. I do not include the value of the dung applied in autumn by Mr. Crosbie, as neither that, nor the guano which he gave at the time of sowing his turnips, is beyond what most of us are in the practice of applying for the latter crop alone. The account will, therefore, stand thus:—

Estimated value of an acre of Mr. Crosbie's tares, on the data given in my summary			£9 0 0
3½ bushels of seed-tares, at 6s. per bushel	£1	1	0
½ bushel of wheat	0	2	6
40 bushels of soot for top-dressing, at 3d	0	10	0
Loss on succeeding turnip crop by later sowing	2	10	0
			4 3 6
			£4 16 6

As Mr. Hosick's crop would show substantially the same result, it is unnecessary to repeat the calculation. To this extent, then, I believe that the conjunct crop of tares and turnips exceeds in value a crop of turnips only, sown at the proper season on similar land and with the same manure, and supposing both to have been consumed by stock taken in to board at such rates as I have given. The manure produced from the tares would, of course, be an offset in their favour, not to mention that their value to the grower in enabling him to carry forward his own stock at a critical season of the year, will usually be far beyond what he could realize by letting them to others in the way which I have supposed.

I do not know what rent these gentlemen pay for their land, and although I did, it would not affect the simple view of the matter to which I have restricted myself. I do not for a moment suppose that such results can be realised with any kind of soil and climate, and any kind of management; but, at the same time, it does not detract from the merits of these gentlemen to say that they do not monopolise the good land and skill of the district, and that what they have done may be equalled by scores of their neighbours, if they choose to try. I should be sorry were my statements to induce any one to depart rashly from his ordinary practice; but there is enough surely in the reports read to our club on Saturday last, to warrant any of us to make trial of these crops in a cautious way, and more than this I do not advise. JNO. WILSON.

Edington Mains, Dec. 8, 1851.

HIGHLAND AND AGRICULTURAL SOCIETY.

A monthly meeting of the society was held in the Museum, on Wednesday, the 28th January. His Grace the Duke of Buccleuch in the chair.

His Grace, on taking the chair, remarked—As this is the first occasion on which I have attended as the chairman of these meetings, having held on previous occasions the honour of officiating for others, who have so well and so worthily filled this position, I think it necessary to state that I feel it my bounden duty to further the interests of this society, and, in doing so, of my country, and also to show publicly the high estimation in which I hold these meetings, which have both created a very great interest throughout the country generally, and also communicated valuable information to those who have been present. Not being able to attend the annual meeting of the society, I can only return my thanks for the honour you have done me, in appointing me chairman of these monthly meetings.

Mr. HALL MAXWELL stated that the next meeting would be held on Wednesday, 25th February, when the cultivation of flax would form the subject of discussion. As there existed some excitement on this question at present, he might mention that it was not proposed by the society for the next meeting, in consequence of recent meetings or statements in other quarters; on the contrary, some of the papers to be brought before the meeting had been called for by the society so far back as 1848, and embodied the results of practical experiments conducted over several years, and on considerable extents of ground. Some may think the society remiss in not having ere this made public their views on this important question, for the guidance of the farmer; but the directors felt that, before recommending any change, they were bound to exercise the utmost circumspection. They did not feel they possessed data sufficient to warrant a decided opinion as yet, but they pro-

posed to introduce the subject at the February meeting.

Subject for discussion: — "The comparative value, in point of economy, immediate and permanent effect, of guano and other special manures, and of farm-yard manure produced by turnips alone, or by turnips with auxiliary feeding."

Mr. DICKSON, Saughton Mains, Mid-Lothian, said—When I proposed this subject in committee, as one likely to be interesting for discussion at one of our meetings, I expected rather to have gained information by listening to others than to have been called upon to open the discussion myself; but holding the opinion that every one ought to come forward when asked to give his views on any subject under discussion, I readily agreed to state to the society the result of my experience on this question, which is rather a difficult one. Seeing it is only about ten years since guano was introduced into this country, and that for some years at first, from the high price of the article, and the uncertainty regarding its effects, it was applied to the soil in small quantities, and chiefly along with farm-yard manure, it was only after some experience of its beneficial effects that we were induced to risk the production of a good crop with guano alone; therefore, the period is limited over which our experience extends, in forming a correct judgment of the comparative advantages of special and of farm-yard manures. I have made many experiments with guano, and nearly all the other special manures on soils of various qualities, the general result of which has been that while rape, bones, and many other special manures have proved powerful fertilizers when judiciously applied, guano has been decidedly the most profitable of the class. But as these experiments were made not so much with the view of minutely satisfying myself as to the immediate and permanent effects of the substances employed, as of profitably conducting the working of my farm, and as they were not instituted with the intention of giving them publicity, I am consequently unable to detail the exact produce of the different crops, and am compelled to make my observations more general than I could have wished. However, in so treating the subject, I shall endeavour to state only such results as I am fully satisfied in my own mind are correct. To save repetitions, I may here mention that in using the word acre, I mean the imperial acre, and by guano, good quality of Peruvian, which, including the cost of carriage and application, I estimate at £10 per ton; and by farm-yard manure, I mean good quality and well prepared, which, including the cost of carriage and application, I estimate at 8s. per ton. In dealing with the question of economy there can be no doubt as to the advantages of employing special manures. The saving of labour and time thus gained is in the first place indisputable. I consider their most profitable application, however, to be in conjunction with farm-yard manure; and I find that by applying 15 tons of manure, 4 cwts. of guano, and 2 cwts. of dissolved bones, I can raise a heavier crop of turnips than by the application of 30 tons of manure alone. Such a substitution of special for farm-yard manure is therefore economical and profitable, although from its immediate effect it is less permanent; but the saving of £3 4s. besides the advantage of having a superior crop of turnips, enables us to apply an additional quantity of manure to the succeeding crops of the rotation. My neighbour, Mr. Finnie, informs me that he has raised as heavy a crop of turnips with 6 cwts. of guano, 5 cwts. guano and 3 cwts. rape, 5 cwts. guano and 2 cwts. dissolved bones, as from 30 tons of the best horse and cow manure. And he has given me an instance where 5 acres of turnips manured with 6 cwts. of guano alone, brought as much by public roup as 5 acres adjoining which had received 30 tons per acre of farm-yard manure, which entirely coincides with my own experience. On light sandy, or gravelly soils, where manure of all kinds is quickly used up, it is found advantageous to apply only the light manures to the green crop, and the farm-yard manure to the succeeding white crop, which, as well as the succeeding crops of the rotation, are much benefited by this arrangement, and by a liberal application of the light manures the turnip crop is generally better than where the farm-yard manure is applied alone. In looking to the permanent effect of manures on soils, it is necessary to keep in view the various descriptions of land, as the permanency of the effect produced by the application of manure to the kind of soil last described is very different from that on a soil consisting of a deep clay, or clay loam. In applying a full quantity of farm-yard manure to the green crop of the rotation, it is generally understood that the beneficial effect of the manure extends over the current rotation, including the succeeding white crop, the one or two years' grass, and the following white crop, when it is supposed to be exhausted; whereas, in applying guano, it is understood to be exhausted by the first crop, and that, unless where the crop is consumed where it grows by sheep, it is necessary to make fresh application of manure to the succeeding crop. I believe this theory to be mainly sound; however, having repeatedly observed beneficial effects on the second crop, I am satisfied that to some extent it is useful to the crop succeeding that to which it has been applied, although I would not recommend any one to trust to it alone in the second year for securing a full crop.

In the communication above alluded to, from Mr. Finnie, he concurs with me in objecting to place reliance on the permanency of guano and other special manures, unaccompanied during the rotation by farm-yard manure; and he states as his opinion that it is not profitable to displace more than 2½ tons of manure for every cwt. of guano used. In comparing the effect of the liquid manures with that of farm-yard manure, the following experiment has been with me the most successful in growing with the former equally good crops, for a period of four years, against 30 tons of farm-yard manure per acre applied to the turnip crop, over an equal extent of the same field. The following special manures were applied, viz.: 5 cwt. of guano and 2 cwt. dissolved bones to the turnip crop; 6 cwt. of rape cake to the wheat crop; 1 cwt. of nitrate of soda to the grass crop; and to the oat crop, 1½ cwt. of sulphate of ammonia. The cost of these light manures was under £7, and that of 30 tons of farm-yard manure, £12. At the same time I am not of opinion that this application of these light manures would have been equally successful if continued through another rotation; because, as I formerly stated, I consider their most profitable application to be in conjunction with farm-yard manure. I merely refer to this case as a successful substitution for farm-yard manure in a part of a rotation, and I should farther explain that the crop grown on the land previous to the turnips was wheat after potatoes, to which there had been applied about 40 tons of farm-yard manure, so that a different result might probably follow the same application made to poorer soil, which had been less amply supplied with manure previously. As there are different modes of applying guano and light manures generally I may state my own practice, viz:—When the farm-yard manure has been previously applied in autumn (which is generally the case with me) after the land is prepared for drilling up for turnips, the guano is sown broadcast and well harrowed in, and mixed with the soil, the land being then drilled up and sown with turnip. Where the manure is applied in spring, after it is spread, the drills are rolled down with a moderately heavy roller, so as to cover the manure as much as possible and present a greater surface of the soil to mix with the guano, which is then sown broadcast, and the drills split up and sown with turnips. I have mentioned this as I frequently observe the guano applied to the turnip crops only in the centre of the drill, and when used along with farm manure placed right over it in a narrow line, and seeing it is well known that the roots of a good crop of turnips fill the whole space between the drills of the soil and subsoil as deep as it has been prepared for their reception, it is surely a mistake to confine manure (viz., the guano) which can be equally spread over the whole to such a limited portion of the soil that only a small part of the roots of the crop can come in contact with it. The result of my experiments in applying light manures to grass for cutting is, that I found the most profitable application to be one cwt. of guano about the beginning of March, and one half cwt. of nitrate of soda and one half cwt. of sulphate of ammonia about the beginning of April, selecting moist weather. I have seldom seen an unprofitable application of the light manures to a turnip crop by using too large a quantity, but I have observed less from the same cause with young grass; but, unless in the case of a very dry season, I have generally found the above application repay the outlay in the increased quantity of grass. And, touching the last part of the subject under discussion, I am not aware of any sufficiently satisfactory result of experiment on this subject from which to draw definite conclusions; but, besides my own experience, having ample opportunity of hearing the opinions of others, who have used cake and corn along with their green crops in feeding stock more largely than I myself have done, I am satisfied in my own mind that although it is most desirable to increase the quality of the manure, by the consumption of cake and corn along with the green crop, yet, as the old-fashioned saying is, "gold may be bought too dear"—and keeping in view the price of guano and bones, and taking the present prices of cake and corn, and supposing them to be consumed on a farm to a moderate extent—say not exceeding five pounds per day for each ox, and one pound for each sheep—no farmer would, in my opinion, be justified in debiting his manure account with more than one-fifth part, or twenty per cent. of their cost. And in case, as sometimes will happen, the balance of the feeding account should unfortunately be on the wrong side of the book, I would counsel my unfortunate brother farmer rather to set off the loss against the year to which it properly belongs than to deceive himself by adding it to the manure account of the succeeding crop, which, like many of its predecessors, may have enough to do with its own proper burdens. In giving this opinion, I am not ignorant of the fact that in many counties of England the manurial value of the consumption of cake and corn on the farm is estimated considerably higher than I have stated it at; but I am also aware that these rates were fixed long before the introduction of guano into this country, and as the auxiliary substances are chiefly used for feeding sheep, besides the additional increase of value in the quality of the manure, there was included the benefit derived

from the consolidation of the land from the treading of the sheep, which can be now more cheaply effected by growing green crops with guano to almost any extent; and were the manurial value of the consumption of cake and corn to be fixed under present circumstances, I believe it would be estimated at a much lower rate. In my own experience I find the application of guano and other light manures yearly increasing without interfering to any great extent with the quantity of farm-yard manure formerly applied; at the same time I do not see how we could possibly farm without them, or grow crops that would either please ourselves or suit our present circumstances.

Mr. DUDGEON, Spylaw, Roxburghshire, said—As I must confess I have had no experience in comparative trials with special manures and farm-yard dung produced under different circumstances, which forms the main feature of the question as set down in the programme, I at first felt considerable reluctance to take part in this discussion; and this hesitation has since, I am sorry to say, been rather increased from finding, on inquiry, that I am still unable to throw any direct light upon this—the chief subject of investigation—from the experiments of my neighbours. But as I have had such experience as has been able to satisfy myself of the comparative value of many varieties of artificial manures, and pretty full practice in the use of the chief, and what I have been led to think the most superior of these manures in the raising of turnips —which may be said to be, as practised in the district I now have the honour to represent, the foundation of all the other crops in the rotation on the farm—while I have not neglected to satisfy myself as to the benefit of the application of some other of these special manures to the cereal crops—I trust that, thus confining myself chiefly to the main field of my experience, it may not be without its use that I have ventured now to assist in the discussion of the question now before us. The introduction of bone dust may be said to have given the first great impetus to improved agriculture in the turnip districts in Scotland, where, much of the land being steep, and without much expense and labour inaccessible to ordinary farm-yard manure, as little as possible was made to serve on these high uplands, and hence scanty crops alone were produced. A great change came over the productive powers of these lands, when 8 or 10 cwt. was made to serve the purpose of 16 or 20 tons of manure. No wonder for some time the farmer remained sceptical as to the virtues of so greatly decreased an application; and it was only, it may be said, as each had satisfied himself, that he became convinced that at one step such extraordinary progress had been accomplished. For the first time he now began to listen to the wonderful things which scientific men promised him, and the labours of the laboratory were no longer disregarded. At this time, accordingly many experiments began to be made with purely chemical substances prepared for the purpose. I see, on looking back to my notes upwards of twelve years ago, I engaged on a small scale in many of these experiments, but in most instances, I am free to confess, with little encouragement to extend my operations. But we were not done with all that nature had accomplished for us: and intelligent investigation now began to draw general attention to the highly fertilizing properties of a substance, the virtues of which as an exceedingly effective manure, though known for ages, the stubborn reluctance to adopt new expedients, had hitherto excluded from our shores. Though the attempt had frequently been made before to recommend it to our notice and to introduce it here, it was not then until 1840 that, in the small quantity of 20 casks, guano was brought into this country. I have taken the liberty to detain you with these few preliminary observations as marking the period at which it may be said the more general use of special manures commenced; and the time when the attention of the agricultural community came to be more particularly directed to experiments with chemically prepared substances in comparison with bone dust and guano. It was in 1842, when our imports of guano, which in the last eleven months amounted to upwards of 200,000 tons, were only about 1,760 tons, that I was induced upon a small scale to test the virtues of this valuable manure. Though my experiments were very limited in extent, I took especial care to make them as general in the application as the nature of my land allowed. Those upon the turnip crop thus came to occupy portions of three different fields, the comparison in each case being made with bone dust and well prepared farm-yard manure. The guano was applied at the rate of 3, 4, and 5 cwt.; the bone-dust and farm-yard manure at the usual quantity for an ordinary crop, of 16 bushels and 16 or 18 tons respectively. In every case I was satisfied of the superiority, general healthy appearance, and ultimately in weight, of the drills manured with guano, which, being in juxtaposition and alternating with those drills otherwise manured, showed throughout distinct evidence of a better quality. The weight was subsequently tested, and the whole results at the time reported to the Highland Society. In the same year I applied guano mixed with animal charcoal, two parts of the former to one of the latter, at the rate of 3 cwt. per acre, as a top dressing for barley. This was no comparative trial with any other manure, but merely to ascertain the effects as an additional

stimulent. I cannot say much as to the economical result of this last experiment, and I merely have adverted to it here at all to show my early impression of the questionable nature of the benefit of guano as a manure for cereal crops, compared with the very decided conviction with which I was, at this time, impressed of the high value of this manure as adapted for the growth of turnips. For so satisfied was I of this latter fact, and my experiments, limited though they were, had been so diffused as to enable me well to ascertain the virtues of guano as a manure of turnips on different varieties of soil, that on the following year, while there was not I have reason to believe much more than a similar quantity over the whole county of Roxburgh, I had nearly 100 acres of turnips raised with this manure; and great part without any other stimulating application. The result proved highly satisfactory. I now continued to extend the use of guano in raising my turnip crop, very frequently in the first course applying no other manure; but this only when the whole, or the greater part, of the turnips are consumed on the ground by sheep. I have endeavoured alone to procure the best quality of guano; and when used without other manures, I have been inclined to think, from the result of my first experiment, when the whole crop was weighed, that the most economical application is in quantities from 3 to 4 cwt. per acre. All this time I had not failed to observe other special or artificial manures which were being pressed upon the notice of agriculturists. Some of these professing to give all the valuable elements of Peruvian guano, "with additions;" others to be the concentrated essence, in a portable form, of all that can give virtue to plants as contained in manures of established utility, while others were the carefully prepared substances which science indicated as the best adapted for special plants. Many of these I tried, but only to confirm me in my faith of the superiority generally of guano. It was now that the investigations of science led to the discovery, or perhaps I should rather say to the more general knowledge of the important fact, that, by the addition of sulphuric acid to crushed bones, they became, in this shape of superphosphate of lime, more soluble and better adapted readily to be taken up as the food of plants, by which great economy in the quantity of bones required was effected. In point of money value, the quantity of this substance required for a turnip crop approached more nearly the price of guano; indeed, in some instances, lately pretty extensively used in my own neighbourhood, the cost is, I understand, considerably less. But I have just been told by some gentlemen, who have been in the habit of using this limited quantity of bones thus prepared to a considerable extent of late, that it has frequently occasioned such disappointment as to have led them to the resolution in future to substitute guano. Prepared in the method thus recommended, I have made trial frequently, on a limited scale, of this superphosphate, and have also applied that manufactured and sold from chemical works, in comparison with Peruvian guano; but I must say I have still had occasion to be satisfied generally, at the same price even, with the superiority of the latter. This opinion has been strengthened, and appears to me to be corroborated, by the result of the great majority of the experiments with special manures, reported in the Highland Society's transactions; and it is extremely gratifying to know, from the careful and elaborate analysis of the very eminent chemical officer of the society, that his investigations have led to the conclusion that turnips grown with guano cannot be considered in any respect inferior in feeding properties to those produced by other manures. But I am prepared to admit there are some soils of a dry sandy and gravelly nature where bones will be found fully as efficient and economical, and probably more durable. The operation of such soils upon bones in a minute state of division, seems to be sufficiently active to occasion a dissolution or solubility, fitted to the immediate supplies of the plant, while in all probability a larger portion remains to afford nourishment to the after crops in the rotation than would be preserved from the lesser weight, and more evanescent nature of guano. As a top dressing for cereal crops and grass I am inclined to think guano is surpassed in many instances by other special manures applied at the rate of the same amount in money value, such as sulphate of ammonia, nitrate of soda, and, for permanent pasture, composts with bone-dust. I have reason to believe also that bruised rape-cake is a more efficient and economical application for autumn-sown wheat applied at the time of sowing, though I admit I have not had much experience of this manure, and I think, perhaps, it is less used in the district with which I am best acquainted than it deserves. Perhaps it may be thought in thus dwelling upon the comparative merits of special manures I have unnecessarily occupied the time of this meeting, which, as it does not directly form the subject of this discussion, might have been more hastily passed over. But I conceive it may not be without its use that I have gone over the ground by which I have been led to the conclusion as to the superiority of guano over all other special manures, as thus narrowing the field of the legitimate subject of our investigation, namely, the comparative value, &c., of the various kinds of special manures with farm-yard dung. For having shown

the reasons of this preference for guano, I am not called upon farther to go into the comparison which remains to be made, than as regards the value of guano thus estimated. And, even with the question thus narrowod, here I am met with so many difficulties in my endeavours to make the estimate required, that I confess I have no hope in the time here allotted to me—even were the first data for such a comparison better ascertained—of being able to lay before this meeting, in the absence of direct experiment, the great variety of elements which fall to be considered in coming to a just conclusion on so extensive a subject as is embraced in this question. I must, therefore, content myself by offering a few general remarks by which it will be seen by what considerations I have been guided in my own practice in the matter under consideration, and to what preference I have been led. The difficulty which meets us in the outset, to which I have alluded, in making an estimate of the value of guano in point of economy, compared to that of farm-yard manure, is that the one is represented by a fixed price, while the other is merely of a conventional money value, which varies in different districts and localities. Hence the want of data upon the most material element for such a calculation. I get over this difficulty, however, as regulating my own practice, in still giving a preference to guano as manure for my turnip crop, in comparison with farm-yard dung—in that I have in a great measure, since the introduction of guano, discontinued purchasing dung in the neighbouring town of Kelso. This, which I have established to be equal to the best farm-yard manure, and perhaps about the same money value when all is considered, can be obtained for about 3s. a load, equal to about a ton—18 to 20 such loads being, in ordinary cases, sufficient for an imperial acre; but it costs me, besides estimating the labour at the usual rate of the country, from 35s. to 45s. an acre to lay it down on my farm and subsequently apply it in the drill—

Thus to produce an acre with such manure may be said to cost	£4	16	0
I have found that I have been able to produce an equally good crop of turnips with Peruvian guano, say 4 cwt. at 10s.	2	0	0
Difference	£2	16	0

in first cost. As regards "economy" here is an immediate saving. In respect to "immediate effect" I have said I have found the turnip crop to be equally good in weight and appearance. As to "durability," under ordinary circumstances, and presuming I was obliged to take the whole crop from the field, I believe I would require to admit some defalcation. But with the usual management, and means of disposal as regards the turnip crop in the district, I have no opportunity, at no sacrifice of value in ordinary circumstances, to have the whole, or the greater part, of these turnips, as I may incline, consumed on the ground by sheep. This is accordingly done. I have had no reason to think the succeeding crop of barley or wheat, as the case may be, deficient in comparison with such a crop where the preceding crop of turnips was raised with farm-yard manure. I cannot speak so positively, in every instance, as to the succeeding crops of grass and oats; but still I am inclined to think there has in no case been a deficiency which has not been well met by the £2 16s. saved at the outset. Of course I would be careful not to repeat a similar application of any light manure to the same field in the next rotation; for, however valuable these may be in the elements required for the food of plants in the first instance, every practical farmer's experience must have taught him that there is a substantial and lasting effect in more weighty applications which it would be dangerous long to dispense with. It is, therefore, as accessory, and in conjunction with farm-yard manure, that special manures are especially valuable; and as I am not prepared, from my own experience, to detail to you any trial of a comparative nature with guano and farm-yard manures produced by turnips in conjunction with cake, &c., I trust I may be permitted to make a remark or two on this subject, which may perhaps be of some use in any investigation which may be afterwards made in the institution of such a comparison. Permit me to say, then, that from my experience hitherto in comparing the effects of farm-yard dung produced by turnips alone, and in conjunction with cake and corn, I have not in every instance been able to mark any sufficiently striking difference to justify a strong preference; and if I am right in this, I fear it may be still more difficult to institute a satisfactory comparison as to the value of farm-yard dung, produced in these different ways, with any special manure. It does not seem to follow, because the excretions of animals fed upon a higher description of food are superior in some valuable properties, as affording nourishment to the ordinary plants of the farm, that therefore the manure heap derived from cattle partly fed upon corn and cake must be more efficacious. It may be true that these richer substances contain far more nitrogen in proportion to weight than turnips; but we know that the diminished quantity of the latter consumed by cattle, to which a large portion of cake is given, is so considerable, that the real quantity of nitrogen thus taken up—if that gives the value to the manure—is not augmented to

an extent corresponding with the increased weight of corn and cake which may be thus supplied. Then, as to the question of economy, no doubt a larger number of cattle can be kept on the farm in proportion to the quantity of turnips grown by the addition of artificial food. And let it be admitted that a larger amount of fertilizing properties can be imparted to the straw available for manure by the free use of richer feeding substances; but if, as has been allowed by a great authority on this subject, and one whose practice has been conspicuously held forth as example on such matters to others—"no food, be it hay, straw, turnips, oilcake, or corn, can be bought, brought home, and consumed without a loss (including all charges and casualties) of 33 per cent."—it would follow that the fewer animals that can be kept with a view to the right preparation of the manure heap—by which I mean equivalent urinal saturation—limited to the ordinary feeding substances which the farm affords, the more profitable will be the practice. I do not mean to say, however, I would at all times act upon the principle indicated by the conclusion thus arrived at. I am still rather inclined to think very considerable additional value may be imparted to manures, when otherwise properly treated, by the use of richer feeding substances, particularly oilcakes. And I conceive, moreover, to a limited extent, such food may be supplied to yield a profit—presuming a fair condition of markets—irrespective of manurial advantages. But, taking into account all risks, it is only when there is a good prospect from prices that auxiliary food can be given without any direct loss upon the cattle so fed, that I would consider it safe to enter far into this practice. In the meantime it would be very desirable to ascertain by experiment, extended over the whole course of rotation, what amount of the value of artificial food may be safely placed to the account of fertilizing effects. Hitherto, I must say, I have been in the habit of looking to my stock as something more than mere manure manufacturers, and I well know that rents would soon cease to be paid in Roxburghshire were tenants deprived of the profits which go to form this item in their balance-sheet. A full allowance of nutritious food is at all times essential to secure a valuable manure heap, but at the same time more would seem to depend upon the manner in which it is treated and preserved than upon the nature of food given to the animals which produce it. Much difference of opinion, and not a little absurdity, it appears to me, at present exists on this subject, and notions which agitated the minds of practical men upwards of forty years ago, only to be in the end repudiated, have been revived. I must say I have been inclined all along to agree with Mr. Pusey on this subject, when, in alluding to the escape of ammonia occasioned by the collecting of the urine separately, and the loss of carbon by the consumption of straw in quantities which might be more profitably employed by being otherwise well saturated—he warns agriculturists against what he thus designates "to the last degree questionable in science as well as novel in practice." And I must add further, I think that eminent agriculturist and accomplished gentleman is just in the remark with which he concludes his review of this subject, when he says—"That in the management of manures generally we should adhere rigidly to our present system, and that before it undergoes a radical revolution the various transformations of animal manure require to be traced by chemistry with accurate investigation of its different stages." But, undoubtedly, as I have said, it is as an assistant, and in conjunction with farm-yard dung, that the triumphs of special manure are conspicuously seen. Like some recent improvements effected by the adaptation of science, they have served to give encouragement to what it was at first thought they would supersede. They have done more—they have actually become the propagators of their rival; for by their means the amount of farm-yard dung (after all, the main support and chief foundation of successful agriculture) has been greatly increased. They have, above all, by the facility with which they are administered, unaided, carried fertility to the mountain tops, and, in conjunction with farm-yard manure, have enabled the preparations of the most fundamental crop in the rotation to be properly overtaken within a season formerly from necessity too much extended; but which, as now accomplished, secures success by great additional productiveness. It is well known in practice that turnips sown in the early part of June will, in ordinary circumstances, with a greatly less quantity of manure, be superior to those better treated in this respect, committed to the ground in the latter part of the same month. Thus early sowing is now, by the use of special manures, comparatively easily accomplished, and the duties of an active season brought within due limits, by the practice now so generally adopted, of applying the farm-yard dung in the less busy season of autumn and winter; and it is highly satisfactory to think that the hesitation and doubt by which some men were impressed as to the questionable economy of such a system has been of late much removed by the result of the valuable experiments of Mr. Thompson and Professor Way, as to the absorbing powers of the better descriptions of soils. The result of the former gentleman's intelligent investigations in the field, confirmed and enlarged by Professor Way's

valuable experiments, you are aware has been satisfactorily to establish that loamy soils not only arrest ammonia, but everything that can serve as a manure for plants; and that the deep description of such soils are thus, it has been proved, able to retain all that is valuable in the farm-yard dung committed to them until required by the future crop. Farm-yard manure then applied to the land in the autumn and winter months, as it can be got properly prepared before the first ploughing, and guano distributed in the drill immediately before sowing, I consider the best mode of securing, as far as that is otherwise possible, a full crop of turnips; and, moreover, of preparing the soil beneficially for the after crops of the rotation. I regret, as I feared would be the case, I have found it impassible from my experience, or from that of my neighbours, to give much information directly on the question under discussion, as to the nature of special manures in comparison with farm-yard dung under different circumstances; and I beg you will excuse me if in the observations I have made I have departed in any way from what may be said to be legitimately connected with the subject. I shall be relieved to learn, that in thus endeavouring to give some additional interest to the remarks I have had the honour to be permitted to offer, I have not transgressed the bounds permitted in these discussions.

Mr. MAIN, Whitehill, Mid-Lothian, said—It would be a gratuitous attempt, in a meeting like the present, to get up a special pleading in recommendation of guano, or the better portion of the manures of which guano is the representative. One might as well discuss with a cotton-spinner the importance of using the spinning jenny. There were sceptics no doubt in the virtues of guano, &c., and it is possible that many of ourselves have shaken our heads wisely on the subject. With many the "pickle broon snuff" would not go down at all; but since its wonderful power on vegetable life has been experienced, these doubters have been fain to admit with the old ploughman, "It canna de dooted, it speaks for itself." So, believing that light manures have powerfully spoken for themselves to all of us, we take the admission of their intrinsic merits for granted, and pass on to the question on the card. I shall leave the economics of the question to be discussed after the other divisions of it have had their proper share of attention. This arrangement then at once introduces us to the immediate effects of light manures as compared with farm-yard manure. My experience has led me to the following conclusions on the immediate relative merits of these substances:—1. Light manures have a speedier effect on the growth of turnips and other root crops: not so much that they braird them earlier, as that they push them on more rapidly after they are brairded. I consider this characteristic of light manures as it effects turnips, coupled with a little thicker sowing, a greater security against the ravages of the fly than any of the nostrums we have so lavishly supplied to us. 2. Light manures produce a greater and better sustained growth during the season. 3. Light manures secure a more equal-sized crop of roots, and bring them earlier to maturity. 4. They produce, when applied in quantitive proportion, and at much less cost and labour, an equal, if not a superior, crop. 5. The quantitive proportion, such as I adopt in practice at least, is about 2½ cwt. or 3 cwt. of light manure, as equal to 10 tons of farm-yard manure. But as the application of the light substance is increased, I have generally found that the quantitive proportion may be lessened. Thus, though applying 10 tons of dung to one acre, I would not apply to another acre less than 3 cwt. of guano, for instance; yet if applying 20 tons of dung to a third acre, I would expect to secure an equal result if I applied 5 cwt. of guano to a fourth acre, and so on in proportion. The greater the mass of the light substance its operation is the more active, and its vegetative power is proportionally increased. 6. Light manures do not deteriorate the nutritive value of root crops. On this subject Dr. Anderson's valuable paper in the last number of the Transactions is of great importance, and is clearly demonstrative of the fact that the nutritive qualities of our crops are not injured by the use of light manures, if in fact they are not improved. 7. Light manures are of greater advantage in the cultivation of high land, and lands to which the expensive application of farmyard manure would be attended with difficulty and loss. And 8th, Light manures afford greater facility in the cultivation of root crops, and have supplied us with more abundant means for the production of beef and mutton, and those in better quality. I might add, that light manures facilitate the improved cultivation of all descriptions of soils, and supply to the farmer an easier obtained, a cheaper, and more efficacious agent for keeping his lands in a higher state of fertility. In enumerating these conclusions, I have made them generally applicable to all light manures; but of course there are individuals of the class, on which we can place a greater dependence, and to which in consequence these remarks are more particularly directed. I may enumerate guano, bones as superphosphate, sulphate and muriate of ammonia, nitrate of soda, and to these I would now add dried flesh manure; rape is also useful, but I have found it chiefly as applied to potatoes and beans, and even on these crops all the substances previously enumerated

have, in my experience, been productive of greater immediate results. In the preceding observations I have had in view the comparative effects of light and heavy manures individually applied. If, however, we estimate the effects of the light substances, as they exhibit themselves when combined with heavy manure, all the conclusions I have specified are applicable to them in a greatly enhanced degree: and applied in this mode the quantitive value of these substances is greatly changed. I have found, for instance, 12 tons of home manure with little more than 2 cwt. of guano, produce a crop of turnips fully equal to 28 tons of home manure. In this case 2 cwt. of guano was equal to 16 tons of dung. In another instance I found 16 tons of dung with 4 cwt. of superphosphate produce upwards of 2 tons of turnips per imperial acre, more than 26 tons of home manure. In this case 4 cwt. of the light substance proved itself much superior to 12 tons of dung; and in fact we may justly conclude that, to the extent of our present knowledge at least, the best mode of using light manures is in connection with farmyard dung. It is in this combined form the great bulk of these manures is used, and the consequent immediate effects on the style and character, as well as the results of agriculture, have greatly exceeded calculation. In fact, the use of light manures may now be considered indispensable to the farmer, whether we view them as agents to promote the fertility of his land, or the machinery for extending and facilitating his business. In this way the immediate effects of light manures gain immensely by the comparison with farmyard manure. But the comparison is not more favourable to these substances in their physical, than in their intellectual effects on agriculture—"a spur in the head is worth two on the heels," says the old adage; and the saying is a true one, independent of its original application, applied to all the social relations of life. Now light manures have been the spurs in the agricultural head—their ammoniacal fumes, like the fumes of other potent agents, have supplied energy to the cranial organization, and we may hope they will bring us, with the aid of moderate and wise political appliances, clearly and speedily out of every difficulty, and render us

"O'er a' the ills o' life victorious."

Certainly light manures have given an immense stimulus to the science of agriculture, and the chemical and physiological facts thus eliminated have established a truer and better appreciated theory, and one in greater harmony with the ideas and experience of practical men. But the practice as well as the science of agriculture has been intellectually benefited. Inquiry and observation have been elicited by the occurrence of new facts. Farming, which previously wore but one aspect, varied occasionally by the changes of seasons, now presents various interesting phenomena, the production of which the farmer finds he has to a large extent under his own direction and control. In fact, farming, which was once little better than a blind chance, is now so reduced to a science, and though still dependent on seasons and other agents beyond human control, the farmer, in the judicious use of the means a kind Providence has supplied to him, can more safely, and with less presumption, calculate on the resources of his farm. The next subject for our consideration is the permanent effect of light manures as compared with farmyard manure. This question has received much less attention from agriculturists than its merits demand. Probably this has arisen from a hitherto generally and tacitly admitted *à priori* conclusion, that light manures are not to be trusted for a rotation; for of course in comparing the permanent effects of light with heavy manures, the rotation principle must always form an element in our calculations. And certainly the idea that the "pickle broon snuff" is fitted to enrich our lands, and grow green crops through a rotation, as well as the portly manure we have been in the habit of applying, is, at first sight, sufficiently attenuated to warrant our incredulity. But of late years we have been cognizant of many facts, which make us hesitate to affirm that we will never have confidence in the application of light manures, to be used as rotation manures. The fact is, they are so already in connection with sheep-farming and grazing. The practice of many high country farmers is to grow turnips with guano or bones or rape, and eat the crop wholly or partially on the ground with sheep, and the after-fertility of these lands appears to lack nothing from the want of farm-yard manure. Again, I am aware that several farmers who have had lands long in pasture, have trusted their rotation, when the lands were lifted, to the fertilizing powers of light manures, and have not been disappointed. For several years I have followed this practice on portions of Whitehill home farm, and though I regret I have no special results to communicate, I can safely affirm that the portions so treated with light manures are at this moment as fertile as any other parts of the farm. Indeed, I never hesitate when arranging my turnip break, to exceed by four or five acres the breadth I could otherwise have sown, and to use for those extra acres light manures alone. It is true sheep-farming and grazing form part of my agricultural system, and it may admit of question whether, without these important adjuncts to light manures, they would in themselves be effectual for a rotation. Without anticipating the results of inquiry into this

important matter, I may state that at present I would be unwilling to recommend the use of light manures (except for the purposes of experiment), without combining with them the benefits of sheep culture. Where turnips can be eaten on with sheep, however, I have little hesitation in saying that light manures will not lose in the comparison with farm-yard manure in permanent effects. While this holds true of light lands, however, the question is as yet unsettled as regards heavier soils: and probably on many of these soils the question will have to be determined on the powers of light manures unaided by sheep or even pasture. This will more effectually test their merits; and, indeed, it is desirable that their permanent effects should be tested in this way. Unless we know the individual strength of the forces, or section of forces at our command, we will be unable to use them with equal advantage to ourselves, or to the production of our crops. These once known, however, we may individualize or combine as we choose, with an enlightened perception of the means we employ, and with a machinery well and wisely directed to secure the desiderated results. In the absence of any experiments of my own on the permanent effects of light manures, I may be allowed to refer to the published report of others. In the *Agricultural Journal* for October, 1843, Mr. Gibson, of Woolmet, reports the results of an experiment on the immediate effects of rapecake on the turnip and potato crop of 1840. Mr. Gibson there remarks:—"In 1841, I tried rapecake on a greater scale, and the result was most satisfactory. In 1842, it did not succeed so well from the dry season. As compared with guano it was decidedly inferior; indeed, the latter, applied at the rate of 7½ cwt. per Scots acre, produced a better crop of turnips than any of the other manures I applied that season. In regard to the succeeding crops," Mr. G. remarks, "no difference could be observed on the wheat after potatoes, as compared with that manured with well-made horse and cow dung; but the barley after turnips was decidedly better." This is strong testimony in favour of the continued effects of light manures. In the Highland Society's Transactions, for July, 1845, Mr. Gardiner, at Barrochan, reports a number of experiments on the permanent effects of light manures, and his results range over three years of the rotation. The majority of the results are in favour of the permanent effects of light manures; but as Mr. Gardiner applied the light substances over and above an equal weight of dung, to that of the dung lot itself, their individual merits are less distinctly brought out. In a report of experiments by the Turriff Agricultural Association, however, we have better defined results, and I shall therefore take the liberty of introducing one of the experiments in full. The investigation was conducted on three farms, and the results are wonderfully uniform. The experiment supplies results from three years in the rotation; it was conducted on the farm of Hap, in Aberdeenshire. It is as follows:—

No. of lots.	Substances employed.	Quantity of each applied.	Immediate results. Crop 1843. Turnips.			Continued effects. Crop 1844. Oats.			Crop 1845. Hay.		
			tons	cwt.	qrs.	qrs.	bush.	lbs.	cwt.	qrs.	lbs.
1	Bone dust	20 bush.	13	6	1	5	0	16	21	1	12
2	Ditto and sulphuric acid	12 „	10	18	2	4	1	10	19	2	4
3	Guano	6 cwt.	16	13	0	4	3	21	15	2	4
4	Farmyard manure	20 tons	13	18	2	5	5	15¾	18	3	20
5	Farmyard manure and Bone dust	10 „ 10 bush.	12	18	3	5	0	35	22	1	20
6	Farmyard manure and Dissolved bones	10 tons 6 bush.	16	17	3	5	4	13	19	1	8
7	Farmyard manure and Guano	10 tons 3 cwt.	18	18	1	6	2	16	22	0	0
8	Peat Bone dust Sul. of ammonia Nitrate of soda	10 tons 6 bush. 75 lbs. 56 „	13	0	0	4	3	5	17	0	
9	Farmyard manure Bone dust Sul. of ammonia Nitrate of soda	10 tons 3 bush. 37½ lbs. 28 „	17	15	3	5	7	22	21	1	24

These results unquestionably prove that at all events the effects of light manures, even unaided, are not so ephemeral as many may be inclined to suppose. The effects of bones on the hay crop of the third year are astonishing, and speak well for their permanency. Undoubtedly, however, the greatest results—immediate or continued—of all the years proceed from the combination of light manures with farmyard manures. This fact, and many other weighty reasons, connected both with the character of our soils, and our system of farming, warn us in the meantime to counsel the conservation and improvement of our old ally—farmyard manure; and though we dare not say that, as compared with it in permanent effects, light manures do not present many claims to our regard, yet we await the results of more definite experiment before we can assert, that unaided they are superior to it, if indeed equal. Light manures, however, demand, and are entitled to have their merits as rotation crops more fully investigated. They have made out a strong case in support of this demand, and agriculturists will greatly overlook their best interests if they allow the question to remain much longer in abeyance. It is true, that while we produce cattle as well as corn, we will always find farmyard manure of value as a fertilizer, and so far there is less inducement to attempt its substitution. But cases will readily occur to every mind, where the lessened use of farmyard manure would greatly aid the farmer in his struggles with hard times, or with any times, and while easing his labours would increase his profits. Our interests then obviously demand that we become better acquainted with these new agents, and determine by accurate experiment their true value as auxiliaries and independent manures. No prejudices should be allowed to mar the investigation. In those days of "*no favour*" we must cast about our ideas on the field of fair and judicious inquiry, and incorporate them with other forms, and other associations than those of the past, and on the old principle of putting "every iron in the fire," attempt the subjugation and appliance of every power from which we can extract the greatest good. We have now to attend to the last branch of inquiry—the economic effects of light manures as compared with farmyard manure, the produce of turnips alone, or turnips with auxiliary feeding. In the preceding remarks, I had in view their application to light manures, as compared with any description of farm manure. My experience of the value of light manures has been chiefly in connection with dung, enriched by auxiliary feeding, and if I have found them so superior by this test, I am entitled to argue their greater superiority in connection with home manure not so enriched. Hence the following economical conclusions are applicable to light manures, as compared with either description of farmyard manure:—1st, they secure lessened outlay in farming; 2nd, greater productiveness; 3rd, greater facilities in agricultural pursuits; and 4th, a fruitful and secure means of promoting the improvement, and maintaining the fertility of the soil. There is no necessity for entering into further detail on these conclusions: my previous observations establish their correctness. I apprehend, however, that the question is not exhausted by these remarks, and that to do it full justice, we must institute a comparison betwixt auxiliary food to cattle as a means of enriching manure, and light substances as auxiliaries to it. That is the comparison of the effects of light manures with those from auxiliary feeding. This question enters largely into the economics of farming, and from the very absurd notions entertained regarding it, many have been led to excessive and ruinous outlay. To understand the question aright, it will be necessary to determine as nearly as possible the extent to which auxiliary feeding to cattle enriches home manure. Last year I conducted an experiment on Swedish turnips with this object expressly in view, and I shall now take the liberty of detailing the results. The field is a heavy clay, thorough drained; it received two deep furrows in the autumn of 1850, and the land was prepared last year for the turnips with the grubber and roller alone. Each experimental lot contained one-fourth of an imperial acre, and was manured at the rate of 20 tons of each description of home manure per acre; in addition, each lot received at the rate of 5 cwt. per imperial acre of Peruvian guano, and dried flesh manure in mixture, in the proportion of 3 cwt. of guano to 2 cwt. of the flesh manure. I may just add that each lot had its proportion of light manure weighed, mixed, and applied separately to secure correctness. The turnips were lifted and weighed during the last week of December, and the first week of this month. The weight of bulbs is the mean of two portions lifted in each lot. The following are the results:—

RESULTS OF AN EXPERIMENT ON SWEDISH TURNIPS. CROP 1851.

Nos. of Lots.	Description of application.	Produce per Imperial acre. Tns.	cwt.	lbs.
1	Home manure—old rotten dung, made by summer fed cattle—food, cut grass, straw fodder, with 6lbs. of oilcake daily	21	17	56
2	Home manure—old and rotten, made by cattle kept during winter—food, full turnips, and straw fodder—no auxiliaries	18	2	84
3	Home manure—8 weeks in heap, made by cattle winter fed—			

Nos. of Lots.	Description of application.	Produce per Imperial acre. Tns.	cwt.	lbs.
	food, full turnips, straw fodder, with 6 lbs. of oilcake (home) daily	21	11	84
4	Home manure—8 weeks in heap, made by cattle during winter—food, full turnips, straw fodder with 5lbs. of rapecake daily....	17	16	..
5	Home manure—in a rank or green state, made by calves—food, turnips, with 2lbs. of home oilcake—*taken from open court*	16	18	..
6	Home manure—exactly the same as lot 5, but *taken from covered shed*.....	18	6	..
7	Home manure—in a rank state, made from feeding cattle—food, full turnips, straw fodder, with 6lbs. home oilcake—dung *taken from open court*.....	18	0	56
8	Home manure—exactly the same as lot 7, but *taken from covered shed*	19	16	56
9	Home manure—in a rank state, made by three young horses—food, hay fodder, turnip mashes, &c.	16	1	84
10	Home manure—exactly the same as lot 9, but *taken from covered shed*.....	10	0	84
11	Home manure—in a rank state, made by pigs—food, offal, with a mixture of coarse dust and cracklings	20	16	56

The portions of the above results applicable to our present purpose are those of lots 2 and 3. The first, the produce of dung from cattle fed on full turnips without auxiliary food; and the second the produce of dung from cattle fed on full turnips, with 6lb. of home oilcake extra per day. Both descriptions of dung were in a rotten state, but the manure from turnip feeding alone was about one month longer in heap than the other, and consequently fully more rotten. The result is 3 tons 9 cwt. of bulbs. in favour of auxiliary feeding. I shall now state the results of portions of two experiments with home and light manures in combination, as against home manure alone. The first to Swedish turnips, crop 1849. The 1st lot received at the rate of 26 tons of farmyard manure alone; and the 2nd lot, 16 tons of farmyard manure, and 4 cwt. of dissolved bones, and the produce was as follows:—

	tns.	cwt.	lbs.
Lot 1, at a cost of £7 16s. produced....	19	7	43
Lot 2, at a cost of £7 4s. ,, ...	22	2	76
Leaving excess in favour of dung and bones.....	2	15	33

The next experiment was on Dale's hybrid turnips, crop 1850. The 1st lot was manured with 28 tons of farmyard manure; and the 2nd lot, with 12 tons of farmyard manure, and 228lbs. of Peruvian guano, and the produce was as follows:—

	tns.	cwt.	lbs.
Lot 1, at a cost of £8 8s., produced....	21	5	28
Lot 2, at a cost of £4 13s. ,, ...	21	13	14
Leaving excess in favour of dung and guano.....	0	7	98

So far the vegetative results are in favour of auxiliary feeding; but we must now apply the economical test to these results, and they will stand as follows:

	£	s.	d.
Cost of auxiliary food in 20 tons of dung—calculating this quantity as the produce of 2½ beasts (as on a calculation of last year's manufacture of manure. I estimate that each beast left me rather less than 8 tons), we have the sum of	2	3	0½
Value of 3 tons 9 cwt. of swedes, at 7s. 6d. per ton, the consuming	1	5	10½
Loss from auxiliary feeding	£0	17	2

Of course I estimate the value of the auxiliary food in the manure, on the principle of the advocates for its excellence, at one-third of the original cost. Here, then, is a clear loss of 17s. 2d. per imperial acre. But the economic results of the experiments with light manures as auxiliaries to farmyard manure, exhibit a decided gain. They are as follows: first experiment, 1849, on Swedish turnips, I gained—

	£	s.	d.
1st, Increased produce, 2 tons 15 cwt., at 7s. 6d. per ton.....	1	0	7½
2nd, Saving on original cost of manure ..	0	12	0
Gain from application of bones	£1	12	7½

Second experiment in 1850, on Dale's hybrid turnips, I gained—

	£	s.	d.
1st, Increased produce, 7 cwt. 98 lbs., at 6s. per ton	0	2	4
2nd, Saving on original cost of manure ..	3	15	0
Gain from application of guano.....	£3	17	4

These calculations clearly enough prove the great economical superiority of light manures, as compared with the immediate effects of auxiliary feeding in farmyard manure. But this advantage is further evident, from the fact that the auxiliary feeding was in the application over and above the same weight of manure—each lot receiving at the rate of 20 tons per imperial acre; whereas the light manures left a large quantity of dung free, to be used in extending the break of turnips—in one case 10 tons, and in the other 16 tons of farmyard manure was thus saved, or a quantity equal to an additional two acres of turnips. Now this latter fact itself is of sufficient importance to stamp the greater value of light manures in point of economy; and, even admitting that a much larger produce could be raised from manure enriched by extra food

than my experiment exhibits, yet taking all the advantages of light manures into calculation, an ample margin is left for increase in the productive powers of these rival fertilizers, and despite that increase, there will still be left more than enough to prove their superiority. I am aware that I left unnoticed numerous minutiæ of calculations in this estimate; but if the omissions were supplied, the advantages of light manures over auxiliary feeding, taken at its estimated manurial value, would only be the more apparent. If such calculations as those I have enumerated were carefully attended to, we would hear less of the manurial value of auxiliary feeding, and of the absurd estimates based upon it. The idea is wholly chimerical, that if we lose on our feeding speculations, we make up our loss in our manure. In the first place, I have shown that at least we can obtain more effectual and more economical agents as fertilizers than any description of auxiliary food; and then I must take leave respectfully to question the possibility of getting back in increased productiveness the sum we have lost on turnips or cattle. Even admitting the probability of the productiveness, there is the uncertain state of both the cattle and grain markets to check an over zealous expectation of retrieving our loss. But examine the question of productiveness. I have shown a loss of 17s. on the manurial value of the extra food, as compared with its increased produce; but to this I have to add the value of at least half an acre of turnips, which I could have had extra had I used light manures alone, and estimating those at 50s., I have an aggregate loss of £3 7s. per acre to make up, or a sum equal in my case to two rents. Now, just calmly consider the possibility of this sum being obtained from land already in a high state of fertility. No doubt, the great apostle and advocate of this principle (Mr. Mechi) says, that after his great outlay, he has now nothing to do but to redeem his loss by severe cropping. How does he mean?—without further expenditure? Then a more unscientific and impracticable scheme was never propounded. By moderate and more judicious outlay, and fair rotation cropping, he *may* make his farm *pay* in the future, but he may bid "a long and last farewell" to his lost thousands. Do I then condemn auxiliary feeding? By no means. As a part, and an important part, of our improved husbandry, it is indispensable. What I condemn is the abuse of the principle. Farming, as well as other speculations, should be conducted as near to the mercantile principle as possible, and our attempt should be to render every individual part of our system *self-sustaining*. If we depart from this rule, and spend large sums on one department, in the hope that the greater profits of another will repay our expenditure, we build on a false foundation, and only doom ourselves to certain disappointment and loss. Moderate expenditure, in auxiliary food, I have always found profitable. My usual practice is to give 6lbs. of extra food daily to each beast; and last year this system, besides repaying the whole extra outlay on food, left £5 per acre for turnips. But on a calculation I find that had I given a much increased allowance of extra food, I would have left little or nothing to pay for turnips. This last result would have inflamed a desire for after advantages, which I might have dreamed of, but never realized. In conclusion I do not hesitate to admit that auxiliary feeding does improve our home manure, I have shown it by experiment; but the advantages we thus derive from the system ought to form part of our profits, to afford some remuneration for our extra trouble, and some additional per-centage for our extra capital. If we must calculate on these advantages to repay a loss, how useless are our efforts at improvement, and how profitless withal! Our feeding system must be self-sustaining, or it is worthless and worse than worthless. But with economy, and fair markets, which we are entitled to calculate on, this system can be rendered profitable, and in fact more profitable with than without extra feeding. Taken as its self-supporting estimate we make auxiliary feeding a useful appendage, or rather an inseparable part of improving agriculture; but at its contingent estimate, it is a clog to the advancing wheel, better to do without it altogether. But we are not to fear, or adopt any such alternative; and we just perceive in auxiliary feeding another aid to our efforts, which, in combination with light manures, will enable us largely to enhance the fertility of our soils, and have a fair remunerative profit to ourselves.

Dr. Anderson said, the subject under discussion is one of much importance, and now that guano and other light manures are so extensively employed, deserves the best attention of the farmer. It is exactly one of those matters on which science and practice meet on a common ground, and regard the same questions from different points of view, and are enabled mutually to illustrate and assist one another. The observations of the different speakers, and the opinions they have expressed, are strictly in accordance with the conclusions to which we are led by theory. Mr. Dickson has informed us that guano is much the cheapest artificial manure, and that corresponds completely with a statement I made some time since, in the Transactions of the Society, that it must of necessity be the cheapest, as the valuable matters of manure are obtained in it at a lower price than they can in other substances. I agree in full, however, with Mr. Dickson, that these light manures can never be depended on as com-

plete substitutes for farmyard manure. They are most important as applications to rapidly growing crops, such as the turnip, because they supply rapidly a large amount of the essential elements of the plant, while farmyard manure only yields these matters slowly, and steadily during a longer period of time. It is for this reason that guano proves so valuable, and not because it affords more nutriment to the plants than farmyard manure does; in fact, it actually supplies much less: 30 tons of farmyard manure—which may, however, be taken as a large manuring—yield to the soil about 200 pounds of nitrogen, corresponding to about 310lbs. of ammonia, and about 450lbs. of phosphates. But 5 cwt. Peruvian guano, which would be an ample supply, contain only about 87lbs. of ammonia, and about 100 to 110 of phosphates. You see that if this be the case we could never depend upon guano, in this proportion at least, as a substitute for farmyard manure; in fact, a turnip crop of 20 tons per acre, which is not very large, takes from the soil pretty nearly that quantity of ammonia to form its nitrogenous constituents, and more than half the quantity of phosphates which the guano contains. It is obvious from this that guano must of necessity merely exhaust its effects upon the crop to which it is applied, and comparatively little influence will be exerted on those following: some effect there must be, but comparatively trifling. Mr. Dickson has related a very interesting experiment, in which he employed a variety of light manures throughout the rotation, and with good effect. I agree, however, with him that a repetition of the experiment throughout another rotation could scarcely have given an equally good result; for it may be easily shown by calculation that his crop must have carried off more nitrogen than they received from the manure employed, and they must consequently have been abstracting nitrogen from the soils; and though the quantity of that element which a fertile soil contains is, comparatively speaking, considerable enough to supply many crops, still the state in which it exists is such as enables it only slowly to become available to the plants, and of course if nitrogen be not supplied from without, the crops must of necessity diminish in amount. The comparative value of the manure produced by cattle fed on turnips, and on turnips with auxiliary food, is a subject on which I have no information. I question, however, much, whether any great difference will be observed. It is true, we supply a much smaller weight of food in the shape of these auxiliaries; but though the actual quantity of nutritive matters is proportionately large—5lbs. of oilcake, for instance, containing about as much nitrogen as a cwt. of turnips, and in this respect perhaps a benefit might be obtained—yet it must not be forgotten that that auxiliary food was used in the hope of producing a larger amount of fat and flesh, and therefore it seemed that a larger proportion of that nutriment passed into that form, and if that were the case no advantage would be gained. Mr. Main's experiments throw more light on this subject than any with which he was acquainted; but with all deference to that gentleman, he would desire to see these experiments continued through a series of years, for he considered that in all agricultural matters, single experiments must be accepted with great caution.

In answer to a question by Mr. Gulland, Newton of Wemyss, Fifeshire, Dr. Anderson explained that if the necessary elements could be supplied to the soil in the form of guano, he believed it would be the cheapest manurial application; but he doubted whether the supply of guano to the full money value would have the same effect on the crops of the rotation, as guano was especially applicable to the quickly growing crops, as turnips, and not so much so to the cereals.

Mr. MILNE, of Milnegraden, remarked that taking comparative values of farmyard manure and guano, the former contains a much larger proportion of chemical ingredients, and consequently ought to be a much more productive agent: so also with oilcake, which containing a greater proportion and variety of elements ought to prove the more powerful in the fattening of animals. In like manner, a combination of manures is more likely to give to the plants the various numerous ingredients which they require. This is a circumstance which is not sufficiently attended to. Guano presenting the elements in a more highly soluble form, tends especially to quicken vegetation, while the other manures contribute to the permanent support of the land.

Mr. FINNIE, Swanston, doubted the continued effects of guano, and remarked, that however fine the appearance of the crop, he invariably traced the effects of the guano when the crop came to be thrashed.

The CHAIRMAN remarked, that the present meeting seemed to him inferior to none to which at least he had had the opportunity of listening. His Grace shortly referred to one or two of the leading points which had been brought out in the discussion.

On the motion of Mr. WARDLAW RAMSAY, of Whitehill, the thanks of the meeting were given to the chairman.—North British Agriculturist.

THE CULTIVATION OF DUPLICATE CROPS ON THE SAME LAND.

Of the new propositions which are made to the agricultural public, that of growing more crops on the same area of land is amongst the foremost. We do not mean growing a larger produce of the same kind of plants, but the production of either several kinds of plants in one year in succession, or at least the combining of them, so as to interfere as little as possible with each other, and by this means yield a much larger proportion of food from the same soil.

Now, theoretically, this is decidedly correct. There are many plants which have a large leaf development, and derive a large proportion of their sustenance from the air and from the water. There are others which have a small leaf development, and hence derive a large amount of nutriment from the soil. The same may be said of roots. There are some which send down wedge-like tap roots, and derive a large portion of their food from the lowest stratum of soil—almost from the subsoil. There are others which are continually spreading their small filaments sideways in all directions. Now, these may be combined, for they do not much interfere with each other mechanically. So chemically there are some plants which feed largely on a certain class of mineral constituents, and but slightly on others, and *vice versâ*; while some feed on the organic and some on the inorganic, the one in larger proportions than the other. Now, if these could be so combined together on the same soil, it is perfectly feasible to suppose that a much larger amount of food per acre might be obtained of two kinds of produce than one. Hence some parties have mixed seeds. They have sown rye and wheat together, called maslin; and they have obtained a larger produce per acre in bushels than they could possibly do by either the one or the other. They sow two or three kinds of turnip seed at once, and as they go on in the process of turnip hoeing, they throw out the least promising looking plants, and they find that Nature has selected for the soil and season those individual plants, or that kind of turnip plant which is best adapted for the one and the other, and hence have a larger crop.

But there is another mode in which crops may be combined: they mature at different periods. Hence artificial grasses, which are useful in their second year, are sown with barley, which ripens in the first, and is consequently out of the way, before the second crop is required, and instead of wasting two years over producing it, the land is going on. But there is manifestly a limit to this mode of farming. We well remember a theorist who, seeing the fertility of good grass land, determined to try his hand at growing beans on grass land without ploughing up. He commenced by driving a deep cut in the grass, a little wedge-shaped, and in this he put a set of rows of beans. His plan was to have wide rows of beans growing with grass, the latter to be hand-mown, and so eaten while the former were ripening. He calculated that, as the beans did not occupy above one-fortieth part of the absolute surface—at least in the early stages of their growth—the loss of grass would be scarcely perceptible; while, if he got some twenty or thirty bushels of beans per acre, as he fancied he easily could do on fresh grass land, he imagined he had found out the way to get rich. And he did sow; he mowed the grass; he watched the beans: but they grew up to a certain period—some five or six inches high—and withered away; and all his plan of combination faded away.

We have seen, in gardens, beans and even cabbages grown with potatoes, on the same land; nor could it be said that, in ground so highly manured as garden-ground generally is, there can be any want of crop—any over-cropping of the soil: and if, on a farm, a greater weight of nutritious green food could be grown by adopting any of the schemes which are propounded, there is no doubt but it must considerably benefit the farmer. But how far can it be done? Great success is sometimes reported to have attended the cropping of a dry, blowing sand, during its fallow-time, with mustard, and rape succeeding it. Instead of the open fallows in the south all the year, a bastard fallow is sometimes made, and winter tares sown, to cart off and eat on the land green with sheep, so manuring and consolidating a soil, which is afterwards broken up and mellowed by the plough, the drag, and the harrow. A crop of rye is sometimes taken off between the wheat and the turnips. We recently met with a gentleman who is a theoretical chemist, and who makes agricultural chemistry his peculiar study, who very strongly urged upon the agriculturists so far north as Yorkshire to insert a green crop of some description between the wheat and the turnips as a rule. He argued that, the wheat being off in—say September, there was ample time for stubble-turnips, rye, Italian rye-grass, winter tares, or some such green food for stock; and that, all this food being absolute gain to the farmer, on which no more rent, rates, tithes, and very little labour, were chargeable,

it must be an advantage to the farmer. But this is not so. The climate is too cold and backward for stubble turnips. The lighter soils, on which this would be applicable if carried out, would be so opened by the mechanical influence of the roots of the plants, that the succeeding crop of turnips would never be obtained, at least in a droughty season; while, if the roots were attempted to be cleared off, the working of the soil then would be destructive. If any could be introduced, it might be the rye-grass. There is great command over this by the application of liquid manure. Sown on a clover stubble in the spring, when the young wheat plant is growing, it would be a pasture early next spring. A plough, and share or skim, before it, would easily get rid of this, and form a bed of decaying matter below the soil beneficial rather than injurious to the turnips. But, as this could only apply to deep loams, and where there were no weeds, it could not be of very extensive application.

There are circumstances easily conceivable when it may be desirable to grow as many crops as possible on the same surface of land. Thus the demands of a town increase the value of products which will not bear a very long transit, and hence great rents are paid for convenience. It is called accommodation land, and we know parties who find it economical to pay ten pounds per acre for land close to their dwelling. Now on this land it is clear every effort should be made to produce the greatest amount of crops possible. On land situated differently it is a simple question of economy. The gross producing of say ten pounds worth of produce per acre—over seven pounds per acre is not all profit—and it is possible that it may be more profitable on some farm land to allow it to lie a winter, and even an occasional summer fallow, in preference to growing an intermediate crop. Nay, more, on a very great many soils in the country we are convinced that, if instead of a four-course shift—a really exhausting course when attempted to be self-supporting on inferior soils—a five-course were adopted, and after the midsummer of the second year of seeds—when the clovers usually begin to yield but little food—we are certain that great advantage would accrue to the farmer by a bastard fallow. We had rather run the chance of a little lightness of the soil arising from it, and all its probable damage to the wheat or other crop which might be sown, than contend with the ruinous effect of the weeds upon it which, in low qualities of soil, ever insinuate themselves in the wheat crop at the close.

Mr. John Sillet, of Kelsale, near Saxmundham, in Suffolk, has recently called attention, in a pamphlet on fork and spade husbandry, to which we shall more particularly hereafter allude—to a mode of growing two, three, and even four crops on the same piece of land in twelve months; and, while there are many valuable hints and suggestions—while we are quite certain that much of his process might be adopted by small suburban farmers—we are not prepared to advocate its full adoption on any inland farm, unless there were special circumstances of soil or situation, especially demand for the crops, or peculiar favourable position for obtaining cheap manure.

We will first give an idea of the area and produce of the land. Two acres were purchased at £118 per acre—a proof of two circumstances, viz., convenience and good quality of the land. *He breaks up this pasture*, and consequently avails himself of the manure of his predecessors, accumulated in centuries, and which he paid for in the £236; in other words, he commenced cropping out of capital. In proof of its being in a convenient position and thriving neighbourhood, where there was a population and a market, he had £163 per acre bid for it, and could since sell it for three times that sum. So much for his land. Now for his produce in 1847. He made as follows:—

	£	s.	d.
Produce of two cows, after family's consumption, fattening one calf and weaning one	29	12	8
One calf fatted weighed nine stone, at 8s. 2d. per stone of 14 lbs. £3 12 6			
Skin, head, feet, &c. 0 16 0			
	4	8	6
One-year-old heifer	5	0	0
One fat pig of eight stone, at 8s. per stone	3	4	0
Twenty sacks of potatoes, at 8s.	8	0	0
Twelve bushels early ditto, at 5s.	3	0	0
Seven thousand cabbages, at 0½d.	14	11	8
Twelve pecks of onions, at 1s.	0	12	0
Various seeds, vegetables, &c.	5	15	0
	74	3	10
Deduct rent for land, at 5 per cent. on purchase money (including expenses), £250 12 10 0			
Rent for house 8 0 0			
Rates, taxes, &c. 2 12 0			
	23	2	0
What he calls "Nett profit for the year"	£51	1	10

Now what we have to call attention to, is the gross rather than the "nett profit," for it is clear it is no such thing as *nett profit*. There are no deductions for *seed, labour,* nor interest of capital; and the produce of the cows is not given clearly, for it is a very small produce in itself; only the family are supplied, and the extent of this supply we have no

means of knowing. We know two cows are in favourable situations, capable of making £60 per annum gross, if they are successful, and of a right kind; but the question of the greatest consequence in the matter is, how is he able to *keep two cows and a yearling out of ten acres of newly taken out grass land?*

This brings us to his plan of growing four crops off the same piece of ground within the year, consisting of cabbages, wheat, potatoes, and Swede turnips. Early cabbage seed is sown on the 22nd of July in beds previously manured and dug. These are planted out in rows the first week in October, two feet apart. The interstices are sown with wheat about the last week in October; Spalding's prolific being the kind selected. In the middle of February early potatoes are dibbled between the cabbages, which we ought to have said are transplanted fifteen inches apart. In May he cuts off the blades of the wheat close to the stem, and gives them to the cows. This gives food in considerable quantities to the animals, air and space to the potatoes, and prevents the lodging of the wheat. The cabbages are fit for use and cleared off in May, and in June the potatoes in Suffolk, are ripe and fit to take up for sale, being ash-leaved kidneys. He then digs the rows between the wheat out of which the potatoes and cabbages have been taken, and plants out in the last week in June rows of Swedish turnips, which make the fourth crop. In August, early, the wheat is fit for cutting, and then the swedes have the full benefit of the sun and air. He does not mention digging nor forking the spaces from which the wheat has come out, but we doubt not this is done; and thus in twelve months, by combination of crops ripe at different stages, and by the transplantation of those capable of it, four crops, and these in a fine climate, and a rich and fresh soil, may doubtless be obtained. The labour here is, however, it must be confessed, very considerable, and he has not taken proper credit for it in his balance-sheet, but we have no doubt there are situations and circumstances where it will pay.

He has also similar combinations of other crops, as potatoes, beans, and turnips; mangold and beans; cattle-cabbages and beans; and so far as he shows skill in combination, in producing great bulks of produce from a small area, and, above all, selecting the best possible soil for the success of his experiment, we cannot but give him credit.—Gardeners' and Farmers' Journal.

THE AGRICULTURAL DISTRICTS OF ENGLAND.

[FROM THE TIMES' COMMISSIONER.]

MATLOCK, DERBYSHIRE, FEB., 1851.

On a wet and stormy winter night we arrived by railway at Matlock, too dark to get a glimpse of the country, the only outline indication of which was the glimmering of window-lights—some beneath us, some at the same level, and some far above us. The morning opened with a crisp light frost, and presented a scene from the esplanade in front of Mr. Greaves's hotel contrasting pleasantly with the plains of the vale of York, which we had traversed on the preceding day. Deep in the recess of a rocky valley lay the little village of Matlock Bath, while dotted about the sunny face of the steep hill by which it is shut in, at all various points of elevation, stood villas of different architecture, prettily interspersed with trees and little patches of green field or garden ground. In the bottom of the valley flowed the swollen Derwent, brown with winter floods, hemmed in on its opposite bank by lofty crags of mountain limestone, every crevice of which and each bluff projecting eminence were clothed with wood. Entering the railway carriage, we were soon whirled through a tunnel about a mile in length, whence we emerged on a more open country skirting the stream of the Derwent. Along the river the fields are chiefly in grass, forming the meadows which yield winter food for the stock of the dairy farmers.

The southern and northern parts of Derbyshire are very dissimilar, the former being in many respects like the adjoining parts of Leicester and Stafford, the latter celebrated for the beauty of its scenery, and its constant succession of hill and valley. On the moors of North Derbyshire commences the back bone of England, whence a continuous range of mountain stretches northwards by Yorkshire and the northern counties to the Scottish border. The principal geological features of this district are the grit and mountain limestone, the river Derwent forming the boundary of each. On the grit the soil is earliest, and vegetation springs more rapidly. On the limestone the land is richest, and its pasture stands out longest. The best feeding pastures are found on the latter, and those which yield the highest rent to the landlord and the largest returns to the farmer. The High Peak is a region of bleak high moors, intersected by deep valleys, where the native breed of white-faced moor sheep are the only stock that the severity of the climate admits. It is very subject to violent storms of wind and rain, which, with the high elevation of the country, render it cold and backward, and the vegetation more bulky than nutritious.

In the lower country, within the limits of profitable cultivation, the land is still very hilly, but it is cultivated to the tops of the hills. Wheat, which is grown as high as 600 feet above the level of the

sea, does not, on the whole, succeed well. It is generally thick chaffed, and does not yield in proportion to the bulk of straw. Oats are more common and much more to be depended on. They are grown successfully at an elevation of 900 feet. Nine-tenths of the county are in grass. It is a dairy and rearing district, the growth of corn being of quite inferior consideration. The farmers of the lower hills rear, from their dairy stocks, short-horned cattle, which are sold to the graziers of the low country to be fattened. The same practice is generally followed with Leicester sheep, which, after the first winter, are passed off to the richer clover of the low country farmer. In some places, however, the pastures are of rich feeding quality, and for the most part they are sweet and healthy for stock.

Passing from a general description, we proceed to detail the management of the farm of Birchills, on the Duke of Devonshire's estate, in the parish of Bakewell, and occupied by Mr. Furniss. It is 300 acres in extent, 100 acres of which are permanent pasture and meadow, and 200 acres tillage, the half of which is in crop. The course of cropping is not very clearly defined, the great object with Mr. Furniss, as with all tenants of highly manured farms, being to grow as heavy crops of the most valuable kinds as can be grown without lodging. The fields are laid out in divisions of 12 or 13 acres each, the landlord paying the expense of new fences and the tenant doing the team work. Drains, where requisite, are made 30 inches in depth, still laid with the expensive three-inch tiles and soles; all at the Duke's charge, except team-work. On this outlay no interest has yet been charged. The soil is a fine friable loam, with a considerably undulating surface.

On breaking up from grass the first crop is usually oats, sown on one furrow, and yielding an excellent crop, 72 bushels to the acre, and weighing 42lbs. to the bushel. The next crop is swedes, for which the land receives the usual autumn and spring cultivation. In the end of May it is drawn into ridges, about 28 inches apart, into which 15 tons of well-rotted dung and 16 bushels of bones are applied per acre, and the seed is then sown. This is uniformly a successful crop, the average for the present year, as weighed on the ground by impartial judges, being 27 tons an acre. The winters being generally very severe, the swede crop is taken up before winter, and stored in little heaps in the field, of about one and a half ton in each, covered with straw and nine inches of soil. In these the turnips remain protected from the weather or the depredation of game till wanted. But the expense of this operation seems very great, being not less than 15s. an acre for lifting and pitting, besides cartage. The turnips are followed by oats, or barley, which are sown out with red clover or mixed seeds, part of which are mown and part pastured. The "seeds" are dressed with dung, the clover does not require it. The clover stubble or second year's seed, as may be, is broken up, and, after being ploughed, is pressed and sown broadcast with red lammas or Burwell wheat, eight or ten pecks to the acre. The yield varies from 30 to 36 bushels. Instead of swedes or turnips, rape is sometimes taken, sown in ridges at the same distance, and manured with bones. The rape is eaten off with sheep early in autumn, and the land is then sown with wheat.

Seventy head of cattle, young and old, are kept on this farm. They are all high bred short-horns. A milking stock of 12 cows is kept, which, besides rearing 20 calves (the requisite number of young calves to make up this quantity being purchased in the neighbourhood), yield, in cheese and butter, about £8 each. The calves are fed for the first fortnight with six quarts a-day of new milk (three quarts at a time); after that, with two gallons a-day of skimmed milk, with which half a pound of boiled linseed is mixed. This is continued till the calves can help themselves to other food. The sales annually consist of 20 three-year olds: if oxen, fat, if heifers, in calf, at an average price of £10 to £12 each.

The sheep stock comprises 110 high-bred Leicester ewes, the produce of which used to be sold at 20 months old, but, by an improved method of winter feeding, are now ready for the fat-market in little more than 12 months. In a sheltered situation not far from the farm buildings, and so placed as to admit of access on all sides to different pasture fields, a nicely contrived establishment for the winter feeding of sheep has been erected. It comprises, in the centre, a house for turnips, with a loft over for hay and cake or corn, and accommodation for the shepherd in the lambing season. Behind this are two yards, open in the centre, and shedded all round for shelter. A rack for hay runs right round the shed, and under it a manger for the cut turnips and cake. The yard is littered with straw or haulm. Each yard opens into a pasture field, to which the sheep have access for exercise. As soon as the pastures fail in autumn the young sheep are put into these yards, and there receive the whole of their food. They have cut swedes twice a-day, 1lb. of oats each, and ½lb. of cake each, for the last ten weeks, besides hay in the rack. Both fleece and carcass are improved by this management, food is economized, and the stock are less subject to casualties. The year-old sheep sell at 30s. each, besides their wool, at present worth 6s. more. The ewes are lambed in one of these yards.

Five horses and a riding nag do the horse-work of the farm. The manual labour is performed by six men and a boy, four of whom are boarded in the farm-house, and three are on weekly wages. These average 10s. to 12s., without beer. The in-door men have £10 to £12, and their food, which, as it is very substantial fare, we may detail for the instruction of some of the large corn farmers on Salisbury Plain, whose poorly-paid labourers must often go to bed on a supper of bread and water. For breakfast they have porridge, then bread and cheese. They take with them to the field each man his pint of ale, and what bread and cheese he likes. At 1 o'clock they have dinner, which is either bacon, beef, or mutton, and pudding, with small beer *ad libitum*. At 7 o'clock they have supper of milk porridge, then bread and cheese. The men are stout and muscular, and work hard. During harvest they have a quart of ale per day.

Since 1831 the stock kept on this farm has been

much increased, whilst at the same time a larger extent of it is now under crop. The yield per acre has also greatly increased. The rent of the farm is 24s. an acre, poor and all other rates 4s. 6d. per pound.

On the home-farm of Mr. Thornhill, of Stanton, near Bakewell, great improvements have been effected, and, as they illustrate the advantage of such improvements, and show by contrast how much may yet be done by well-directed enterprise to increase the produce of our fields and the employment of our labourers, we shall describe them somewhat in detail. The farm extends to 400 acres, 200 of which are grass and 200 arable. Mr. Thornhill took it into his own hands in 1840. The farm then kept 16 cows, producing 2½ cwt. of cheese each. There were about six young cattle sold off the farm annually, and 50 to 60 sheep. Four farm horses were employed in working it, and, besides an annual produce of 60 quarters of oats, there might be once in three years or so a field of five or six acres of the best land in wheat, which, after a clean summer fallow, yielded 27 bushels an acre. Such was the whole produce of the farm in stock and corn. It now maintains a regular stock of 43 milch cows, 30 of the produce of which are sold fat every year at three years old. Each cow, besides rearing the calves, produces equal to 4 cwt. of new milk cheese. 200 sheep, old and young, are now kept on the farm, and £160 worth of pigs were last year sold off it. The average yield of wheat is now 40 bushels an acre, and of oats 60 bushels.

The land lies on the gritstone, and is all on a considerable slope, the lowest part being 620 feet above sea level, from which it rises over the top of the hill to an elevation of 900 feet. It is well sheltered by plantations, and good stone walls, and the fields have been laid out in convenient enclosures. The soil is now dry and friable, and the field operations can be conducted without impediment. To render it so, a very large expenditure has been incurred, the land having been full of great blocks of stones, all of which have been removed, either by being broken and placed in drains, or by being carried bodily from the field, or by breaking them to pieces, and then covering them with trenched earth to a depth beyond the reach of the plough. This latter operation is at present being carried into effect on a corner of a field for the purpose of making the fence straight. The ground is literally paved with huge blocks of grit-stone, which are blown to pieces by gunpowder, or split by wedges, and then, after being spread along the face of a trench, are covered to a considerable depth by fine friable soil, got by the workmen in great abundance under the bed of the different massive blocks as they are removed. The cost of this operation is £50 an acre, and can only be justified on the score of convenience in laying out the adjoining better land. But the reclamation of the whole farm has been an expensive operation, 200 acres having cost £15 an acre for drainage, trenching, and fences.

The arable land is managed on the four-course system, with this peculiarity, that on the upper land oats are the only corn crop taken, and on the lower and richer land wheat only. On the upper land the turnips and clover are both eaten on the land, the sheep getting also cake or corn. On the lower land the turnips are drawn for consumption in the stalls, and the clover is cut for soiling or for hay. The general style of management is as follows:—1st. The "seeds," which are a mixture of 14lbs. of red clover and 2 pecks of Italian rye-grass per acre, are watered with liquid manure from the tank in April. The first cut is made into hay, and the ground is then watered a second time with the best effect. The second cut is given to the horses, and to the cows when the grass on the pastures begins to fail, in August, at which time the grit-stone land gives way, and the cows fall off in produce a half-cwt. of cheese, as compared with those fed on limestone land. The cut grass more than counterbalances this natural defect of the soil, the increase of produce in consequence of this additional food being from a ½ cwt. to 1 cwt. of cheese each. The whole of this land is ploughed up for wheat in October, the worst of it being first dressed with 10 tons of farmyard dung per acre. The land is then sown with (2nd) wheat, 8 to 10 pecks of Spalding's Prolific being drilled across it, in rows of 7 to 8 inches apart. The wheat-crop is never hoed. Last year the average yield was 48 bushels an acre. When the crop has been harvested the stubble is gone over by men with forks, who fork out all the twitch. This, after being exposed to the weather, is gathered into heaps and mixed with lime. The land is then ploughed and prepared in spring for (3rd) swedes, mangold, and yellow bullock turnips. The swedes are sown in the end of May, 20 tons of dung being previously spread in the ridges. The crop averages 20 tons. It is in all cases drawn in autumn and pitted. The other green crops are treated in the same way. On the most distant and elevated fields 16 bushels of bones and 1 cwt. of guano per acre are used without dung, which cannot be conveniently taken so far; but the crop is there consumed on the field where it grew by sheep, the turnips having been previously taken up and pitted in little heaps, to preserve them from frost or other injury. The turnips are taken out of the little pits as required, and given, cut, to the sheep in troughs, with ½lb. to 1lb. of cake each daily. The green crop is followed by wheat on the best land, by oats on the inferior land.

The cattle being all fed in stalls, and the buildings spouted to carry off rain water, a large quantity of liquid manure is collected in an underground tank, which is found most valuable as an application to young grass. The dairy produce chiefly consists of cheese, which weigh from 27lb. to 30lb. each. They are coloured, and salted by being placed in brine in a trough for two days. The calves are fed for the first fortnight on four quarts of new milk a-day each, for the second fortnight on six quarts, and after that on scalded whey and 1lb. of oilcake, steeped overnight in boiling water and hay tea.

The accounts on this farm are kept minutely and accurately, and for the last year they show a charge in addition to the old rent of 7 per cent. interest on expenditure on buildings, 5 per cent. on other permanent improvements, 10 per cent. on implements, 10 per cent. on live stock, amounting altogether to a charge of £885 against the farm for rent and in-

terest of capital. After deducting an abatement of 10 per cent. on the rent for "present prices," and adding the usual expenses of cultivation, the produce of the farm in stock and crop last year leave a balance over to the credit of the farm. Mr. Thornhill has, therefore, the satisfaction of having furnished remunerative employment to a large extent by his enterprise, besides ameliorating the face of the conntry and engaging himself in an occupation most useful to the neighbourhood, and which not only does not interfere with, but adds zest and interest to the other occupations of a resident landlord.

On the farm of Ashford, occupied by the Hon. Mr. Cavendish, M.P., and situated 600 feet above the sea, it has been found necessary on account of the rankness of the crops, to adopt, instead of the four-course, a six-course, with two successive corn-crops, as follows:—(1), clover; (2), oats; (3), wheat; (4), turnips or mangold; (5), potatoes; (6), winter barley. The winter barley is eaten down in April or May by sheep, affording, at that time, very useful feed, and is then left for a crop, which last year proved a heavy one. Tho sheep, which are Shropshire Downs, are fed during the winter in sheds and yards; the cattle are wintered in stalls.

There is a privilege in this part of the country enjoyed by the public which very much inteferes with the economy of an arable farm. In the mineral districts, and on "King's field," that is where the Sovereign is lord of the manor, in the Duchy of Lancaster, any one may enter where he likes, or whatever crop may be in the particular field, and dig for ore without paying damages to the owner or farmer of the land. He has a right to keep the pit open for a certain time, and can extend that time by occasional workings. There are some restrictions connected with the exercise of this privilege, but not in any degree commensurate with the injury done to the surface where the pits are opened in valuable tillage or grazing land.

There is no general custom of compensation to outgoing tenants for manures or management, but on the Duke of Devonshire's estate a special agreement has been introduced, by which tenants receive the following payments:—for labour and manure on fallows the last year of lease; for lime, its value as for two years on ploughed land, for seven on pasture; for purchased manure, as for two years; for inch bones, four years; for bonedust, three years on tillage land, and double that time on grass land; the price of "seeds;" the expense of paring and burning for the turnip crop; for drains, as for seven years; fences, seven years; and anything farther that, in the discretion of the Duke's agents, the tenant may have a just claim to. On a farm of 268 acres the payment made by an incoming to an outgoing tenant, under this agreement, was summed up thus:—"Amount of tillages, including the above items, £568 1s. 10d.," or, rather over 42s. an acre.

In Bakewell there are no poor but frame stocking knitters, who were established in their trade before power-looms were invented. They still continue to work at a business to which they were brought up, although it scarcely now affords them a bare maintenance.

NORTHAMPTON, FEB., 1851.

The farm of Mr. Sharpley of Wittering, a few miles south of Stamford, presents us with the details of good agricultural management in North Northamptonshire. It contains 630 acres, 480 of which are arable and 150 in grass. The arable is managed in a four course rotation of 120 acres in each division.

Beginning with (1) wheat after seeds, the land is ploughed and pressed, and sown from the middle of October to the middle of November with three bushels an acre of Spaldings red wheat scattered broadcast. It is rolled in spring with Crosskills clod-crusher. The average produce is 28 bushels an acre. The stubble is then ploughed in autumn in preparation for (2) turnips, and in the following spring it is worked twice with Finlayson's harrow, which not only takes out the twitch better than the plough, but is less expensive, and keeps the moisture in the land, which the turning over by the plough in dry spring weather entirely dries up. When the land is thus sufficiently cleaned and prepared the turnip seed is drilled on the flat, in rows 16 inches apart, from the middle of June till the middle of July, with 10 bushels of bone dust and 70 bushels of ashes per acre. The ashes are burnt in spring from bottoms of hedge banks, road sides, and any waste corners, and are found a most valuable adjunct to the bones. There are no swedes grown on this farm, as they are believed to exhaust the land, are found more difficult to grow, and are not considered better than common turnips for a breeding stock of ewes. There are two varieties of turnips cultivated—the white, which are meant to serve till Christmas; and the green top white, which are to carry the stock on till the beginning of April. The crop produced by this management is equal to the keep of 8 sheep per acre for 20 weeks. It is consumed on the ground by the whole of the flock, in two divisions, the hoggets first, and the ewes following. Such sheep as are being fed fat go loose before all. No cake is given, nor are any turnips cut. As soon as each piece is eaten, the ground is ploughed about three inches deep and prepared for (3) barley, which is sown broadcast as soon after the middle of March as possible. The seed is "scuffled" in with long-tined strong harrows. This crop yields 40 bushels an acre. It is followed by (4) seeds, 100 acres of which were sown with 12lb. of white clover, 2lb. of trefoil, and half a peck of rye grass per acre, which is grazed with sheep only, except that for a few weeks at first the young cattle are also admitted to it. The remainder of this division, 20 acres in extent, is sown with 14lb. of red clover and half a peck of rye grass per acre, to be mown for the horses and for hay. The red clover piece is changed at each return of the course, and its recurrence on the same ground in that way postponed for several rotations. 40 acres of the grass land is mown for hay also, the remainder being grazed.

The whole of the dung from the yards is carted out during the winter and laid in large heaps in in each of the fields of "seeds," where after being well rotted, it is applied before ploughing for wheat in September. If it could be got rotted in time, Mr. Sharpely would greatly prefer applying it on

the seeds in spring, that they might receive the first benefit, as the additional feed eaten on the ground would equally prepare it for wheat. But this is thought to require a year's dung in advance, which would necessitate the use of artificial manure for a year, on a scale more expensive than the farmers here are yet accustomed to.

The stock on this farm consists of 400 Lincolnshire ewes, which lamb in March, and rear about 400 lambs. The wedders are sold at one year old (last year at 31s. each), the ewes are kept for stock. 900 sheep altogether are wintered. 400 ewes and lambs and 100 young ewes are kept during the summer.

Besides a few milch cows there are every year about 18 or 20 heifers, which have a calf, and rear it. 20 calves are thus reared annually. The steers are kept till three years old, and sold in March or April to go to the rich grazing lands to feed. The average price last year was £13. The heifers, after rearing a calf, come into the straw-yard to be wintered, and they are sold in spring with the steers. During winter 80 to 90 head of cattle altogether are kept in yards on this farm. They never receive a turnip, as Mr. Sharpely thinks it a waste of labour to draw home the turnips and take back the manure: besides that, he finds the turnips to pay better by sheep feeding, and as the cattle are kept only in a rearing state, they can be carried on very well, and not expensively with straw and cake. They are managed in this fashion:—During summer they are grazed on the grass lands, and in winter are put into separate straw-yards with sheds. The yearlings get hay or clover-chaff and 1lb. of cake each daily. The two-years-old get barley straw and 2lb. of cake each daily, besides barley and wheat chaff, of which they are very fond. The three-year-olds get two fodderings of straw, one of clover-hay, and 3lb. to 4lb. of cake daily. They have all an abundant supply of water in their yards and look fresh and thriving.

When the cattle leave their yards for the grass their places are supplied by the work horses, 12 in number, which are taken from their stables, and during the summer receive their food in the cattle yards. The whole of the straw on the farm is thus made into good dung. In the winter the horses are put into a stable in which there are no division stalls, but if any horse is inclined to be vicious a bar of wood is hung up between him and his neighbours. The winter food of the horses consists of two parts oat-straw with the corn, and one part clover hay, cut together, and given in the manger, as much as they can eat without waste. The quantity of oats consumed by each horse in the day, besides the straw and hay, may be about 12½ lb. During the summer they received green clover and oats. The work of the farm horses is very light, as the land is easy of tillage.

Eight men and two boys are regularly employed on the farm, the men receiving 10s. a week, and the boys, who can plough, 5s.

This farm was entered to on the 25th of March, and the first half-year's rent is payable on the 1st of January thereafter, the second on the 1st of July. The whole implements were bought two years ago, quite new, and with the live stock, cost the tenant 3,500*l*. Besides that sum, he had to pay for labour before getting any of his crop turned into money. His invested capital altogether amounted to 6*l*. an acre, but there is here no draining, building, or permanent improvements, which the tenant has either to execute himself or to aid in doing; he has just to stock and work an easy light land farm. It is commonly thought in this part of the country that an arable farm requires less capital than a grass farm, and many men without adequate capital enter to arable land with the intention of trusting to cropping entirely. But an arable farm, if fully stocked and *fully farmed*, cannot be carried on without a good capital. Here there is said to be a great deficiency among the farmers in that important matter, many having taken to arable farming with the idea that ploughing and sowing, with seed and labour, were the only requisites. The low range of prices is compelling greater attention to business, and, as we were significantly told, the fox-hunting farmers are becoming a gradually diminishing body. Industry, capital, and skill may, it is conceded, still carry a man through with difficulty; a deficiency in all these qualities must be fatal to him.

The only tenant-right or compensation in this part of the country is that an outgoing tenant is allowed the whole of his "bones" bill and the half of his "cake" bill for the last year of his occupation; but in general practice little or no artificial food or manure is purchased. The dung of the few poorly straw-fed cattle is used to raise the turnip crop. That is eaten on the ground by sheep, and insures a fair crop of barley. But there is no progress here, no addition to the powers of the soil to compensate for their continued exhaustion, and consequently there can be no increasing averages to make good the deficiencies of price.

In the neighbourhood of Wansford we come on the Duke of Bedford's estate, where the well-managed farm of Mr. Perceval at once arrests the notice of the traveller by its neatly trimmed fences, well kept roads, and cleanly cultivated fields. The swedes are a fine crop. They are taken up in the beginning of winter, and stored in little heaps covered with earth on the field where they grow. When the sheep come over the ground a few hurdles are placed round each heap and the turnip cutter inside, and the cut swedes are then served out to the sheep in boxes. The crop is by this means protected from injury by game, it is kept juicy till wanted, and it neither exhausts itself nor "draws" the ground by shooting up a seed stem in a mild winter or at the beginning of spring. Winter tares and rye are sown in autumn, to be cut for the horses in spring and summer; and these are followed by white turnips, which are eaten on the ground by sheep. The next farm, that of Mr. Leeds, of Stebbington, is also very neatly farmed.

On this portion of his estate the Duke of Bedford is draining all the heavy and wet fields of such of his tenants as are unable to do so themselves. In these cases he supplies and carts the tiles, makes the drains, and finishes the whole free of all charge to the tenant. The drains are made 4 feet deep and 33 feet apart, and are found very efficient on strong land.

All the labourers are employed, and the general

rate of wages is 9s. a-week. No beer is given to the labourers. The Duke's cottages are let at very low rents, but others in the village are extremely high, as much as 3s. 6d. a-week, with much less accommodation and a more limited extent of garden-ground than the more fortunate tenants under the Duke, who pay 1s. to 1s. 6d. a-week.

Nearly the whole county of Northampton lies on the lower oolite formation. The southern division is celebrated for its grazing qualities. For ten miles round the town of Northampton one-third to one-fourth of the land is in grass. Grazing, which was formerly the most profitable occupation of the Northamptonshire farmer, is now interfered with by the mode of feeding adopted on the arable farms, which by the aid of artificial food, corn, and cake, turn out more fat stock than the purely grazing farms. Some of the farms in this division are wholly arable, but the most common proportions into which farms are divided are two-thirds arable and one-third old grass. In winter the cattle are generally turned out on the grass lands during the day, and seldom receive any cake in the yards, as after such treatment they are found to fall off when turned out in summer to be fattened on the pastures, the cake not being then continued. The appearance of the country generally is well wooded and picturesque, undulating, with a fine friable red soil, admirably suited for green crops, corn, and grass.

Though there are many excellent farmers in the county, and much improvement has taken place in its agriculture, good farming is still the exception. For this there are several causes. In regard to the landlords, in the first place, many of them have no interest in their farms beyond the annual rent they receive, know nothing of the management of land themselves, and do not employ an agent who does. Some employ men of low standing with a small salary, and in a dependent position, butlers, gardeners, and sometimes gamekeepers, performing the functions of land-agent. Lawyers are employed by some, but they merely receive the rents. The duties of a competent agent, embracing an inspection of the farms, a general intelligent supervision of the property, with that confidential communication with the landlord as to the measures best adapted to promote the interests of both landlord and tenant, and the suggestion of such improvements as may be made at the least cost for the benefit of both, cannot, of course, by such agency be contemplated. Many of the landlords are straitened for capital, having their land heavily mortgaged or burdened with annuities, and who would yet rather embarrass themselves more by spending money in adding to their acres than by improving those they have, though their tenants from deficient buildings and want of drainage are incapacitated from doing justice to their farms. In many cases the arable land is much injured by superfluous fences and hedge-row timber, the injurious quantity of which may be seen right and left from the railway between Blisworth and Rugby. The inequality of rents is also the cause of some districts and estates being better farmed than others. Many estates are let and have been rented for years at 20 and 25 per cent. higher than others. These are carefully eschewed by the best tenants, and any good farmer with capital who may have the misfortune to be placed on such rack-rented estates is constantly looking out for a vacant farm under a more liberal landlord, where he may expend his capital with security. A great obstacle to good farming is the system adopted by some landlords, and those not the least popular among the tenants, of letting their farms at low rents, with the understanding that all improvements are to be made by the tenants. A good tenant keeps things in good order, and very possibly improves his farm. A bad tenant most likely deteriorates it. In the course of years a stranger is sent to make a new valuation of the farms, and he of course fixes the highest rent on the good farmer, whose spirit of improvement is effectually curbed for the future.

On the part of the tenants the obstacles to good farming are those too common to their class in other counties as well as Northamptonshire—a headlong running after more land than they have capital to manage, and the employment of insufficient labour to work their farms.

On the light soils the four-course system of cropping is practised by some farmers, especially for the purpose of cleaning their farms, but the most general course on the red land is a six-course, thus —(1) turnips, (2) barley, (3) clover mown, (4) clover grazed, (5) wheat, (6) barley. Though some farms are profitably managed under this course, they are never quite clean. If the land is not perfectly clean when laid down to clover, the two years' grass allows the root weeds to gain strength and strike deeper, and with two corn-crops after the breaking-up of the clover leys the land gets very foul. Where the land is left only one year in clover, and if well farmed and the wheat stubbles cleaned before sowing the barley, the crops are generally very good, and the land tolerably clean. Where the *substratum*, instead of being red sandstone or sand, is of a clayey nature, the eight-course is successfully practised, viz., turnips, barley, clover, wheat, turnips, barley, beans, wheat. In some parts of the county the clay lands are very ill-farmed and imperfectly drained. On the eastern side of the county, however, there is some good clay farming where the land has been well drained, and the following mode of management is adopted:—Half the fallow is sown with vetches, the other half is a naked fallow well worked through the summer, and as the vetches on the first half are folded off with sheep the land is ploughed up and the whole worked together. It is kept as rough as possible, and soon after harvest before the land gets wet it is manured. In that state it is left till the spring, when, without again ploughing, the barley is drilled as early in the season as the land is dry. Under this management heavier crops of barley are got on very strong clays than on the best turnip soils, especially in a dry season. The barley is followed by clover, which is mown, the clover ley is sown with wheat, and the wheat is followed by beans. Some farmers take the beans after the clover, and follow them with wheat, which they find to succeed best after beans, and less subject to grub and wireworm than after clover.

On some very good and well-managed land within a mile or two of Northampton, on the frrm of Mr. West, of Dallington, we saw a fine crop of swedes

which had been drilled on the flat, the dung having been previously ploughed in. When ridged over freshly applied dung, the crop, though bulkier, is said to be more apt to decay. The course adopted here is seed, wheat, barley, turnips, barley. As soon as the wheat stubble is ploughed the land is sown with mustard, which is ploughed in green, as a preparation for barley, with much success.

Mr. Shaw, of Cotton-end, near Northampton, adopts the four-course. His "seeds," which are very early and fine, are chiefly Italian rye grass, which is grazed the first year, dunged in autumn, and after yielding two months' keep to the sheep the following spring, it is to be ploughed with a skim coulter plough, and the land planted with potatoes. The swedes are all taken up in November, and stored in heaps on the field covered with earth, whence they are taken as required, and given to the sheep cut, in boxes, with 1lb. of cake each, for the last ten weeks, before being sold fat. The wheat land after being sown in autumn is dressed with 7 cwt. of salt per acre, which is found to have a very beneficial effect in destroying all small weeds, and in strengthening and brightening the straw. It renders loose land firm by glazing over the surface, and for that reason probably would not be a suitable application on strong or wet land. Being in the immediate neighbourhood of Northampton, a town of 20,000 to 30,000 inhabitants, Mr. Shaw kept a dairy stock on this farm, which he found very profitable, as milk sells at 2d. per quart, and there is a constant demand for it; but his stock was so much injured by pleuro-pneumonia that he has for the present discontinued a dairy. The rent of this farm, 300 acres in extent, is 45s. an acre, tithe free; the land is of superior quality, and the situation very advantageous.

The regular labourers on the farm are hired by the year, the best receiving 12s. a week, and a house rent free; others 11s., and the lowest 9s. The average rate of wages for the county is 9s. a week. There are very few labourers unemployed, and scarcely any ablebodied in the workhouses. As a class, it is said they were never better off, and yet there have been more incendiary fires than in any former winter.

The farmers generally are very desponding, and there can be little doubt that many of them have been losing money during the last two years. Those of small capital originally may be unable to recover the shock, as that can only be done by greater exertions on the part of both landlord and tenant, and their means are already gone. It is anticipated that there will be many changes of tenants—those who have not capital and industry being obliged to give up, and those who are quitting one landlord to go to another under whom they expect better conditions. The landlord who gives least encouragement and assistance to his tenants in this crisis will suffer most severely at last, as all good tenants will go to good landlords, and the careless and indifferent must content themselves with just such as they can get. The best farms of the best landlords will probably maintain their value; the inferior farms and those of cold clay must fall very considerably. In the latter there will probably be a new basis of valuation altogether, more in accordance with their relative value, which hitherto has been rated too high. The greater expense of cultivation on clay as compared with stock land will now bear much more heavily on the balance left for rent than formerly, when the value of the produce was relatively high. On the whole, there can be little doubt that the first effect of all these changes will be a lowering of rent to a greater or less extent throughout this county.

COMPARATIVE FATTING QUALITIES OF SHEEP.

The Journal of the Royal Agricultural Society, just published, contains an elaborate article by Mr. Lawes, on the "comparative fatting qualities of sheep." Two lots of forty each of Hampshire down and Sussex down lambs were selected as nearly as possible alike in every respect. They were fed and treated in the same manner for 26 weeks, and the following is the balance sheet given of the results in each case :—

BALANCE ACCOUNT OF THE HAMPSHIRES.

	£	s.	d.	£	s.	d.
Cost of forty Hampshire Wether Lambs, November 7th, 1850, at 29s. per head		..		58	0	0
They consumed of purchased food—						
8120lbs. Oilcake, at £6 15s. per ton	24	9	4½			
7280lbs. Clover Hay, at £4 per ton	13	0	0			
Total purchased food		..		37	9	4½
Forty fat Hampshire Sheep, and Wool, sold May, 1851, for		..		95	9	4½
		..		95	2	9
Difference		..		0	6	7½

BALANCE ACCOUNT OF THE SUSSEX SHEEP.

	£	s.	d.	£	s.	d.
Cost of forty Sussex Wether Lambs, November 7th, 1850, at 25s. 6d. per head		..		51	0	0
They consumed of purchased food—						
6272lbs. Oilcake, at £6 15s. per ton	18	18	0			
6020lbs. Clover Hay, at £4 per ton	10	15	0			
Total purchased food		..		29	13	0
Forty fat Sussex Sheep, and Wool, sold May, 1851, for		..		80	13	0
		..		80	6	11½
Difference		..		0	6	0½

It appears from previous tables that the eighty sheep consumed, in addition, 85¼ tons of turnips, and Mr. Lawes makes the following remarks upon the results—"From these balance tables it appears that in both cases the prices of the fat sheep (and their wool) covered, within a few shillings, the cost of the lambs and of the purchased food—that is to say, the increase of animal has exactly paid for the purchased food." Again, he observes—"In both cases, then, the dry food has been paid for by the increased value of the forty sheep, and in both cases, therefore, we have the manure of this food, and of the turnips consumed, to pay for those turnips and the attendance on the animals.

USELESS HEDGES, OR FIELDS ENCUMBERED WITH HEDGE-ROWS, HEDGE-ROW TIMBER, AND OLD POLLARDS: ALSO SMALL INCLOSURES, AND MIS-SHAPEN FIELDS.

BY A PRACTICAL FARMER.

In treating of *useless hedges*, I would at once say that I more particularly mean those enclosing small and inconveniently-shaped fields. These are useless enough to all intents and purposes, and the sooner such can be got rid of, and the crooked fences made straight, the better. I therefore make no apology for thus irrelevantly *lugging* in this important subject. Some time ago I extracted (I believe from the *Mark Lane Express*) the following resolution adopted by the Netherexe Farmers' Club (Devonshire):—"That the state of the hedge-rows and small enclosures of this neighbourhood demand the serious consideration of landowners and farmers entrusted with the management of estates, inasmuch as they clog the best energies of the farmer, and are most prejudicial to the interests of the community at large. It will be found that *one-fourth* of the enclosures in many parishes are under *two acres*, more than *one-third* under *three acres*, and nearly *two-thirds* under *four acres*: thus the tenants sustain a loss of 10 per cent. in the land which they occupy, and full 20 per cent. difference in the expense of plough-labour, as compared with enclosures of from eight to ten acres each, to say nothing of the serious inconvenience and loss sustained in harvesting and securing corn crops, for it is well known that corn can be carried in large open fields a day or two earlier, in showery weather, than that in small enclosures with high hedge-rows." I am well aware that the above resolution describes no very singular case, but on the contrary, a very common one. I most sincerely lament it, and with the hope of arousing in some measure the public mind by calling attention to it, I with some diffidence offer a few observations. Will my readers bear with me if I attempt to show the number of acres in the kingdom taken up with hedge-rows? The quantity of land in England and Wales amounts to about 38,000,000 acres, of which about 7,000,000 are called waste, or rather is not brought into cultivation. Now, as almost every part of the country is enclosed, it will not be a very difficult task to show that an immense breadth of land is taken up by hedge-rows. Suppose 25,000,000 out of 31,000,000 acres to be at this time enclosed and subdivided into fields *by hedge-rows*, and that the average size of each field is ten acres—certainly a very high estimate; that five per cent. of each field is taken up by hedge-rows, which again is a low estimate; it follows that not less than 1,250,000 acres are thus appropriated—*taken up by hedge-rows*. If we go further, and take into account, as we most assuredly ought to do, the great breadth of land overshadowed by the foliage from above, and again the exhaustion by the wide-spreading roots of hedge and hedge-row timber from beneath, we have, I will venture to assert, a surface-soil of not less than 3,000,000 acres made comparatively unproductive to the farmer, and very nearly so to the community at large. If we go still further, and, for example, take the resolution as adopted by the Netherexe Farmers' Club to be correct, and apply it to the whole country, it will give nearly 8,000,000 acres of land, as not only encumbered, but overburthened with hedge-rows and hedge-row timber. My desire is to keep within the true limit. I wish to take a fair view of the case, and would rather take a low estimate of it. But upon mature consideration, I again repeat that there cannot be less than 3,000,000 acres in England and Wales thus rendered comparatively unserviceable to the community. Now, as it is necessary for the profitable management of fields, that some portion of each field should be taken up by a hedge to form the fence, I most willingly award ample room; and I think I have already shown that such fences or hedges need not extend far, or be allowed to grow to any great height; indeed, from almost innumerable instances that have come under my own notice, I am prepared to assert that the hedge-rows of this country need not necessarily extend to more than one-third of the usual width in which they are now allowed to luxuriate and revel, and which, I think, I have fully proved in the first part of this article, in reference to the best method of maintaining fences. If, then, the position I have attempted to establish is correct, it follows that by a careful attention to this subject, and the universal adoption of the mode of management I have pointed out relative to hedge-rows, a saving of 2,000,000 acres of land to this country is effected. What an astonishing breadth! It is, however, a plain demonstrable fact, that 2,000,000 acres of valuable land may be saved, and may be added to the productive soil of the United Kingdom in England and Wales alone, by the proper division of fields, the abolition of useless overgrown hedge-rows, and the proper management and close pruning of the remaining. If we further take into account the produce of these 2,000,000 acres, and contrast the loss incurred by the existence and management of so many useless incumbrances to farm economy, the result is still more astonishing. I shall not try to calculate; but I will say that it would go far to equal the amount paid in county rates, poor's rates, and possibly the malt tax too, all of which press most heavily and unequally on the landed interest of this country.

OLD POLLARDS—SMALL INCLOSURES—MISSHAPEN FIELDS.

Old Pollards.—Grub them up!

Small Inclosures and irregular-shaped Fields.—The proper subdivision of fields is of great importance, as thereby the number of useless fences are lessened, and

the fields are put into the best shape for general purposes. The size of the fields should vary according to the size of the farm. Fields for most profitable culture should not exceed twenty acres on farms of moderate extent, and on larger occupations it is not desirable to go far beyond that size. The greatest produce per acre has generally been found to arise from fields of ten to twelve acres; and this will more forcibly apply to pasture land. If the fields are large, the stock will waste much time and condition, as also much herbage in the course of travelling to and fro either to shelter or watering. Cattle in sultry weather are very restless, and no gambol or gallop is then too long for them. I need not say that cool shade and quiet are highly conducive in promoting the good condition of store stock, as well as the rapid fatting of animals on pastures, or that both store and fatting stock thrive faster in enclosed and shaded fields than in open and exposed ones. I believe that a field of one hundred acres, divided into ten equal parts and well fenced, would keep in equal condition, or fatten fully 10 per cent. more stock than if allowed to roam in one field. This is well known in good grazing districts, and acted upon pretty generally. The stock are less disturbed, or if disturbed soon reach the boundary of the enclosure, and more readily again settle down to their feeding. I have frequently seen large heavy sheep, on being alarmed, gallop the whole extent of their enclosure, however large; and I know it is a too common practice for the shepherd himself to cause this gallop, perhaps twice in the day, by his well-known holloa, or the bark of his dog. This must be extremely hurtful to fatting sheep, and the larger the field the more are they injured. Graziers, by all means abolish such a practice as this!

Mis-shapen Fields.—What can be more detrimental to the proper cultivation of a farm than small fields of every imaginable shape, and enclosed with hedge-rows abounding with timber and old pollards? The great space taken up, and the damage occasioned by their over-shadowing tops and wide-spreading roots, I have alluded to, I hope, sufficiently. The great thing here to notice is their number. *Small Fields*—The club already named say "that in many parishes one-fourth of the fields are under two acres, more than one-third under three acres, and nearly two-thirds under four acres." I only ask you to imagine these fields—these to be actually enclosed with crooked, angular, serpentine, zig-zag, or other imaginable irregular fence, and the conviction will be far more complete than anything I can urge to cause the abandonment of such odious "cumber-ground" pests. Away with them!

> "To plough up or delve up, advised with skill
> The breadth of a ridge, and in length as ye will,
> Where speedy quickset for a fence ye will draw.
> * * * * *
> Now lop for thy fuel old pollenger grown,
> That hinder the corn, or the grass to be mown.
> In lopping or felling, save edder and stake—
> Thine hedges, as needeth, to mend or to make."
>
> TUSSER.

A word on the management of *young Quicksets*. I have already recommended the planting of strong, well-grown quickset, together with the management requisite; where, however, time for the rearing of the hedge is of no importance, younger quick will do well, and it is bought at a lower price. There are so many methods pursued in the planting of young quick, that I scarcely know which to prefer; I will name one or two. One plan is to cut two parallel ditches; throw up the earth from each so as to form a bank between, on which the quick is planted. Another plan, on gravelly or stony land, is to raise a bank, by cartage or otherwise, on which to plant the quick. Both these plans are open to objection. The banks soon become dry from exposure to sun and winds, and the moisture from the subsoil cannot so readily be brought up for its nourishment. Another plan, in the low countries, is to throw out the contents from a ditch on the side intended to be planted, and after well trampling, to plant it along the ditch side. This is also objectionable, as liable to serious injury from drought in summer and drifting snow in winter. These causes, in many districts, operate to the destruction of the quick by causing it in both cases to fall into the ditch, in the summer from the cracking and parting of the ditch bank, and in winter from the heavy lodgment of snow. I am inclined to think the plan I recommend in the former part of this article is the best for general adoption; but every district has its peculiarities, both of soil and climate, and the judgment of the planter must be his surest guide. All the aids that a prudent planter can afford will not be lost upon the young hedge, whether it be in protection, cleanliness, culture by repeated diggings or forkings, or bedding up, stopping, or again by fresh soiling or manuring.

> "Banks, newly quicksetted, some weeding do crave,
> The kindlier nourishment thereby to have;
> Then after a shower, to weeding a snatch,
> More easily weed with the root to despatch."
>
> TUSSER.

VALUE OF LONDON SOOT.—In *London Labour and the London Poor* we find the following statistics as to metropolitan soot:—

	Bush. of soot per annum.
53,840 houses, at a yearly rental above £50 producing six bushels of soot each per annum	323,040
90,002 houses, at a yearly rental above £30 and below £50 producing five bushels of soot each per annum	450,010
163,880 houses, at a yearly rental below £30 producing two bushels of soot each per annum	327,760
Total number of bushels of soot annually produced throughout London	1,100,810

The price of soot per bushel is but 5d. and sometimes 4½d., but 5d. may be taken as an average. Now, 1,000,000 bushels of soot, at 5d., will be found to yield £20,833 6s. 8d. per annum.

MR. LAWFORD'S EXPERIMENTS TO FEED BULLOCKS AND GROW GRAPES AND FLOWERING PLANTS IN THE SAME HOUSE.

It is a notable fact that science, no matter in what department, owes nearly all its greatest triumphs to restless and speculative spirits, who, according to the verdict of the world, are commonly thought to be "a little cracked." This is the opinion which the world has hitherto entertained of all its greatest benefactors, at least during their own lifetime. Let a man have but a little more or a little less intellect and genius than the current and ordinary endowment, and for this he is certain, in either case, to be set down as "a little wanting"—"not quite sound." Lambert, whose well-deserved fame and merit as a botanist and patron of botany, was, by some, thought to be "a little cracked;" and we have ourselves seen him dance in frantic joy at the exhibition of a new flower which he had never seen before. Loudon, whose enthusiasm and love of horticulture led him to say and hope many things, which all very sober and extremely prudent people thought worse than strange; but, nevertheless, some of his wildest speculations have been abundantly realized. It was deemed to be a public duty by some of the wisest horticulturists of the time to try and disabuse the public mind of their misplaced confidence, as it was then said, to the advantage and skilful experiments of the late Mr. Knight, of Downton Castle: he, too, though one of the greatest benefactors which horticulture ever had, was gravely pronounced to be "rather cracked." So has it been in every pursuit and profession; and so, we suppose, it ever must be; for, however great the gain, the public mind is sure to be shocked, irritated, and annoyed, if upon any subject, no matter what, a sudden glare of light is unexpectedly thrown; and the natural result, which is sure to follow invariably, has been an endeavour to obscure and conceal and misrepresent all such discoveries; and the more brilliant and striking, the more they have been and will be resisted and spoken against. We remember the time when thrashing machines were very generally reckoned an agricultural curse; spinning jennies and power-looms have been many times demolished by popular rage. Railways, the very heart-strings of our little island, were once on a day avoided and shunned by towns and cities, just as a sullen ill-tempered animal skulks away from the hand that would have caressed and fed it. The mowing-machine for lawns, which offers to save many a weary back-ache, is far from being a favourite with those whom it is so admirably calculated to benefit. But poor horticulture has unhappily escaped much disturbance from intrusions of this kind. As a great body politic, it is very conservative of its ancient practices, habits, and customs; and since the late Mr. Knight talked of growing pineapples without bottom heat, and Mr. Hoare of making vines flourish on dry and sultry brick pillars with their roots uppermost; and more recently Mr. Barnes' system of pine culture in the open borders; Mr. Fleming's salting-machine, and the turning tender plants into hardy ones, as in the case of Weeks's Victoria; and a few miracles which have been wrought with Polmaise and plate-glass—we say, with the exception of these small ruffflements, horticulture has had a wonderful freedom from internal disturbances; has been most happy and self-complacent, and believed everything to be progress, down to several degrees below that of positive stand-still. We suppose, then, we must just regard horticulturists as men cast in a very similar mould to those of mechanics and men of science—embracing, of course, the public at large—for there is, in one and all, a very proper and wholesome amount of suspicion running through and pervading the minds of all classes; and by this not very bright ingredient of the mind it is that we are mainly protected, nevertheless, against empiricism and imposture. While we therefore point to, and smile at the evils and absurdities which naturally grow out of this cherished habit, and regret its existence for its own sake, we of course acknowledge its universal power, as well as its usefulness. The facts and incidents to which we have just referred will assist the mind to comprehend and see at once that improvements in horticulture, any more than in other branches of art or science, are not to be correctly estimated from the first blush of public opinion respecting them, to say nothing of the indispensability of time to prove or disprove their actual worth. With these remarks, we beg to introduce to our readers that which, although we have previously briefly noticed, we still feel warranted in viewing as a horticultural novelty. We refer to the following communication by Mr. Bundy, who gives a full and interesting account of Mr. Lawford's experiments to feed bullocks and grow grapes and flowering plants in the same house, and under the same roof. A reference to the wood-cuts will show at once the kind of arrangement by which this is effected; and a perusal of Mr. Bundy's correct

and clear description will furnish the reader with the details. We need only observe that we were eye-witness of the occupation of the single house (Fig. 1) at the time the back-

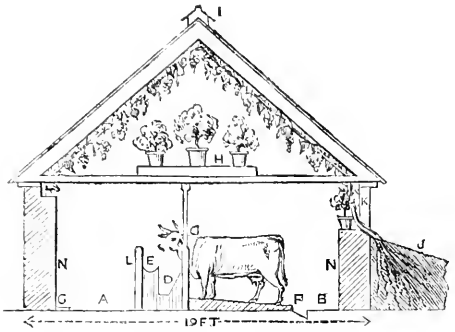


Fig. 1. Reference to section.

A A walk in front of the cattle
B Ditto behind the cattle
C Border where it is intended to plant orange trees, &c.
D Feeding trough
E Water trough
F Manure water drain
G Upright post to which the cattle are tied
H Platforra for plants in pots
I Ventilators
J Vine border
K South front sash (upright).

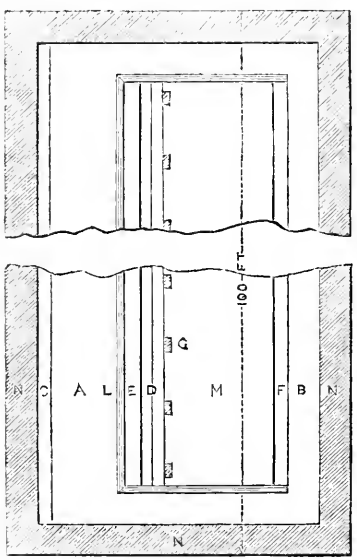


Fig. 2. Reference to ground plan.

A Walk in front of cows
B Ditto behind
C Border for orange trees, &c.
D Food trough
E Water trough
F Manure water drain
G Upright posts
L Partition between water trough and walk
M Cattle stand
N Outside wall.

wall in front of the cattle was covered with flowering plants; the path itself was rubbed with white stone, and therefore quite as clean, and more cheerful to walk along, than many conservatories commonly are. The double house (Fig. 3) was then being built, and this, of course, we did not see in use. One thing struck us as very remarkable, in passing through Mr. Lawford's very wonderful establishment; namely, what a different aspect the occupation of the agriculturist assumes here, where system, order, cleanliness, and all the requisite aids and appliances of science, money, and experience can bring to bear, to that which it presents in some of the wasteful and slovenly homesteads which one is often compelled to witness. With the comparative profits of high and low farming we of course have nothing to do. As a horticultural experiment, we regard it as exceedingly interesting, and claim for it the forbearance of those who very properly use the microscope when they investigate the claims of whatever comes before them in the character of a novelty. The thing is very suggestive, and cannot fail to furnish useful experience both to the farmer and the gardener. To Mr. Lawford, therefore, and all such, we tender both our homage and thanks. It is to such men that the world owes nearly every thing.

TIRYDAIL, near LLANDILO, THE RESIDENCE OF T. W. LAWFORD, ESQ., F.H.S.

In laying before the readers of the *Journal* some of the particulars of this place, which bear upon the subject of horticulture, it may be well to remark that it is but five years since Mr. Lawford first turned his attention to the cultivation of plants and fruits; and when the fact is considered in connection with the progress he has made, probably we have no instance on record of a single individual having accomplished such practical experiments, or brought more to a successful issue. But before entering on the description of its horticultural features, more strictly considered as such, I shall proceed to notice two houses which have been erected for *cattle*, as well as *plants*. My present object is simply to show that at Tirydail plants and cows do stand somewhat in relation to each other. And, although the cattle here are not the pruners of the vine or tillers of the garden, neither are they used in any way as a specific for the various maladies which plants are subject to; they are the heating apparatus, so to speak, of two extensive ranges of glass, as well as the producers of those chemical properties which form so essential a part of the atmosphere to plants, viz., carbonic acid gas and ammonia. And in consequence of this and other reasons, particularly that of the present moderate price of glass, they are now made the inmates of these houses, together with ornamental plants, figs, strawberries, and grapes; presenting to the curious and the critic a scene most interesting, and a speculation most fruitful. Certainly the combination is an attempt at an experiment involving many considerations, and numerous have been the vague premises of the theorist upon the scheme, and not a few are more inclined to ridicule than to question the soundness of the plan; but to each I would say, be not

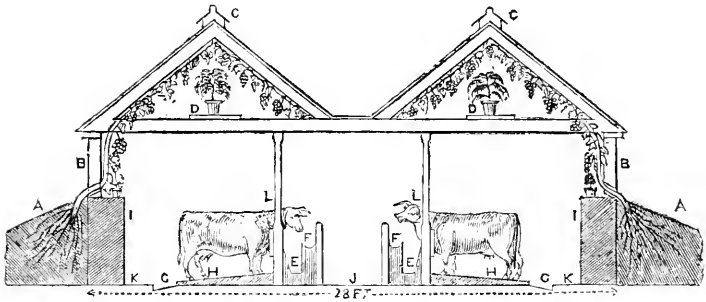


FIG. 3.—DOUBLE SPAN-ROOF HOUSE.

A Vine border
B Upright sashes
C Ventilators
D Platform for plants in pots placed on the tie beams
E Food trough
F Water trough
G Liquid manure drain
H Cattle stand
I Outside walls
J Walk between the two rows of cows
K Walk behind
L Pillars that support the tie beams, and to which the cows are fastened

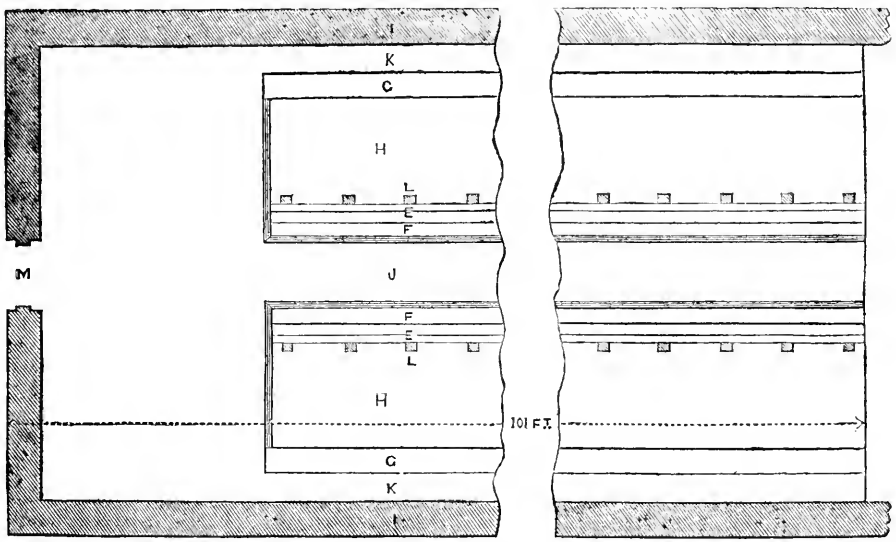


FIG. 4.—GROUND PLAN.

E Places for the feeding troughs
F Ditto water troughs
G Manure water drain
H Cattle stand
I Outside walls
J Walk between the rows of cows
K Walk behind
L Posts to which the cows are fastened
M Entrance

Fig. 6 Shows the elevation of this house, with the heating apparatus below.

hasty in pronouncing an opinion against what I, for one, see no philosophical argument to advance; as *tempora mutantur, et nos mutamur cum illis.* I have heard some fastidious persons remark that the flowers and fruit grown in these structures would taste and smell of cows. Nothing can be more absurd than such conclusions; but these questions have already been set at rest, as Mr. L. has flowered and fruited plants in one of these houses with the cattle, possessing their own innate odour and flavour unaffected by any *supposed* unpleasant smell or taste that could be imparted by the cows. And now, as glass roofs can be put on to buildings at the same expense as slate ones, let us ponder on and examine into the advantages that are likely to accrue from the use of transparent roofs. It is a well-known fact that light is an important agent in the animal as well as in the vegetable economy, and Mr. L. has already found that cattle grow faster and are healthier under transparent roofs than under opaque ones, which circumstance is of itself valuable; but when it is found that grapes can also be grown under the same roof with advantage to the cattle by the shade which the foliage gives, we may not be

surprised if in a few years we see in many noblemen's farms greater quantities of grapes and other fruit grown under glass-roofs over cattle than the most sanguine have ever ventured to conceive. The first of these two houses is a single-span roof (Fig. 1), 96 ft. long and 13 ft. wide. It stands east and west, presenting a width of 20 ft. of glass in the roof, with 3 ft. of upright sashes in the south side. The upright sashes are on hinges, and open and shut in 25 ft.-lengths by a simple contrivance of leverage. The roof is glazed in 2 ft. squares of Hartley's patent rough plate glass, laid into fixed sash-bars that were cut at Montgomery's saw-mills. A border, 7 in. wide, runs along the walk at the head of the cattle, for planting any plant to grow against the wall. Oranges are intended to be planted there; and

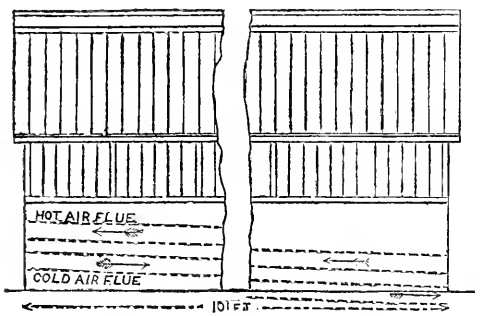


Fig. 5

shelves are given in front and back, as well as a platform on the tie-beams, to hold plants, as is shown in the section plan. Under the lights, 1 ft. from the roof, is a trellis of strained galvanized wire of ¼-inch size, placed at one foot apart, to which the vines are trained at two feet distance from each other. They have been planted one year, and many of them now reach the ridge, but will be cut back, when pruned, to about half that height. The vine border here is made above the surrounding ground, in a sloping direction. When plants were first introduced into the house with the cattle, they evidently showed signs of ill health, and it was soon discovered that the dust which arose from the daily currying of the cattle was more than had been anticipated, and was thought to have a share in producing the sickly hue then upon the plants; therefore this operation was soon dispensed with, without any disadvantage to the cattle, requiring only a little more attention to clean floors, which was also found to be necessary in order to keep in check that volatile chemical agent, ammonia. These little difficulties have now been overcome, and the vines and other plants have luxuriated in this house during the past summer with surprising vigour. The heat of the cattle is found to be sufficient to keep out the frost, although a stove has been provided, in case it should be necessary to dry up damps when the grapes are ripening, and it is calculated that the vines will break about six weeks earlier than if out of doors. Their foliage will shade the cattle till midsummer, when the animals will be turned out for three months each year, and at the time they will be placed in again it is expected the greater part of the crop of fruit will have been cut. The great probability of success in this house induced Mr. L. to erect a second one, 100 feet long, and wide enough for two lines of cattle, with a double span roof (fig. 4), with three feet of upright sashes all round, which are all glazed with "crown" glass in frames of 8½ inches by 6½; and in consequence of using glass of this size the roof cost *less* by a few shillings than a slate one would have done.—Henry Bundy, *Dynevor Castle, Llandilo.*—Gardeners' and Farmers' Journal.

PRICES AND BUSINESS IN 1851 AND 1852.

There is a singular unanimity in the trade circulars issued at the beginning of the year, in anticipating during its progress great manufacturing and commercial activity, accompanied by rising prices and successful business. Great activity prevailed throughout the past year, but it was not accompanied by rising prices nor successful business, for those who buy only to sell again. As if to warn them in time that the general anticipations may not be realized, the colonial produce market opened, after the Christmas holidays, with slight exceptions, worse than it closed; and, though it has now recovered a little, it afterwards declined still further. The metal markets, too, are dull, and prices have fallen since the year began. From India, the trade reports are not favourable. The demand for silk and wool, partly consequent on the political apprehensions felt in France having been temporarily allayed by the certainties of despotism, and partly in anticipation of a short supply of wool from Australia, is greater than the supply, and the prices of these two important raw materials are hardening. So the corn market is getting up, both here and on the continent. A comparatively short supply of food, and of some raw materials, with other markets declining, suggest a doubt whether the general anticipations will be realized, and make it advisable to subject them to a brief examination.

The anticipations are chiefly founded on the fact, that prices at the close of 1850 and the beginning of 1851 were speculatively high, and that the fall of from 20 to 25 per cent. in the course of the year only reduced them to their proper level. Now, it may be expected that under the impulse of rapid consumption they will gradually improve, give increased value to stocks on hand, and at least reasonable profit to those who import commodities, or buy them in order to sell them unaltered in form. To producers of all classes, most of whom have done well in 1851, the subject is of less importance than to the merchant, who, meeting lower prices when he expected higher, has been the sufferer. To both, however, it is of great consequence to take correct views of future

prices, and to ascertain whether the fall last year is a mere temporary oscillation, or only a step in the general reduction of cost. A considerable rise of prices for a considerable period, and a theory founded on that which has been generally received, though later events disparage if they do not disprove it, make it more necessary to be cautious as to the future. To suggest the probability of a general and a continued tendency to a decline of prices, we ask attention to a brief table, copied in part from Mr. Tooke's work on prices, and in part from the *Economist*, which he copied :—

Prices of.	At the commencement of the year, According to Tooke.		1851.	
	1840.	1847.	First week.	Last week.
Wheat, per quarter.....	72s. 10d.	69s. 10d.	29s. 9d.	37s. 2d.
Ashes, pearl, per cwt.....	31s.	29s.	30s. 6d. to 31s.	28s. to 28s. 6d.
Coffee, B.P.....	80s. to 155s.	25s. to 115s.	44s. to 100s.	30s. to 80s.
Copper, per ton	£94	£88 10s.	£84	£88 10s.
Cotton, B.G. per lb.	5¾d. to 7¾d.	6d. to 8d.	7¾d. to 8d.	5d. to 6d.
Hemp, St. Petersbg. ton .	£36 to £36 10s.	£37 15s. to £38	£30 to £30 10s.	£30 10s. to £31
Indigo, per lb.	3s. to 9s. 8d.	1s. 8d. to 6s. 4d.	3s. 10d. to 6s. 10d.	1s. 9d. to 6s. 3d.
Iron, bars, per ton	£9 15s. to £10 (1844, £4 15s.)	£10	£5 15s. to £5	£5 2s. 0½d.
Lead	£17 12s.	£18 10s.	£17 10s.	£16 15s. to £17
Oil, fish, per ton	£25 to £31	£27 to £27 15s.	£27 to £27 10s.	£32 15s. to £33
Olive, per ton	£60 to £61	£48 to £49	£43 to £43 10s.	£42 10s. to £43
Pepper, per lb.	4d. to 4¾d.	2¾d. to 3¾d.	3¼d. to 3¾d.	3¼d. to 3¾d.
Butter, per cwt.	88s. to 92s.	80s. to 88s.	78s. to 80s.	74s. to 80s.
Silk, China, per lb.....	22s. 6d. to 26s. 6d.	12s. to 18s.	18s. to 22s.	14s. 6d. to 19s. 6d.
Do., Italian, per lb.....	18s. to 33s.	18s. to 25s.	19s. to 28s.	17s. to 25s.
Rum, per gallon	3s. to 5s. 2¼d.	3s. to 3s. 6d.	2s. 6d. to 2s. 8d.	2s. 2d. to 2s. 4d.
Sugar, Mass. per cwt.....	37s. 7d.	33s. 10d.	37s. to 46s.	29s. to 38s.
Tallow, Ic.....	50s. 6d.	51s. 3d. to 51s. 6d.	36s. to 36s. 9d.	30s. 9d. to 37s.
Tar, per barrel	17s. 6d.	17s. 3d. to 17s. 6d.	16s.	16s. 3d.
Tea, Congou, per lb.	2s. 4d. to 3s. 4d.	6d. to 2s. 2d.	1s. to 1s. 1¼d.	7d. to 9d.
Timber, Dantzic, per load	102s. 6d. to 110s.	80s. to 90s.	60s. to 70s.	45s. to 60s.
Do., Canadian, per load..	85s.	70s. to 80s.	55s. to 65s.	50s. to 70s.
Tobacco, Vir., per lb.	4¾d. to 11¾d.	2¾d. to 5¾d.	4¾d. to 10d.	2¾d. to 7¾d.
Wool, Luxem., per lb. ..	2s. 1d. to 2s. 8d.	1s. 8d. to 2s.	1s. 5d. to 1s. 6d.	1s. 5d. to 1s. 6d.

It is true, therefore, that in the beginning of 1851 the prices of some articles—coffee, cotton, indigo, silk, sugar, tobacco, &c.—were temporarily higher than the demand and the stocks on hand justified; but it is also true, that the prices of the majority of the articles referred to had a tendency to fall before that period. It may be necessary to remind the reader with respect to the price of wheat, that 1847 was a famine year throughout Europe, and that prior to Sir Robert Peel altering the corn-laws in 1842, the average price of wheat, and what was considered a necessary remuneration to the grower, had successively fallen from upwards of 80s. to 56s. per qr. Since the corn-laws were abolished, though there have been two bad harvests at home and one on the continent, the price of wheat has steadily approximated to about 40s. It has fallen less as yet, since the laws were repealed (28 per cent.), than it fell (30 per cent.) while they were maintained in their full vigour. Of almost all other things, the price fell continuously before 1840, and has continued to fall since.

There are some exceptions, such as fish oil, the supply of which does not keep pace with the demand; and such as hemp, silk, cotton, &c., cultivated in comparatively narrow districts, and of which the improvements in cultivation do not always compensate for inauspicious seasons; but otherwise, the price of every product of human industry, more especially those products which require much ingenious labour to perfect them, has almost continuously fallen. Nature does not mock the exertions of man, and the attempts everywhere made and making to produce all kinds of useful commodities at a cheap rate have been almost everywhere eminently successful. Within the last four years, the fall in price has been very remarkable, for it has gone on almost continuously, contrary to all expectation, in spite of a new supply of gold, exceeding in one year threefold the produce of all the gold mines previously worked; in spite of very much increased consumption, by an increasing population; and in spite of the development of industry having been impeded by unusual political convulsions.

Is it, then, quite certain, as all the circular writers conclude, that prices have now reached the lowest point? that continuously falling for years, they are hereafter to rise? that the exertion still everywhere making, and we think now making, more than ever, to produce commodities at a diminishing cost, are to be fruitless? and that in the present and the following years stocks of all kinds, and all kinds of capital, are to increase in value, and merchants to obtain higher prices for every commodity they import? The question interests alike the trading classes, the statesman, and the philosopher; but to answer it effectually, and in reference not only to the year now begun, but subsequent years, more facts than have yet been accumulated must be collected; and he must be very presumptuous, or possess more than ordinary wisdom, who undertakes more than to bring together a few facts bearing on the subject.

With reference to the present year, to which we now confine our remarks, it may first be noticed that the corn market, both at home and abroad, is rapidly rising. The finest flour is dearer at Paris than at London, and wheat, which already is exported to Belgium, is purchased to be exported to France in March. The price in our market is not at present sufficiently high to bring large quantities from the United States, or the neighbourhood of the Black Sea; our stock of corn in the hands of the farmers is not supposed to be unusually large, and it seems certain that between the present time and the next harvest, the price of bread will rise. Now, as a portion of the sum applied to buy manufactures, colonial produce, &c., is derived from what those who live on wages can spare from their necessary expenditure on food, a rise in its price is not immediately favourable to a rise in the price of other things. There is less in fact, with a short harvest, to be given for them, and the failure of the last harvest on the continent is a

sure indication of a diminished demand there for manufactures and colonial produce.

Some persons rather hastily conclude that a rise in one market gives buoyancy to other markets, and that a rise in the price of corn causes a rise in the price of other things. So far as corn and sugar can be substituted, as in the distilleries, for one another, such an effect may be immediate; and so far as the price of corn enters into the price of other things, such an effect is sure in the long run to follow a rise in the price of corn. But the reverse also ensues from a fall in the price of corn, which by lessening the cost of labour, lessens the cost of its produce. We may fairly set off, therefore, against the effects of a temporary rise in the price of food over the price of other things, the effects of its low price for some years. Indeed, it may be doubted, considering the degraded condition of the bulk of the labourers under the corn laws, and that the increase in their number has not yet operated, subsequently to an improvement in their condition, to their disadvantage in the labour market, whether the uniformly low price of food for the last three years has yet had all the effects it is destined to have in lowering the price of other commodities. We are inclined to think that wages are more likely to fall than rise; and that the price of other things will yet be reduced, in consequence of the great reduction that has already taken place in the price of food. This is one reason for supposing that, so far as a successful business in the present year is expected from a rise in the prices of other commodities than food, it will not be realised.

Assuming that consumption will be unabated, and will increase progressively in 1852 as in 1851—which is doubtful as to England, and almost certain not to be the case on the continent—the stocks of colonial produce on hand are extremely heavy, and with what are coming forward, in several cases apparently in excess of the demand. Thus the stocks were at the close of the years—

	1850.	1851.
Of sugar, in the principal ports of Europe	2,785,000 cwt.	3,781,000 cwt.
Of colonial in Great Britain	1,092,000 „	1,730,000 „
Of coffee, total stocks in Europe	254,000 „	1,014,000 „
Ditto in Great Britain..	380,000 „	350,000 „
Of tea.....	34,400,000 lbs.	47,600,000 lbs.
Of indigo, in Europe....	35,706 chests	39,343 chests

We willingly include Europe in the statements, because Europe is now one commercial whole. Telegraphs and railroads place the stocks in any one port under the immediate command of the capitalist in almost every other.

The increase of consumption of sugar in 1851 in Great Britain was about six per cent., but the increase in stock at the end of the year was upwards of 36 per cent.; and while the increase in the whole stock in Europe was 35 per cent., the consumption in all Europe was actually 57,000 cwt. less than in 1850. Consumption in Europe, according to the usefully compiled tables in the *Economist* of the 24th inst.:—

	Cwt.
1850.....	9,674,000
1851.....	9,617,000
Less in 1851....	57,000

This is in face of a rapidly increasing supply both of colonial and beet-root sugar.

The increased consumption of coffee in 1851 in Great Britain was something less than four per cent., or in the eleven months, for which which we have accurate returns, 29,005,273 lb. in 1850, against 30,170,020 lb. in 1851, and the stock was about eight per cent. less in 1850 than in 1851. In the whole of Europe the increase of consumption has been from 2,308,000 cwt. in 1850, to 2,678,000 cwt. in 1851, or about 14 per cent., and the increase of stock in Europe is only about six per cent. Notwithstanding the complaints made of the consumption of chicory, there is a better prospect for coffee than for sugar, though the latest accounts from Ceylon and Brazils tell us of large crops coming forward.

Of tea, the consumption in 1851 was 53,700,000 lb., against 51,100,000 in 1850, or an increase of five per cent.; but the increase in the stock from 34,400,000 lb. to 47,600,000 lb., or thirty-eight per cent. The stock on hand is estimated at ten months' consumption, the usual quantity being seven; and large quantities continue to arrive.

The consumption of indigo last year was less than usual, and the supplies greater. It may be reasonably expected that the consumption in the present year will be greater than in the last; but the supplies, we are informed, will be still more abundant; and there can be as little hope that the price of indigo will rise as the price of sugar.

The articles we have referred to may be taken as indicating the general state of our markets. It is very encouraging for our manufacturers, it is full of promise to the consumers, it is all that can be wished by free-traders and the bulk of the people; but we cannot join in the conclusion that it is likely to be advantageous to the mercantile classes. They were sufferers in 1851; and, we fear, they are likely to be sufferers in 1852. Over the operations of the producers in various countries they can exercise very little control; and the producers, everywhere bent on lowering the cost of production, are continually bringing forward greater quantities at a less cost, and reducing the prices of all existing stocks. These considerations are wholly commercial, and they apply exclusively to the present year. We have not referred to the effects of the great political changes which appear likely to ensue; and we have left wholly untouched the larger question of prices in future, complicated as that now is by almost daily discoveries of new mines of gold. The sum of our observations is to impress great caution on all mercantile men; while for most manufacturers and for all consumers the prospects for the present are as good as were the realisations of the past year.—Manchester Examiner.

MODEL LODGING HOUSES.

SIR,—The model lodging-house in Kirkgate, for the accommodation of seventy-five single men, has now been in operation a sufficient time to enable any one who looks at the accounts, to judge how far it has been successful in a pecuniary point of view: and for this purpose I send you a statement of the income and expenditure upon the house for the past half-year, from which it will be seen that after allowing a liberal margin for depreciation and replacement of capital, there remains a very fair interest on the original outlay. It must be borne in mind, moreover, that had the receipts for the first four months of the half-year been equal to the last two months—as they probably will be in future—the profit would have been much greater; indeed, the demand for accommodation during the last two months has been such, that I am now enlarging it to the extent of 110 beds.

I take this opportunity, too, of publishing an account of the original outlay, which may possibly interest some of your readers; and, at any rate, will serve to answer numerous requests that have been made to me for information from various places in the north of England, with a view to erecting similar establishments in other large towns. These particulars I have collected from the various invoices; and the whole outlay made by me is rather under, but approximates as nearly as possible to, the total stated here.

STATEMENT OF CAPITAL EXPENDED.

ALTERATION OF PREMISES AND FIXTURES.

	£.	s.	d.	£.	s.	d.
Builder's contract for converting four old houses into suitable premises.	200	0	0			
Plumber for gas apparatus, lead for stairs, and other work	30	0	0			
Extra painting, sign boards, &c.	10	0	0			
Ventilating apparatus	20	0	0			
Cooking ditto	10	0	0	270	0	0

BEDS.

45 bedsteads, at 11s. each	41	5	0			
265 sheets (three for each bed) and making	16	17	6			
75 counterpanes, at 2s. 6d. each	9	7	6			
Tick, &c., for 75 mattresses and pillows, and making	13	10	0			
Flock for 75 beds, and filling in	12	0	0			
Blankets, 75 pairs	24	0	0	117	0	0

FURNITURE, &c.

75 cupboards for bed heads	9	10	0			
36 ditto, with locks and keys, for use of lodgers	5	14	0			
5 tables	5	4	0			
2 large chests for linen	3	0	0			
Seats and forms	4	15	0			
Bath, and trellis flooring for bath room	3	10	0			
Plate racks, shelves, hooks, and rails.	2	13	0	34	6	0

MISCELLANEOUS.

Pots and pans, plates, dishes, &c.	9	9	0			
Brushes of all sorts	2	0	0			
Clock	1	13	0			
Towelling, &c.	2	0	0			
Ledgers, account books, and printing	3	12	0	18	14	0
Total cost				440	0	0
Portions of rent, &c., accruing during the alteration of the premises				10	0	0
				450	0	0

STATEMENT OF THE RECEIPTS AND EXPENSES FOR THE LATTER HALF OF THE YEAR 1851.

RECEIPTS from 3d. per bed.

Receipts for 26 weeks, from the 1st July to the 27th of December	130	4	9
	130	4	9

EXPENSES.

Current expenses for 26 weeks, from 1st July to the 27th December, including wages to superintendent, £1 per week, and assistant, 14s. do.	63	17	10
Half-year's rent	17	10	0
Ditto water rate	1	1	0
Ditto gas bill	7	16	6
Poor rate	1	13	4
	96	18	8
Allowing for replacement of capital expended in alteration of premises, &c., 7½ per cent. per annum on £270	10	2	6
And allowing for depreciation of stock, &c., 10 per cent. per annum on £180 expended	9	0	0
Leaves a balance of profit equal to 6¼ per cent. per annum on £450 total capital	14	3	7
	130	4	9

There are 10,400 threepences in £130 4s. 9d., and adding to that number an average of 40 persons a week who have one free bed, from having slept there six previous nights in succession, there has been accommodation provided during the half-year, to the extent of 11,500 beds.

Of course in a town with such a population as Leeds, one establishment of this kind is a mere drop in a bucket. The great success, however, which has attended this small effort, may perhaps lead to the erection of others in different localities. There is room and need for many similar ones; and for whole streets of model cottages, as well as for baths and wash-houses. But individuals can do little in this way by themselves; such things can only be done well by association. And surely in this town, with its 180,000 inhabitants, there ought to be an Association for the Improvement of the Dwellings of the Poor.

This is neither the time nor place for any remarks on the success of the model lodging-houses, in a moral point of view; and I will only mention that these results are even more satisfactory and encouraging than those I have already named. Your obedient servant,

W. B. DENISON.

TABLE SHEWING THE WEIGHTS OF TURNIPS ON VARIOUS FARMS IN THE MIDDLE AND UPPER DISTRICTS OF ANNANDALE,

INSPECTED BETWEEN THE 17TH AND 25TH NOVEMBER, 1851.

NAMES OF FARMS AND KIND OF TURNIPS.	Width of Dl. in inches.	No. on 10 yards.	WEIGHT. Per Scotch Acre.		Per Imperial Acre.		MANURES. Farmyard Dung.	Peruvian Guano.	Dissolved Bones.	Ground Bones.	Bone Meal.	Superphosphate of Lime.	DATE OF SOWING.
			t.	cwt.	t.	cwt.	c. y.	cwt.	cwt.	bus.	bus.	cwt.	
HARDGRAVE, DALTON,													
White Globe	28	28	25	11	20	5	15	2½	1	13			June 19.
Dale's Hybrid.....	27	32	31	12	25	1	15	2½	1	13			June 19.
Purple Top Yellow.....	27½	29	24	12	19	10	15	2½	1	13			June 17.
do. Swedes.....	26½	25	31	2	24	13	15	2½	1	13			May 24 to 28.
do. do.	28½	26	37	10	29	15	15	2½	1	13			May 22 to 23.
DORMONT, DALTON,													
Swedes	29	35	27	1	21	9		2		17			May 27 to 30.
White Globe	29	38	34	10	27	7		2		17			June 13 to 14.
Yellow Bullock	29	36	20	19	16	12		2		17			June 19 to 21.
Hardy Green	27½	32	23	7	18	10	18	2		6			June 16 to 18.
GREENHILLHEAD, LOCHMABEN,													May30toJune16
Yellow Bullock	27½	39	28	10	22	12	18	2		6			
Swedes	27½	38	27	2	21	10	24	2		10			May 22 to 29.
PRESTONHOUSE, LOCHMABEN,													
Swedes	29½	32	29	12	23	9	15	2½		10			
SMALLHOLM, LOCHMABEN,													
Swedes	27	41	27	16	22	0	18	2		10			May 26 to June 5
Yellow Bullock	25⅓	47	22	19	18	4	18	2		10			do.
HALLEATHS, LOCHMABEN,													
Swedes	28¼	39	30	11	24	4	16	2				1½	May 20 to 26.
do. (Laing's)	27	37	33	14	26	14	16	2				1½	do.
DALFIBBLE, KIRKMICHAEL.													
Swedes	28½	31	28	18	22	18	12	2		12			May 13 to 17.
do.	28½	32	21	7	16	18	10	2		12			June 6.
Pomeranian, white.....	28	33	41	13	33	1	10	1½		12			June 7.
Yellow Bullock	28	33	18	18	15	0	12	2					June 10 to 14.
Swedes	28½	30	30	9	24	3	15½	4¾		18½			May 30 to June 5
DALTONHOOK, DRYFESDALE,													
Hardy Green	28½	30	27	4	21	11	15½	4¾		18½			June 7 to 13.
HILLSIDE, DRYFESDALE,													
Hardy Green (Skirving's),	28	36	37	2	29	8	27	2	3⅔				May 12.
Pur. Top Swedes do. ..	26¾	32	29	10	23	8	27	2	3⅔				May 12 and 13.
do. do. ..	26	29	30	11	25	10	27		6⅔				May 13.
Green Top Swedes.....	28	30	19	19	15	16	20	2		20			May 20.
Purple Top do.	27	30	28	3	22	6	20	2		20			May 22.
Green Top do.	28	30	20	13	16	8	27	2	3⅔				May 20.
Purple Top do.	28	25	24	10	19	9	27	2	3⅔				May 19.
Purple Top Yellow.....	27½	35	18	11	14	14	20	1	2½				June 5.
Green Top do.	28	29	21	14	17	4	20	1	2½				June 4 and 5.
do. do.	27	33	17	8	13	16	20	1		20			June 4.
do. do.	26½	40	23	3	18	7	35						do.

NAMES OF FARMS AND KIND OF TURNIPS.	Width of Dl. in inches.	No. on 10 yards.	WEIGHT. Per Scotch Acre.		WEIGHT. Per Imperial Acre.		MANURES. Farmyard Dung.	Peruvian Guano.	Dissolved Bones.	Ground Bones.	Bone Meal.	Superphosphate of Lime.	DATE OF SOWING.
			t.	cwt.	t.	cwt.	c. y.	cwt.	cwt.	bus.	bus.	cwt.	
KIRKBURN, DRYFESDALE,													
Swedes	27	34	25	8	20	3	25	3		15			May 17 to 24.
Green Top Yellow	27	34	27	1	21	9	18	3		12			June 4 to 6.
Purple Top do	28	36	26	10	21	0	18	3		12			May 24 to 31.
White Globe	27¼	35	34	7	27	4	18	3		12			May 12.
BROOMHOUSES, DRYFESDALE,													
Purple Top Swedes	27½	35	25	17	20	10	25	2			0¾		May 17.
White Globe	28½	37	35	7	28	1	25	2					do.
do.	27½	44	28	4	22	7	24	2					June 6.
Purple Top Yellow	27½	39	27	2	21	10	20	2					June 16.
Green Top do.	27½	43	22	13	17	19	24	2					June 6.
DRYFESDALE, MANSE, DRYFESDALE,													
Purple Top Swedes	27½	31	26	15	21	4	24	2		8			May 19 to 24.
DRYFEHOLM, DRYFESDALE,													
Purple Top Swedes	29½	35	24	0	19	1	20	2					May 26.
Green Top do.	30	36	17	3	13	12	20	2					do.
Purple Top Yellow.....	28	41	19	19	15	16	20	1½					June 20.
TORWOOD, DRYFESDALE,													
Swedes	27¾	40	26	10	21	0	12	2½		12			May 28.
Green Top Yellow.....	27	30	21	8	17	0	10	2		10			June 15.
BECKTON, DRYFESDALE,													
Swedes	28	35	24	14	19	11	25	1½		10			May 20.
Green Top Yellow.....	27	43	27	1	21	9		2½		13			do.
White Globe	28	43	29	15	23	12		2½		13			May 15.
MILLBANK, APPLEGARTH,													
Green Top Yellow.....	28	35	17	5	13	13		2½		12			June 2.
do. Swedes.....	28	43	19	17	15	15	20	2					May 16.
Purple Top do.	28	43	21	0	16	13	20	2					May 17.
Green Top Yellow.....	28	41	19	5	15	5	15	2					June 14.
LAMMONBIE, APPLEGARTH,													
Green Top Yellow.....	27½	43	18	0	14	5	25						June 1.
do. do.	28½	40	23	8	18	11	20	2½					May 16.
do. do.	28½	45	18	5	14	9		3		12			June 10 to 17.
Purple Top Swedes	28½	37	21	14	17	4	20	2½					May 16.
MUIRHOUSEFOOT, APPLEGARTH,													
Green Top Yellow.....	28	45	20	10	16	5		2½		15			June 15.
Purple Top do.	28½	44	22	17	18	3		2½		15			do.
Purple Top Swedes	29	37	18	13	14	16	15	2½		10			June 13.
FISHBECK, APPLEGARTH,													
Purple Top Swedes	29¼	40	26	0	20	13	25	3					May 21.
Green Top Yellow.....	28½	38	22	0	17	9	20	2					June 6 and 9.
BROADHOLM, APPLEGARTH,													
Swedes	29	54	29	18	23	14	16	2				1½	May 20 to 24.
DINWOODIE MAINS, APPLEGARTH,													
Swedes (Skirving's)	28½	35	29	19	23	15	18	4					May 26.
do. (Lothian)	28½	32	25	13	20	6	18	4					May 15 to 20.
Yellow Bullock	28½	30	15	16	12	11	7	2					June 28.
DALMACADDER, APPLEGARTH,													
Hardy Green	26	38	29	16	23	12	15	2½					June 5.

NAMES OF FARMS AND KIND OF TURNIPS.	Width of Dl. in inches.	No. on 10 yards.	WEIGHT. Per Scotch Acre.		Per Imperial Acre.		MANURES. Farmyard Dung.	Peruvian Guano.	Dissolved Bones.	Ground Bones.	Bone Meal.	Superphosphate of Lime.	DATE OF SOWING.
			t.	cwt.	t.	cwt.	c. y.	cwt.	cwt.	bus.	bus.	cwt.	
DALMACADDER (continued)													
Purple Top Yellow.....	26	35	26	0	20	12	15	2½					June 2.
Swedes (Skirving's)	27	39	23	19	19	0	17	2½					May 21 to 27.
HANGINGSHAW, APPLEGARTH,													
Swedes	30	41	21	11	17	3	28	2½					May 20 to 26.
White Globe	30	39	18	19	15	0		4					June 28.
Purple Top White	30	49	18	19	15	0		4					June 29.
DINWOODIE-GREEN, APPLEGARTH,													
Swedes (Lothian)	29½	33	23	12	18	14	30	2					May 17 to 26.
BALGRAY, APPLEGARTH,													
Purple Top Yellow	27	44	21	16	17	5	20	3					June 15.
Swedes	24	43	24	18	19	15	30						May 26.
CLEUGH-HEADS, APPLEGARTH,													
White Globe	29	44	20	6	16	2	25						May 27 to 30.
Yellow Bullock	29	44	17	5	13	13	25						June 2.
do.	29	55	14	4	11	5		4					June 21.
Purple Top Yellow	29	38	17	5	13	13		4					June 28.
SHAW, HUTTON,													
Purple Top Swedes	28	26	24	3	19	3	20	3	4				May 15 to 16.
Hardy Green	28	29	25	11	20	5	20	2½					May 20.
Purple Top Yellow.....	28	29	15	15	12	10	20	2½					May 24.
Yellow Bullock	28	36	17	19	14	3	20	2½					June 8 to 10.
Purple Top White.....	28	28	21	7	16	18	20	2½					June 5.
KIRKHILL, WAMPHRAY,													
Swedes (Lothian)	27½	30	20	6	16	2	25	2			1		May 24.
do. (Skirving's)	29	32	16	8	13	0	28	2					May 21.
Yellow Bullock	27½	32	21	8	16	19	25	2			1		June 6.
Hardy Green	27½	37	21	8	16	19		2½		22			June 10.
do.	29	31	27	14	21	18	28	2					May 21.
White Globe	27½	36	21	15	17	5	22	2½					June 12.
PUMPLIEBURN, WAMPHRAY,													
Swedes	28	27	15	18	12	12	18	3					May 16.
Yellow Bullock	30	43	21	5	16	17	18	3					May 19.
Green Top White	30	30	18	19	15	0	18	3					May 20.
WAMPHRAYGATE, WAMPHRAY,													
Green Top White	28	33	12	5	9	14	18	2					June 27.
do. do.	28	42	15	15	12	10	18	2					do.
Yellow Bullock	28	36	16	2	12	15	18	2					June 11 and 12.
do.	28	44	19	12	15	11	24	2					June 5.
Swedes (Skirving's)	30	35	24	17	19	14	28	2½					May 24.
Green Top Swedes.....	30	32	17	19	14	5	28	2½					do.
BROOMHILLS, WAMPHRAY,													
Green Top Swedes.....	28	37	19	1	15	2	30	3					May 27.
Yellow Bullock	28	38	22	8	17	15	20	3					June 9.
Green Top White	28	35	23	16	18	17	20	3					do.
Swedes (Skirving's)	28	32	26	16	21	5	20	2					May 13 to 16.
ANNANBANK, JOHNSTONE,													
White Globe	28	32	16	2	12	15	15	2					June 27.
do.	28	35	24	10	19	8	16	2					June 10.
Hardy Green	28	35	26	12	21	2	20	2					June 7.
Yellow Bullock	28	33	18	4	14	8	20	2					June 17.

NAMES OF FARMS AND KIND OF TURNIPS.	Width of Dl. in inches.	No. on 10 yards.	WEIGHT. Per Scotch Acre.		Per Imperial Acre.		MANURES. Farmyard Dung.		Peruvian Guano.	Dissolved Bones.	Ground Bones.	Bone Meal.	Superphosphate of Lime.	DATE OF SOWING.
			t.	cwt.	t.	cwt.	c.	y.	cwt.	cwt.	bus.	bus.	cwt.	
ANNANBANK (continued),														
Yellow Bullock	28	33	18	11	14	14	20		2					June 6.
do.	30	47	19	12	15	11	25		2					June 5.
BARNHILL, KIRKPATRICK-JUXTA,														do.
Green Top White	30	38	26	3	20	14	25		2					
WOODFOOT, MOFFAT,														
Yellow Bullock	28	43	21	0	16	13	20		2					
White Globe	28	39	21	0	16	13	20		2					
CRAIGBECK, MOFFAT,														
Yellow Bullock	28	41	22	8	17	15	24		$1\frac{3}{4}$					May 28.
NEWTON, MOFFAT,														
Swedes	$29\frac{1}{2}$	33	27	5	21	12	24		2			$0\frac{3}{4}$		May 23.

THE FOLLOWING WERE INSPECTED AND CERTIFIED BY MEMBERS OF THE CLUB, BUT NOT BY THE APPOINTED INSPECTORS.

NAMES OF FARMS AND KIND OF TURNIPS.	Width of Dl. in inches.	No. on 10 yards.	WEIGHT. Per Scotch Acre.		Per Imperial Acre.		MANURES. Farmyard Dung.		Peruvian Guano.	Dissolved Bones.	Ground Bones.	Superphosphate of Lime.	Animal Manure.	DATE OF SOWING.
			t.	cwt.	t.	cwt.	c.	y.	cwt.	cwt.	bus.	cwt.	cwt.	
FOSTERMEADOW, DALTON,														
Skirving's Swedes	$25\frac{1}{2}$	25	31	11	25	2	10		$1\frac{3}{4}$		20			May 15 to 17.
GILLENBIE, APPLEGARTH,														
Swedes	29	30	24	13	19	11	34			4				May 15 to 21.
CRAIGHOUSE, CORRIE,														
Swedes	29	36	25	7	20	2	20		2					May 27.
Green Top Yellow	29	38	21	16	17	6	20							June 16.
Purple Top do.	29	48	30	15	24	8	20							do.
GOODHOPE, JOHNSTONE,														
Skirving's Swedes	30	33	32	7	25	13	30		2				5	May 15.
Purple Top Yellow.....	28	29	30	9	24	3	25		2		20			May 16.
Red Top White	29	30	32	2	25	9	25		2				5	May 17.
White Globe	29	30	33	11	26	11	25		2				5	do.
Hardy Green	29	31	42	19	34	1	25		2				5	do.
KIRKBANK, JOHNSTONE,														
Hardy Green	$26\frac{1}{2}$	37	37	15	29	19	26		$1\frac{1}{2}$					May 21 and 22.
White Tankard	$26\frac{1}{2}$	37	40	3	31	17	$26\frac{1}{2}$		$1\frac{1}{2}$					May 18 and 20.

The weights were taken in different portions of each field, and those stated show the average; the heaviest and lightest not being particularised.

THE AVERAGE WEIGHTS OF THE WHOLE FIELDS ARE:—

	Scoth Acre. Tons.	Cwt.	*Imp. Acre.* Tons.	Cwt.
For Swedes.....	24	19	19	16
For Yellow.....	21	13	17	0
For Common.....	26	11	21	1

REPORT OF THE LOCKERBIE FARMERS' CLUB ON THE PRECEDING TABLE.

The inspectors appointed, viz., Messrs. Currutchers, Kirkhill; French, Wamphraygate; Dobie, Kirkburn; Jardine, Millbank; Cattle, Dormont; and Wilson, Pilmuirhock, proceeded to the examination of the crops of most of the members of the club on the 17th and 18th November, and the weights now reported were all taken by them before the 21st. Those in the latter part of the table were not examined by the inspectors, but separately, and certified by some individual member of the club not the owner of the crop, and inserted by request here, for the sake of further elucidation.

At the request of the club, at their meeting on the 24th November, the following report is drawn up, containing the substance of the observations made by the inspectors, and the opinions generally expressed by the members at that meeting.

The table comprehends the farms of 21 members of the club, and of the whole fields weighed only seven were in the proprietor's occupation.

GENERAL CHARACTER OF THE CROP.

The crop of 1851 falls far short in point of weight, of those of 1850 and 1849, as will be seen by the following statement of the average of the whole farms taken in these years, viz.:—

	Imp. Acre. 1849.		Imp. Acre. 1850.		Imp. Acre. 1851.	
	Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.
Swedes	21	15	24	[illegible]	19	16
Yellows	21	1	21	14	17	[illegible]
Common	22	[illegible]	23	14	21	1

And taking the three sorts, the deficiency of 1851 is below 1849 11 per cent., and below 1850 17 per cent.

This, in the opinion of the majority, corresponds nearly with the actual deficiency of the general turnip crop in the district, though some think that the proportional shortcoming in the crops unweighed is not so great. It may be observed that the deficiency is to a small degree compensated by a somewhat better bottle swede, the extent being still yearly increasing in the district.

This diminution of weight arising in the face of the improved cultivation, shown by a greater quantity and variety of manures and earlier general sowing, is to be attributed to the stoppage of the growth by cold weather in the end of June, and beginning of July, and the great losses by insects which, though not generally destroying the plant retarded its growth. A fortnight was then lost and never regained; and although generally luxuriant and healthy in September and October, there was not time for the bulbs to gain the ordinary size, checked by the frosts early in November. If that month had been more than usually mild, and the crop allowed to stand, there was every appearance that an average weight would be attained, there still appearing great vigour of growth.

The years of 1849 and 1850 were considered on the whole favourable turnip seasons in the district, and this crop of 1851 is still in point of weight, perhaps, a fair average of the six or seven preceding years, though certainly under what these years would have been had the now more improved management then prevailed.

TIME OF SOWING.

It will be observed from the table that the time of sowing in all cases noted and readily answered by farmers is generally earlier than formerly, arising not so much from any particular facility in the season as the conviction now prevailing that the chances of a large crop are much greater with early sowing, and it may be remarked with regard to

Swedes, that the earlier after the 15th of May the better, and after the 25th, or even 20th, of May the chances of weight diminish.

Common, or White Varieties.—It will be noticed that various cases occur when these have been sown very early, that the produce has been so large as 31 to 33 tons per imperial acre. The general attention of the district has been attracted by these and similar results last year, and there is no doubt but the practice will be extensively followed, and probably with great profit. Some of these early crops, such as Hardgrave and Dalibble, were all, previous to the general inspection, consumed, but were ascertained to be upwards of 40 tons per Scots acre, while it is also stated that so early as the 15th of September some crops reached 30 tons per Scots, or 24 per imperial, acre. And the advantage of having such crops for consumption during all October is very great indeed, as stock of every description fattens so much more rapidly at that mild season with full feeding of turnips. Some farmers propose a partial sowing so early, if possible, as the 1st of May, reckoning at all rates to have their October turnips in by the 15th.

Yellows.—The results this year do not show much marked difference, if sown by the 17th of June. But in every variety, in sowing after the 15th, the inferiority is very marked. If any are sown after that date it should be the white.

It is scarcely necessary to observe that however sowing may be delayed it is indispensable to have the land thoroughly worked and pulverized, and in a very friable state.

WIDTH OF DRILL AND HOEING.

The width of drills is now, it will be seen, very uniform, varying from 27 to 29 inches. It has been

remarked by some farmers that in cases of full and varied manuring, that this crop (especially swedes) on low or sheltered land, or narrow valleys, where there there is no great circulation of air, would this year have been larger, had not the luxuriance of the shaw, with the closeness of the drill, continued during all October to exclude the air and sun too much. There seems no doubt but discrimination is required in varying from 26 to 30 inches, or it may be even more in the case of swedes, richly manured and little exposed.

The hoeing now on many farms approaches nearer the standard of 12 to 14 inches, exemplified by the practice of Mr. Elliot, of Hardgrave, in the two preceding years' weighings, and this would have been more generally approximated to, and to much advantage, had not the cold weather, and the unhealthy look of the crop at the period of hoeing, created hesitation in risking width so much beyond ordinary practice.

QUALITIES OF SEED AND VARIETIES OF TURNIP.

The complaints of imperfect and mixed seed have been very general this year. The irregular shape of the bulbs, and more than usual proportion in many fields of stalks running to seed, as well as a mixture of sorts, are unquestionably more general than heretofore. As the easiest remedy for this, it is strongly recommended to farmers to raise their own seed from selected bulbs. Several neighbouring farmers might join and accomplish it with very little trouble.

In noticing the different sorts of swedes, Skirving's purple top is the heaviest, and indeed purple top is this year very marked in superiority over green. The latter is the hardier turnip (against frost); but, as remarked last year, now that storing before frost is more practised, both yellow and swedes of the purple-topped sorts may be more increased in proportion to the hardier sorts.

Of the white sorts the hardy green is preferred by all farmers who have tried it this year. They are the best shaped, appear more firm and solid, and in October attain a greater weight than any other.

Some of the inspectors expressed a decided opinion that on many farms yellow should be further reduced in proportional extent to white and swedes. It is to be noticed, however, that when stored they keep fully as well as swedes. They do with later sowing, and when cutting is not practised they are the best turnip for hogs in January, February, and March. As the proportion raised for consumption in early winter increases, white will further supersede yellow. And when the use of the turnip cutter for sheep in spring becomes more general, swedes will also encroach further on yellow on the best soils.

MANURE.

On a large number of farms the mixture of farmyard dung with both guano and bones is now practised, influenced no doubt by the great crops on Hardgrave under this system. The result, as appears by the weighing, is very satisfactory; and it is believed that, in future, bones, both rough and dissolved, will be more generally used with guano and dung.

In some cases farmers themselves perform the operation of dissolving with sulphuric acid. They are sure of getting the pure material, and at a considerably cheaper rate – the cost of dissolving being 1s. 3d. to 1s. 4d. per bushel. On one farm, along with equal quantities of dung, 11 bushels of dissolved bones, costing £1 18s. 6d. per Scotch acre, was compared with 2 cwt. of guano and 6 bushels of dissolved bones, at an expense of £2 1s., and the former found superior in produce. As many farmers have expressed their wish to dissolve the bones, a separate note of the mode of dissolving will be furnished to such members as wish it.

It will be noticed from the weighings that so convinced are the farmers of the district of the advantage of adding extra manures, that it is now rare to find any turnips where at least 2 cwt. of guano per Scots acre is not added to the dung that can be spared, and its use has been largely encouraged by the confidence entertained of the quality, in consequence of the samples of the greater portion of all that has been imported into the district having been analyzed by the Highland Society's chemist, and reported, under the sanction of the club, to the public.

The club, on a previous discussion, expressed an opinion that 40s. per Scots acre, or 32s. per imperial acre, might be profitably expended on extra manures, where 15 yards of dung only can be applied. The result of the weighings this, as well as in former years, will confirm the opinion, even putting the smallest value on turnips, which the present low price of beef warrants. At the same time it may again be repeated, that the best mode of obtaining permanent fertility is to increase the farmyard manure; and the raising of turnip crop, by extra manure, large enough to admit of at least a half being consumed in the homestead, is the best way to effect this.

It may be again noticed that this table and its remarks will convey information more useful to the neighbouring farmers, knowing the locality and soils of the different farms, than to strangers.

The members of the club have a strong impression that, were the practice of similar weighing occasionally followed in other districts, much

knowledge, practically useful to the country, would be obtained, perhaps more than by the continuance of the practice in one district. At the same time it is trusted that in future years the club will follow out the system, though probably the mode may be varied, so as to show more minutely than hitherto the comparative experiments of individual members. Several, indeed, have been in the habit of making such experiments, but under the present form of publication they could not be reported.

LABOURERS' WAGES.

That wages will be more or less regulated by supply and demand, cannot be questioned; but at the same time there is such a wide difference in the amount of wages paid in different localities, without any apparent reason, that it would be highly desirable if some rule could be introduced whereby to judge of the sufficiency of the wage paid in proportion to the price of food. This subject has necessarily acquired a greater degree of importance from the reduced prices of agricultural produce. We submit to our readers the following communication on "Labourers' Wages," containing a scale of remuneration, tested through the actual experience of 15 years, by a gentleman, one of the most extensive farmers in England, and hence a large employer of labour, and which he has found work satisfactorily both to himself and his labourers.

In these unsettled times I think it might not be thought amiss if some principle could be acted on to consolidate the interest of the farmer and labourer; and the following plan I think likely to act fairly between both parties.

The account below shows the working of the labourer's wages, if they had varied according to the price of flour—the week's wages to be the price of six gallons of flour and 4s. 6d. —for 14 years, from Michaelmas 1835, to Michaelmas 1849, with the price I have paid, showing a difference of only 4s., and that would be in favour of the labourer.

From the 5th of October 1835, to 2nd December 1848, both included, is 687 weeks, at which period I paid 12s. per week; from the 2nd December, 1848, to 8th October, 1849, is 45 weeks, at which period I paid 10s. 6d. per week.

687 Weeks
45 Weeks

	£	s.	d.
732 Weeks, if the wages had varied according to the price of flour, as below	436	0	6
687 Weeks, 12s. per week, is £412 4 0 45 Weeks, at 10s. 6d. „ is £ 23 12 6	435	16	6
Difference.....	0		0

Below are the number of weeks to each price that flour has been in the 14 years in this parish; the price of flour at this time (March 30, 1850) is 11d. per gallon. I pay my labourers 10s. per week, that being the price of 6 gallons of flour and 4s. 6d., and intend to continue on that scale; for every 1d. per gallon flour rises or falls, his wages will rise or fall 6d. per week.

No. of Weeks.	Price of Flour per Gallon.	Wages per Week.	Total.
	s. d.	s. d.	£ s. d.
22	0 10	9 6	10 9 0
9	0 11	10 0	4 10 0
114	1 0	10 6	59 17 0
94	1 1	11 0	51 14 0
111	1 2	11 6	63 16 6
97	1 3	12 0	58 4 0
88	1 4	12 6	55 0 0
90	1 5	13 0	58 10 0
74	1 6	13 6	49 19 0
19	1 7	14 0	13 6 0
5	1 8	14 6	3 12 6
2	1 9	15 0	1 10 0
1	1 10	15 6	0 15 6
5	1 11	16 0	4 0 0
1	2 1	17 0	0 17 0
732			436 0 6

This shows the variation in each year that would have been if the labourers had been paid by the flour scale.

From Michs.	To Michs.	The Labourer received *less* on account of not being paid by the Flour Scale. £ s. d.	The Labourer received *over* on account of not being paid by the Flour Scale. £ s d.
1835	1836	..	5 2 0
1836	1837	..	0 1 6
1837	1838	1 1 6	..
1838	1839	3 12 6	..
1839	1840	3 3 6	..
1840	1841	1 6 6	..
1841	1842	1 19 6	..
1842	1843	..	2 7 0
1843	1844	..	1 12 6
1844	1845	..	3 7 6
1845	1846	0 0 6	..
1846	1847	3 18 0	..
1847	1848	..	2 8 0
1848	1849	0 0 6	..
		15 2 6	14 18 6
		14 18 6	
	Difference	0 4 0	

April 15, 1850.

CURIOUS BREED OF FOWLS.—Mr. William Lees, gamekeeper to Sir William Gordon, at Earlston House, is at present rearing two young fowls of a very curious and novel breed, being a cross between a bantam hen and a common pheasant. The male is nearly a jet black, though the tail is considerably shorter than the parent's. The female is a beautiful bright red with a black neck. They are about the size of ordinary barn door fowls, and are so tame that out of doors they will pick crumbs from the hand. They are of splendid plumage, and are much admired in the district.

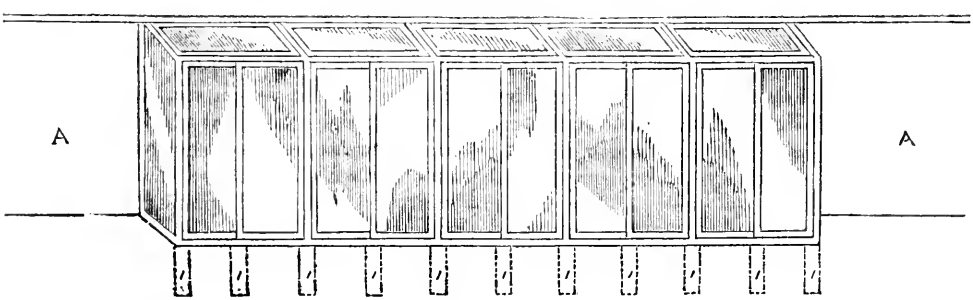
GLASS COVERING FOR WALLS.

A correspondent signing himself "Zephyrus," sends us a communication bearing upon the covering of brick walls with glass, as a protection to fruit trees against the attacks of spring frost. It was not to be expected that any one would, at the present moment, discuss such a subject without some allusion, direct or indirect, to "the present reigning horticultural novelty" — meaning glass walls; accordingly we have what may be fairly called a favourable opinion given. "Zephyrus" is to us a stranger; but as our readers will discover in perusing his communication, he is a sound, practical, and clear writer. In connexion with this matter, our correspondent has referred to a particular to which others have also alluded, namely, that of pulling down existing brick walls, in order to replace them with glass ones. Such a proceeding would be so decided a mistake, to call it by no worse designation, that it never occurred to us as a thing at all likely to be entertained, and we did not therefore deem it necessary to guard our language, when writing on the subject of glass walls, against that which we thought would never happen. In the matter of glass *versus* brick, when compared as garden structures, we think it likely that the public eye would decide in favour of the former; but as matter of utility and practical value, the merits of the latter have been long tried and accurately tested, while the former has not yet passed through this public ordeal; hence the greater the impropriety of pulling down and destroying an agent of ascertained value, for one, the merits of which, however promising, are as yet not fully determined. Our readers will pardon us for referring to this apparently uncalled-for allusion to that which some persons, as well as ourselves, never presumed likely to occur; but we find, in several instances, persons taking it for granted that wherever a hundred feet of glass wall is erected, so of necessity must the owner pull down a hundred feet of his brick walls. This is a very extreme view, and those who are opposed to glass walls may surely find better and sounder arguments than this by which to oppose their introduction and use. Without pulling down or destroying one single yard of brick wall now standing, there is ample room to try the experiments with glass walls on a very broad scale; and to this we think it is fairly entitled. We would not estimate the value of such an experiment as this by the direct and positive results, and count nothing gained which was not obviously palpable and seen. Improvements of every kind, and in every branch of science and art, are the results only of small savings—of long and protracted accumulation—the mere infinitesimal driblets gleaned and compressed from the raw material of common effort, upon which all classes of the public, and horticulturists among the rest, are for ever toiling. Why, then, should we not be rather glad to see whether some crumb or two cannot be gathered from the experiments on glass walls, and thereby add so much to the general stock of horticultural knowledge? There would at least be the chance of gain. It is, beyond all question, the fault of the present times that we are all over-wise. We all know too much. Every one knows what every one else knows; and every one knows beforehand what will and what will not answer. The great *desideratum* in the horticultural world at the present time is a few persons such as the severely wise call "cracked." We long to see a few such at work in various parts of the country, sanguine, full of hope, and trying all manner of absurdities. It would then be for the very knowing ones among us to watch the zeal and effort of such persons, and snatch the precious gems as they were now and again turned up by the rude operator. Let us not be mistaken; for, while we hold it to be a public duty to encourage all who expend either time or money in efforts to improve the science or practice of horticulture, we do not feel that it can be a duty to peep and peer and look critically at all failures and aimless effort; for there must be many of these where the experimentalist comes: but we do contend that it is a public duty to withhold unqualified praise and commendation until time and experience have fairly demonstrated the utility and value of such objects as those to which we refer. Let us only further add that, whenever a new idea is promulgated, the author is necessarily sanguine, and for the most part writes in a tone of hope and expectation of great and beneficial results. Unhappily, however, for such persons, it is but rare indeed that the public display any corresponding sympathy. The contrary, indeed, is rather the rule; and for one person who calmly and dispassionately weighs the claims which new ideas, applications, or discoveries present, twenty others set to work avowedly to examine and discover all the defects and weak points, passing over whatever is really of value. Now this is not only unjust, but it is impolitic; for the truth, which nearly always lies midway betwixt extremes, becomes obscured and darkened by the antagonism and conflict of

those who approve and those who disapprove. The common procedure, to which we have just referred, permits of no middle course. It would be unjust, however, to not a few, did we make no exceptions. Exceptions there are to this course of action, and our correspondent "Zepyhrus" is one of these. He thinks glass walls are not perfect and all that could be wished; but acknowledges the propriety of the effort, accepts what is of value, and passes by that which is defective or faulty. This is precisely the spirit which, we think, wisdom and common sense would on all occasions display towards improvements, were they more generally consulted and listened to. We are not always sufficiently on our guard against the allurements of prejudice. Only one word more. We do not mean to say by all this that every absurdity deserves to be gravely treated, and that everything, wise or foolish, ought to escape criticism. No such thing at all: we would have every proposition, sound or unsound, tested. We entirely abjure the notion of taking anything for granted which natural laws or science will account for. The more criticism the better; only let the great end be truth: not merely victory over some principle or theory, or, it may be, a personal antagonist. The following is our correspondent article:—

There is generally a tendency in a certain portion of the horticultural world, as well as in the world at large, to meet everything in the shape of innovation with something like unreasonable opposition. While, on the other hand, a counterbalancing portion are too apt to give their unqualified approbation and countenances to schemes and inventions which in reality have only their novelty to recommend them. I do not wish to appear to place the present reigning horticultural novelty, the glass walls, in the latter list. On the contrary, I have no doubt but they will answer the purpose for which they are recommended, viz., something like insuring an annual crop of apricots and peaches, &c., which, with the protection that is usually afforded them, the last two or three years have, in most localities, taught us not to expect. And if appearance is, "as it surely ought to be," considered in a garden, the effect produced by the glass walls must be highly ornamental; and fruit ripened in them will doubtless be well-flavoured, and free from the malformations and disfigurements which a pressure upon a brick or stone wall and the ravages of insects too frequently produce. But with all these, and many more advantages, willingly assigned to the contemplated glass walls, I am not sanguine enough to believe that they will ever become general. In the first place every garden must necessarily be protected by a wall of stone or bricks; no other fence will so effectually secure privacy, exclude cattle, game, &c., or even thieves; for if a stone wall does not always do that, a glass wall is much less likely to do so. And such being the case, I think it will be difficult to induce the owners of walled gardens to intersect them with double glass walls, when one half the expense will fix wire upon and cover with glass an equal portion of the existing brick or stone wall. I have at present under my care about 1,200 feet of wall, south aspect, and eleven and a-half feet high, planted with peaches, apricots, and figs; and I contemplate covering a portion of each of them with wood and glass, in the following manner: The trees to be trained to strong strained wire, at 2½ inches from the wall. At two feet from the wall a wood sill-plate to be supported on 9 inch brick piers (1), at 4 ft. apart, the under part of the sill to be about 3 inches above the level of the soil; uprights to spring from the sill-plate at 8 feet apart, to support the top-plate or front of the roof. The upright sashes to be 4 feet wide each, so that two will occupy the space between the uprights; one of the sashes to be fixed, the other to slide past it horizontally, for the purpose of admitting air. The sliding sash to be suspended from the top by casters, acting upon an iron rod stretching from upright to upright. The roof will stand at about an angle of 20 degrees, so that the roof-lights will be about 2 feet 3 inches by 8 feet, and secured by two screws to the top sill-plate. The whole will be so arranged that all the sashes may be easily taken off (and replaced as occasion may require), leaving only the plates and uprights. The sill-plate being placed 3 inches above the soil, prevents contact, and the consequent decay of the former; and when the sashes are put on, the space between the sill-plate and the soil is to be closed by a tile inserted into the soil on each side of the plate, and the space between filled with moss. The accompanying diagram may assist the elucidation of my plan, which I hope you will be so kind as give a place to in your *Journal;* you would greatly oblige me also by any suggestions on the subject.—ZEPHYRUS.—Gardeners' & Farmers' Journal.

GLASS COVERING FOR WALLS.



A A. Portion of wall uncovered.

ROYAL AGRICULTURAL IMPROVEMENT SOCIETY OF IRELAND.

At the monthly meeting of the Council, on Tuesday, February 3, present—Earl of Clancarty in the chair; Lord Monck, Lord Talbot de Malahide, William Dargan, Colonel Hall, C.B., William B. Wade, J. B. Bankhead, Thomas Ball, Dr. Kirkpatrick, Hans H. Woods, Wm. Owen, Anthony Lefroy, Thomas R. Hardy, Samuel Charles Doyne, William Donnelly, Colonel La Touche, Thomas Seymour, St. John, T. Blacker, and Charles Wm. Hamilton, Esqs.,

The following list of new members, admitted since 1st January last, was ordered to be published:—

Sir F. Foster, Bart., Stone House, Dunleer.
Sir St. Vincent Keene Hawkins Whitshed, Bart.
Vere Foster, Esq., Dublin.
Lieutenant E. Slade, R.N.
Edward Bullen, Esq., 12, Bachelor's-walk, Dublin.
William Maffet, Esq., South Frederick-street.
Rev. Somers Payne, Upton, Innoshannon.
George Waller, Esq., Fitzwilliam-square, Dublin.
Thomas Harkness, Esq., Secretary to the Society.
J. A. Nickolson, Esq., Balrath, Kells.
J. R. Boyd, Esq., Ballymacool, Letterkenny.
R. S. Cusack, Esq., St. Doloughs.
Mr. John Connolly, Builder, Dublin.
Mr. Donahy, Agricultural Lecturer and Practical Agriculturist, Glasnevin.
C. G. Grey, Esq., Land Agent to the Earl of Derby, Ballykisteen, Tipperary.
Edward Tandy, Esq., Taxing Master in Chancery.
Mr. James Ganley, Auctioneer, Ushers'-quay, Dublin.
James McGlashan, Esq., Publisher, Sackville-street.
Mr. Miller, Agriculturist and Land Agent, D'Olier-street.
The Earl of Mayo, Palmerston House, Naas.
The Earl of Meath, Kilruddery, Bray.
John Sproule, Esq., Marlboro'-street.
George Lefroy, Esq., Carriggloss, Longford.
Professor Apjohn, Trinity College.

In reply to an inquiry from the Inistiogue Farming Society, the Secretary was intrusted to state that no one can win one of the society's first-class medals unless he shall be a member of both societies; but that in the second-class persons may compete for the medals who are not members of both societies, provided that they be farmers holding under 100 acres of land, though it is not necessary that they should live exclusively by farming.

Various other routine matters were disposed of, and, among others, the Secretary was directed to give due notice of future evening meetings of the society, so that parties interested in these discussions might have an opportunity of attending.

THE AGRICULTURAL IMPROVEMENT SOCIETY.

From the moment that Lord Talbot forced the subject of evening meetings, for the discussion of practical questions, on the attention of the Council of this Society, we cordially seconded the movement, feeling assured, from the experience of kindred associations, of its utility. And, if any doubts existed on the subject, they would have been set at rest by the very interesting meeting held last evening in the board-room of the Royal Dublin Society, the use of which was kindly afforded to the Agricultural Society for the purpose. The subject for discussion was the best mode of feeding and housing live stock, a paper on which was read by Mr. Harkness, the Secretary, and which was followed by an interesting discussion. The comparative value of different kinds of food and systems of feeding forming the first division of the subject, only was touched upon, leaving the arrangements for housing live stock, and the physiological part of it, for another paper. The results of the experience of many of the most eminent farmers of the United Kingdom were detailed at great length by Mr. Harkness, and a mass of statistical information brought forward regarding the quantities of food consumed under different circumstances, the value of which it is impossible to over-estimate, and which reflected the highest credit on the judgment and industry of the Secretary. Such meetings as that of last evening give hope for extended usefulness on the part of this Society; and we trust that the information then brought forward may re-appear in some more enduring shape for the information of the Irish farmers, to whom stock husbandry is of paramount importance. A summary of this paper we hope to publish next week.

A further gratifying feature, in connexion with the meeting of last evening, was the presence of the agricultural pupils from the Glasnevin establishment. Their attendance was a gracious privilege on the part of the society; and we can have little doubt that it was duly estimated by the pupils, who must have derived much useful information, and been furnished with many valuable suggestions for further investigation. Lord Clancarty, who presided on the occasion, expressed the gratification which he experienced at the attendance of these young men at the meeting.

We have only further to express a hope that, in future, more publicity may be given to these evening meetings, as, with the exception the of council of the agricultural society, few persons were aware of the meeting of yesterday evening. Previous notice should be given in the newspapers, not only of the day of meeting, but of the subject, so that parties might come prepared to take part in the discussions of the questions under consideration. An intimation should also accompany the announcement, to the effect that parties desirous of being present could obtain the necessary tickets of admission on application to the secretary. Some such arrangements as these are necessary to give effect to the value of these evening meetings, from which good results may reasonably be anticipated.—The Advocate.

ON CORN RENTS.

The desire universally prevalent among the agricultural interest for the adoption of a new rental, on a more equitable and satisfactory basis, as between landlord and tenant, is a natural consequence of the great depression in the price of agricultural produce; and amid the difficulties which present themselves, owing to the fluctuation in the present, as well as the uncertainty of future prices, no method is calculated to inspire greater confidence in arriving at a re-adjustment of rents than by the substitution of a corn-rent in lieu of a fixed money-rent, the nature of which I shall endeavour to explain. A corn-rent, or rather a corn and money-rent, may be defined as a fixed money payment, together with the value of a certain number of bushels of wheat, barley, and oats, ascertained by the average prices of such grain during a given period; and it

will be conceded that rents which are determined by the price of corn are likely to preserve their true value better than money-rents, and that this is clearly the preferable mode; as under the system of a corn-rent, if in consequence of the largeness of the crop the price is low, the corresponding average value with the increased quantity makes up in some degree to the tenant for the diminution of price, while the landowner derives an advantage in the improved condition of the soil. But to illustrate the mode of ascertaining a corn-rent by the average prices of wheat, barley, and oats, as published by the Inland Revenue inspector, from the returns of the market town where the principal part of the produce is sold:

Suppose, with wheat averaging at 7s., barley at 4s., and oats at 3s., per bushel, before the prohibition of protective duties, the original rent, exclusive of tithe rent-charge, to be 30s. per acre, or as a fixed money rent for a farm of 200 a. per annum	£300	0	0
If at a corn-rent partly, and a fixed rent partly, as in the case of a stock-farm, then one-third of the original rent always at a fixed sum or money-payment	£100	0	0

The remaining amount of rent, £200, being divided into three parts, and converted, one-third into bushels of wheat at 7s., one-third into bushels of barley at 4s., and one-third into bushels of oats at 3s., thus:

190 bush. wheat, at 7s. per bush., 56s. per qr.	£66	10	0
330 bush. barley, at 4s. per bush., 32s. per qr.	66	0	0
450 bush. oats, at 3s. per bush., 24s. per qr.	67	10	0
	£300	0	0

The value of which, by the average prices for the half-year ending Lady-day, 1851, is as follows:

190 bush. wheat, at 41s. 8¾d. per qr.	£49	11	1
330 bush. barley, 23s. 6¾d	48	11	11
450 bush. oats, at 15s. 11½d.	44	17	8
Fixed money payment	100	0	0
	243	0	0
Total half-yearly rent	£121	10	4

And by the average prices for the half-year ending Michaelmas, 1851:

190 bush. wheat, at 42s. 8¼d. per qr.	£50	13	10
330 bush. barley, at 24s. 8d.	50	17	6
450 bush. oats, at 19s. 6½d.	54	19	2
Fixed money payment	100	0	0
	256	10	6
Total half-yearly rent	£128	5	3

It will be seen that the first half-year's corn-rent is equal to an abatement or reduction of 20 per cent. off the original rent; which strengthens the opinion I have entertained that from the commencement of free-trade rents should have been reduced full 20 per cent. The second half-year, owing to the excess in the average price, especially of oats during that period, is equal to a reduction of only 15 per cent. J. H.
—Agricultural Gazette.

ATMOSPHERIC INFLUENCES — THE POTATO DISEASE (By FRANKLIN COXWORTHY, author of "Electrical Condition").—Of the amount of evaporation that prevailed before 1846 there is no record, but it will be seen on reference to the statement which appeared in the *Journal* of the 23rd ult., that from 1846 to 1849, inclusive, it greatly exceeded that of 1850 and 1851. The potato disease was at its height in 1846, and gradually decreased until its disappearance in 1849. There must, therefore, be some other influencing cause than mere evaporation; and this cause, I think, there will be no difficulty in defining. One of the vessels represented in the diagram which accompanied my paper above referred to, is "electrically" insulated from the earth, whilst the other is not; so that although the one suspended by copper wire is as much acted on by the electrical condition of the air as that suspended by silken threads, the operation is either retarded or accelerated by the prevailing condition of the earth. The differences, therefore, in the evaporation from the two vessels cannot fail in representing the comparative electrical condition of the earth, and of the atmosphere, by which the vessels are surrounded.

Statement showing the differences of evaporation from *a* and *b* in diagram, as registered at 9 o'clock in the morning and 10 o'clock at night, at 17, Canterbury-place, Lambeth-road:—

DATE.		1845.	1846.	1847.	1848.	1849.	1850.	1851.
January	Insulate.	The vessels were first filled on Oct. 10, 1845.	270	115	140	40	325	170	99	65	265	395	10
February	Non-insul.		70	280	105	100	55	125	155	95	200	95	..
March	Insulate.		33	370	130	145	170	175	200	65	340	245	60
April	Non-insul.		75	195	195	60	295	20	515	235	320	145	20
May	Insulate.		345	225	185	240	275	60	605	90	365	165	55
June	Non-insul.		460	200	175	425	145	65	660	225	575	290	65
July	Insulate.		445	215	225	335	175	455	233	690	62	280	30
August	Non-insul.		900	355	65	340	65	295	150	160	70	180	65
September	Insulate.		100	215	225	335	175	455	233	690	62	280	30
October	Non-insul.		225	345	65	105	180	65	205	50	180	..	180
November	Insulate.	960	120	65	180	65	225	295	150	160	70	180	65
December	Non-insul.		345	275	310	145	130	280	165	50	180	110	30
Grains	Insulate.	960	280	150	310	145	130	280	165	50	180	110	30
	Non-insul.	..	130	90	140	95	80	405	315	..	..	20	30
	Insulate.		245	80	160	150	110	325	185	..	..	125	..
	Non-insul.		135	320	160	150	110	325	185	..	..	125	..
Mort. per cent.		2.379	2.379	2.782	2.662	3.113	2.176	..

It will be seen, then, that the total amount of the differences was greatest in 1849, and next to that in 1846; the two periods at which the epidemics influenced most the animal and vegetable kingdoms. But in 1846, during the potato disease, the greatest amount of evaporation was induced by the air, and in 1849 by the earth; or, viewing the question in the more simple light above described, in 1846 the connection of the water with the earth retarded its evaporation, whilst similar conditions in 1849 accelerated it. And to the statement

I have added the mortality per cent. in the metropolis, as given in the highly valuable returns afforded by the registrar-general. I shall hereafter show that evaporation is in no way referrible to "heat"—the dogma that has so long deluded mankind. It must, therefore, be dependent on some other condition or ruling principle in nature; and until evidence be adduced to the contrary, this principle I shall conclude to be electricity. In 1846 the evaporating influence of the air was very high; and as all bodies are in an opposite electrical condition to that of the atmosphere by which they are surrounded, it is clear the electrical state of the earth must have been low; and it will be seen that in July and August, the critical period, and extending through September and October, the differences were enormous; the cause of which, or negative state of the earth, doubtless produced a putrefactive action in the plant, by the accumulation of ammonia, and ensured the total destruction, or rot, of the plant: the general prevailing features of the complaint, as well as those of influenza at the close of 1847, and of cholera in 1849, being likewise graphically delineated in the above statement. And yet the instrument that has afforded such valuable information, and has set at nought the hygrometer and the electrometer, remains unseen by the *scientific* world.

The next fact in the order of its relative importance which my apparatus has elicited, in connection with this inquiry, is that evaporation is not referrible to what is commonly understood by "heat" or temperature of the atmosphere, the principle on which are framed the tables for determining the "dew point;" but before proceeding to its consideration, I am induced to direct attention to a singular want of relation between the actual amount of evaporation from both vessels and their relative evaporation, as shown in the statements that accompanied my two last articles, and which perhaps may be adduced as the strongest evidence of the value of the instrument, illustrative as it is that the "differences" are referrible to some modification of the cause that produces actual evaporation. The evaporation of the epidemic period, or from 1846 to 1849 inclusive, may be taken on an average of 175,000, and its differences at 5,000; but 1850, with an evaporation of only 92,000, has an amount of differences equal to those of some of the preceding years, whilst 1851, with the evaporation of 1850, has differences to little more than half the amount, or 2,500, the deficiency being in the non-insulated scale; and be the cause what it may, it prevails to the present time; although, perhaps, to verify the old saying, that before the storm comes a calm. Such, however, is human nature, that on the mere contingency of our being some day threatened with invasion, to meet brute force by brute force, rifle clubs are being formed from one end of the country to the other, and perhaps with great propriety; but to the investigation of a question that may put us in a position to mitigate, if not arrest, the influence of a principle in nature that has spread desolation and death from one end of the world to the other, and which assuredly will regain its action, not a votary can be found, although our legislature, from the want of information identified with the question, may be nearly smothered, baked, and frozen in their deliberative chamber. Connected as evaporation is with vegetable physiology, any step towards the solution of the cause cannot fail in being of great benefit to the enquiring culturist; to the reception of correct principles, the removal of pre-conceived notions of a faulty nature is indispensably necessary, and so far as regards evaporation the venerable doctrine of heat must yield to the influence of the figures in the following statement; it being also to be remarked that in December, 1850, the proportion was only as 1 to 173:—

RELATION OF TEMPERATURE TO EVAPORATION FOR 1851.

	Mean Temperature.		Reduced Scale.		Evap. Grams.				
January	43	..	11	..	4,125	or	1	to	357
February	39	..	7	..	2,995		„		428
March.....	42	..	19	..	5,285		„		528
April	46	..	14	..	5,970		„		426
May	53	..	21	..	10,625		„		506
June	62	..	30	..	15,075		„		502
July	64	..	32	..	12,895		„		403
August	63	..	31	..	13,530		„		437
September	58	..	26	..	9,570		„		368
October	54	..	22	..	5,985		„		272
November	38	..	6	..	3,380		„		563
December	41	..	9	..	2,640		„		293
Year....	50		18		7,673				425

The above "mean temperatures" are deduced from my register of nine o'clock in the morning, the "reduced scale," consisting merely of a deduction of 32 deg., that being, improperly, our freezing point, instead of zero; and it must be evident that, in any such comparison as the above, the addition of 32 deg. to 6 deg., the proper temperature of November, or to 32 deg., that of July, could not fail in creating a serious error. Between the figures in the "reduced scale" and the actual evaporation there is, it will be observed, no relation whatever; and, in addition to this evidence, so fatal to the doctrine of "heat," instances without number could be adduced, that a considerable decrease of temperature in the atmosphere produces a corresponding increase of evaporation; whilst, with an increase of temperature, a decreased amount of evaporation is obtained—a fact, unquestionably, that demands the serious consideration of the agriculturist. My next paper will treat of the hygrometer; and as, in the meantime, we may lose our frosty nights and mornings, I would suggest to those who still persist in consulting that instrument to test it by the evaporation of water in one vessel of a pair of scales, and counterbalancing weights in the other; and they will frequently find, at about noon, or one o'clock p.m., that, on a sudden rise of temperature, with a difference of 2 or 3 deg. in the wet and dry bulbs, little or no evaporation has taken place.—Gardeners' and Farmers' Journal.

THE GAME-LAWS.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—If, as your correspondent, "A Looker-on," informs us (p. 171 of the *Farmer's Magazine* for February), "the tide of reason and justice, long delayed, &c., has nevertheless set in," agricultural journals will cease to teem with such productions as

the one I refer to. A few instances of excessive preservation of game and destruction of crops thereby in a few counties will no longer be ingeniously made to appear as a system prevalent throughout the kingdom. The expense attending the prosecution of the idle and dishonest, and the consequent ruin of his family, will be discovered to have been caused by your correspondent and other like-minded, and by some from whom something better might be expected, who encourage their neighbour (by well-known methods unnecessary here to mention) to break the laws of his country. I suppose, sir, we may shortly hear of the "freeborn Englishman" being "cast into a loathsome prison" for kindly ridding us of a little superabundant vermin in the shape of poultry or sheep. My brother farmers and I have long been tired of the anti-game-law ery. Surely, in these our times of trial, your correspondent will not insult us with such humbug. As far as giving *us* relief is concerned, we look upon the abolition of the game-laws in the same light as we should upon triennial parliaments or universal suffrage. We shall never allow game (to which we are rather partial) to "drive us to cross the Atlantic;" neither are we afraid of the "finger of scorn" being pointed at us by America, or any other country, on account of the protection by law which we enjoy to life and property. Let your correspondent use his brains (if he have any), put his shoulder to the wheel, and try to help us; and no longer content himself with talking nonsense and with remaining "A Looker-on."

A BRITISH FARMER.

Feb. 4.

P.S.—The destructive powers of game appear to have been settled by nice calculations and experiments. Would any of your readers kindly inform us of the *increase* per acre in stock and produce, on any farms, arising from the permission or order to destroy the game?

DISCUSSION ON GUANO AT THE LONDON FARMERS' CLUB.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—Seeing on the card for discussion at the Farmers' Club on Monday last—"On Guano; its Application, Supply, and Adulteration: with Details and Statistics, collected from original sources," by a Mr. Hazlewood, a gentleman of the Stock Exchange, I was somewhat anxious to know what additional light he had to throw upon a subject so repeatedly brought before the members of the club; and I regret to say, although fully concurring in the resolution come to, I was disappointed; for, having understood the gentleman who was to introduce the subject was largely interested in Peruvian bonds, and although we are much indebted to him for the statistical information he afforded us, I did hope he was desirous of seeing the price of that valuable manure reduced in the same ratio that freights have fallen since its first introduction, viz., from £1 10s. to £2 per ton—this, deducting the expense of landing and warehousing, would bring it down to £6 per ton; a price which I have no doubt would double the consumption, prevent adulteration, improve the interest of the bondholder, give an impetus to shipping, and (what is much wanted) confer a boon upon the agriculturists of this country. I am fearful, however, that we are not yet to realize this desirable change; and that the farmers of this country must be content for some time with things as they are.

I cannot close these remarks without regretting that the public are to be saddled with an additional impost upon another manure (next in importance to Peruvian guano), viz, superphosphate of lime, and that by a member of the Council of the Royal Agricultural Society. These things are highly discouraging to agriculturists, and tend to check that spirit of enterprise which we see prevailing in every direction. However, I trust this latter attempt at monopoly will be broken through, and that the farmers of this country may be able to purchase manures at such prices as to enable them to grow corn at a profit. I am, sir, yours obediently,

35, *Leadenhall-street, Feb.* 7. JAMES ODAMS.

EXTRACTS FROM AN ADDRESS BY HON. J. R. WILLIAMS, BEFORE THE ST. JOSEPH COUNTY AGRICULTURAL SOCIETY, IN OCTOBER LAST.—I regard it as the duty of farmers to have more communion with each other, to make and to seek opportunities to compare and communicate with each other. Mechanics work in close proximity to each other. They are all the time engaged in sharp competition. They profit alike by each other's blunders, or each other's success. Merchants meet each other hourly in crowded thoroughfares and on the Exchange. What one knows all can readily know. Inevitable failure and ruin often follow an obstinate adherence to an old track, when time, toil, and expense are saved by the new. Not so with farmers—necessity does not throw them together. They have few chances for consultation—and still fewer chances for correction of blunders. It takes a whole year to correct a single error. But few experiments can be tried in a lifetime. An error in planting the crop is an error which may plunge the farmer into pecuniary ruin. How much it becomes us, therefore, to consult everywhere, with all men, and on every fitting occasion, that we may be guided in all our enterprises by all existing light and knowledge. There are men, it is true, whose converse with Nature is richer in instruction than the teachings of men. A man can study a lifetime in a single garden, and delve only on the surface of the great mysteries of Nature. It is true that each farmer walks every morning into a vast palace, compared with which the Crystal Palace is mere tinsel, a bauble. Each trembling dew-drop, glistening on the tiniest spire of grass, rivals in brilliancy, and exceeds in usefulness, the great diamond, Koh-i-Noor. Realities are all around him—not the shine—not the impostures—not the hollow artifices of the great city. Each breeze brings freshness, fragrance, vitality, and is rarely laden with pestilence. Each exertion which affords vigour to the arm, by sympathetic action, communicates vigour to the intellect. Thus health ought to clothe the whole man. Yet living among such glowing scenes, operated upon by such instructive and healthful influences, farmers, as a class, take the world over, in their habits, opinions, and aspirations, have most doggedly trampled and wallowed along on the dead-level morass of complacent conservatism. If farmers had constant and unremitting communication with each other; if each mind was open; if each faculty was sharpened; each mistake promptly corrected; each agricultural invention communicated, explained, and understood, farmers would be marked by the same characteristics as the most keen, energetic, and vigorous in any other pursuit. Fortunately fairs, periodicals, discussions, are supplying the schools which the exchange, the counting-room, the store, the workshop, the streets, the wharf, and the dock, perpetually supply to other men.—*Michigan Farmer.*

METEOROLOGICAL DIARY.

Day.	Barometer. 8 a.m. in. cts.	Barometer. 10 p.m. in. cts.	Thermometer. Min.	Max.	10 p.m.	Wind and State. Direction.	Force	Atmosphere. 8 a.m.	2 p.m.	10 p.m.	Weath.
Jan. 22	29.29	29.30	37	46	37	W. S. W.	lively	fine	sun	fine	dry
23	29.41	29.82	34	44	36	W. by South	gentle	fine	sun	fine	dry
24	29.86	29.60	35	47	47	S. West	strong	fine	cloudy	cloudy	rain
25	29.80	29.93	39	49	43	S. West	varble.	fine	sun	fine	shower
26	30.—	29.94	36	47	45	S. by West	brisk	fine	sun	fine	dry
27	29.58	29.50	39	45	39	S., S. by E.	lively	cloudy	cloudy	cloudy	rain
28	29.74	29.99	30	42	33	N. Westerly	gentle	haze	sun	fine	dry
29	30.07	30.—	28	43	38	South	gentle	fine	sun	fine	dry
30	29.68	29.90	37	48	36	S.W., N.W.	varble.	cloudy	cloudy	fine	rain
31	29.93	29.72	35	50	50	S. West	strong	cloudy	cloudy	cloudy	rain
Feb. 1	29.72	30.—	49	56	47	S.W., var.	varble.	cloudy	fine	fine	dry
2	30.02	29.93	44	53	47	S. West	brisk	cloudy	cloudy	cloudy	rain
3	30.04	30.15	39	50	39	W., W. by S.	lively	fine	sun	fine	dry
4	30.12	29.83	39	50	50	S. West	strong	cloudy	cloudy	cloudy	rain
5	29.76	29.66	49	52	52	S. Westerly	strong	cloudy	cloudy	cloudy	rain
6	29.74	30.05	37	44	39	S. Westerly	lively	cloudy	fine	fine	rain
7	30.16	30.06	33	48	45	S. Westerly	lively	cloudy	sun	cloudy	dry
8	29.70	29.25	43	52	48	S. West	forcibl.	cloudy	cloudy	cloudy	rain
9	29.14	29.44	39	45	33	N. Westerly	gentle	cloudy	sun	fine	rain
10	29.63	30.—	30	42	34	N. by East	lively	fine	fine	fine	rain
11	30.05	30.10	30	41	29	N. by East	gentle	cloudy	sun	fine	dry
12	30.05	29.73	26	34	32	S.E., S. by W.	gentle	fine	sun	fine	dry
13	29.60	29.85	31	39	35	S. East	gentle	cloudy	sun	cloudy	dry
14	30.01	30.20	33	42	35	Var., N.W.	calm	cloudy	sun	cloudy	dry
15	30.22	30.11	32	48	46	S. Westerly	gentle	cloudy	cloudy	cloudy	dry
16	30.12	29.80	39	48	46	S. West	forcibl.	cloudy	cloudy	cloudy	rain
17	29.87	29.65	46	56	49	W. by North	lively	fine	sun	cloudy	dry
18	29.60	29.72	38	45	32	W. by South	brisk	fine	cloudy	fine	dry
19	29.75	29.98	29	37	32	North, or by W.	very bk	fine	sun	cloudy	dry
20	30.11	30.19	26	36	28	N. by West	lively	fine	sun	fine	dry
21	30.21	30.33	24	39	37	W. by N., var.	gentle	fine	sun	cloudy	dry
22	30.40	30.55	33	45	31	N. by E.	gentle	cloudy	sun	fine	dry

ESTIMATED AVERAGES OF FEBRUARY.

Barometer. High.	Barometer. Low.	Thermometer. High.	Thermometer. Low	Thermometer. Mean.
30.067	29.17	53	21	38

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
45.7	35.6	40.65

WEATHER AND PHENOMENA.

January 22—Fresh, lively day. 23—Beautiful. 24—Furious storm at night. 25—Sharp shower, with hail. 26—Fine. 27—Many hours of rain; finer night. 28—Foggy, with hoar frost. 29—Keen frost; clear, warm sun. 30, 31—Month ends with much rain and wind.

LUNATIONS.—First quarter, 29th day, 10 h. 34 m. morn.

February 1—Several faint rainbows early, among low north-western clouds. 2—Drizzle, and wind at night. 3—Beautiful. 4 and 5—Rain in abundance; high driving wind. 6—Finer. 7—Hoar frost; hot sun. 8 and 9—Changeable; showers and some hail; 10—Frost; a mere hint of snow. 11—Rime, and some ice. 12—Changeable; rising wind. 13—Chilly; frost till noon. 14—Calm; fine broken clouds. 15 and 16—Changeable; fine clouds; wet evening on 16th. 17—Fine as spring. 18—Keen; clouds form in afternoon. 19—North-west and north aurora borealis. 20 & 21—Frosty; sun warm. 22—Mild; cloudy till the afternoon; sunny.

LUNATIONS.—Full moon, 5th day, 6 h. 52 m. afternoon. Last quarter, 12th day, 10 h. 3 m. morning. New moon, 20th day, 12 h. 54 m. morning.

REMARKS REFERRING TO AGRICULTURE.

The fears entertained from the effects of the long-protracted absence of rain, and the very mild weather after the first of December, have been nullified—the former by the late saturating showers, the latter by the sharp night frosts of the last fortnight. Everywhere in this quarter agricultural labour progresses, and crops are beautiful and promising. Dust in clouds has prevailed since the last rain; and at this date the barometer is unusually high.

Croydon, Feb. 23. J. TOWERS.

CALENDAR OF HORTICULTURE.

PLANT HOUSES.

The conservatory will now be for some time the principal source of attraction, and no exertion must be wanting to keep it very gay. Great attention should also be bestowed to keep every part perfectly neat and clean, and to maintain a comfortable atmosphere; indeed, without these useful auxiliaries, the pleasure of beholding even the most beautiful and well-grown plants will be greatly diminished. Be careful to change the position of choice specimen plants every few days, and do not leave them in this structure a day longer than their beauty is perfect. Use the syringe freely on bright mornings over such plants as are not in flower, and occasionally water all over the surface of the borders, as well as a copious allowance to the roots of such as require it. Forced Indian Azaleas and Camellias will require to be returned into heat to perfect their growth for early flowering another season. Stove and orchidæous plants, past flowering, will require a season of rest, and therefore water must be gradually withheld, and they should have an intermediate temperature assigned them. Introduce another lot of Indian Azaleas into the forcing house: these will come in just before the general stock from the cooler compartments. A few plants of Azalea sinensis may be put in heat; they come exceedingly well in the forcing house or vinery, and are splendid additions to the conservatory display, as their fine yellow colour contrasts admirably with the ruddier tints of the Indica varieties, particularly with Indica splendens—an excellent variety for forcing. Plants of Erythrinas should now be removed into heat, and, when well broken, the shoots thinned out to five or six, and kept well tied as they advance. The young shoots may be put in on bottom-heat, and will strike very readily. Kalosanthes must now be encouraged to make a good growth by a liberal shift, and, if possible, a gentle heat, with plenty of light and air. Remove a succession of Amaryllids into the forcing house as they show for bloom, and apply plenty of water to those in full action. Pot Tuberose roots, and place them on a shelf near the glass in the forcing house, or a vinery. The beautiful tribe of Japan Lilies, also Alstrœmerias, and some of the Cape bulbs, such as Ixia, Sparaxis, Watsonia, and also Gladioli, will now be starting, and should be moderately well-watered; all these will be invaluable for the conservatory by-and-bye. A few pots of the more delicate sorts of Oxalis, such as Commersonii, Piottæ, elegans, divaricata, are also very useful, and should now be encouraged to make a strong growth in a gentle heat near the glass. Select a few of the best plants of Scarlet Geraniums, Petunias, Tropæolums, Lobbianums, and Verbenas, and give them a shift, and more light and room, to bring them forward as conservatory plants for summer and autumn. Do not neglect to get in, on gentle heat, a sowing of varieties of showy annuals, for conservatory purposes.

FLOWER GARDEN.

No time must now be lost in getting the whole of the bedding stores potted off, and brought forward in a gentle heat. Those already rooted well in the pots may be removed into cold pits, and keep them well pinched back to induce a bushy habit. Continue the propagation of Petunias, Heliotropes, Calceolarias, Anagallis, and, indeed, of all sorts of which there is likely to be a deficiency. Aim at having rather more than the necessary stock. Persevere in taking off cuttings of Dahlias, pot them singly in three inch pots, and plunge in a nice bottom heat. Struck cuttings of Bouvardias, from pieces of the roots should also be potted off, and placed in bottom heat. The forking up of the rougher parts of flower borders may be commenced, but leave those which contain the choicest herbaceous plants until the season is more advanced. As the operation of forking proceeds, take care to reduce all overgrown plants, and to fill up all vacancies with suitable plants from the reserve garden. Continue the pruning, nailing, and tying of climbers of all sorts against walls and trelliage. Also prune and tie Pillar Roses. Now is an excellent time to cut in over-grown Ivy, previous to making its spring growth. Cut close in—nothing bears the knife better—and its appearance will be greatly improved by-and-bye.

FLORISTS' FLOWERS.

Continue the shifting of Picotees and Carnations into their blooming pots, and see that they are well protected from cutting sharp winds. Look occasionally over the beds planted out in the autumn, and press them firmly in the ground; the next few weeks will probably try them very much, and if cold cutting winds and parching weather should prevail, it will be necessary to apply some means to ward off their bad effects. Hoops and mats are very effectual, and easily applied. Pinks, Hyacinths, choice Anemones, Pansies, Tulips, and Ranunculi will require the same general atten-

tion. Apply plenty of air to Auricula and Polyanthus in frames. Keep the glass clean, and the plants as near to it as possible. Water pretty freely when the plants require it, and such as are in a very free growing state may be occasionally treated to a little clear weak manure water.

HARDY FRUITS.

Attend to previous directions as regards the pruning and nailing of Peaches and Nectarines, and be careful to apply protective coverings immediately. Undoubtedly one great object in protection ought to be to retard as well as to preserve from extreme cold. On the morning of the 21st Feb. the register thermometer indicated 20. How will this tell on the forward blooms of Apricots? some of which, on a south wall, and not protected, are nearly expanded; whereas others, which have been shaded from bright sun, are fully a week later. The male blossom of Filberts having now for some time shed the pollen very freely, the general pruning may be performed. Keep the middle of the trees well open. The leading shoots may be shortened to six inches or a foot, if strong enough; but cut all the side shoots close in, except the small twigs on which are the embryo nuts. When pruned, dress the ground with manure, and fork it in. Fresh planted fruit trees had better be well mulched, to guard against the ill effects of dry parching winds, which often prevail at this season.

KITCHEN GARDEN.

Every exertion should now be used to get the soil in the different quarters well turned about and pulverized, to bring it into good condition for the reception of the main crops of vegetables. A good breadth of second early Peas should be sown, also another sowing of Windsor and Long-pod Beans. Sow a few Onions thick, for drawing early for Salads. Sow also successional crops of Radishes, and Lettuces, of varieties, on a warm border. Make a first sowing of Cabbage, for summer and autumn use. Cattell's improved Dwarf varieties are the best. Plant out Lettuces saved through the winter, on a warm border. Attend well to surface stirring amongst the early crops. Make another sowing of Round Spinach. Plant Red Cabbage, in good ground; also plant from the store beds a good supply of Cabbages, to succeed the winter crops. Plant beds of Seakale and Asparagus. Give abundance of air Cauliflowers in frames and under hand-glasses; stir the surface, and dress for slugs. Sow seed for succession. Sow more celery seed on a gentle heat. Draw the earth up to the advancing crops of Peas, and stick in the spray of evergreens, or twigs of birch, on the exposed sides.—C.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR FEBRUARY.

The progress of most out-door farm-labours was much interrupted in the early part of the month by the almost-continuous heavy rains which fell in most parts of the United Kingdom; but since the 15th a great change has taken place in the weather, which has been cold and wintry. The temporary suspension of ploughing and sowing the land with Lent-corn—from the fact that those operations were sufficiently forward prior to the rains setting in—has not been productive of any serious inconvenience, if we except the loss of life and property occasioned by the floods reported in the northern districts. Circumstances being considered more favourable to an improved range in the value of wheat, from causes already alluded to, a much larger breadth of land is being sown with what are termed the "light" or spring qualities than in 1851; whilst we may observe, and it is important that we should do so, that the acreage sown during the autumn of last year was fully an average. In most of the barley counties that grain has (doubtless from the comparative high value it has sustained for some time past) become more in favour, to the displacement of oats, beans, and peas; although the two latter articles have paid the growers tolerably well. As regards potatoes we may intimate that immense tracts of land are being planted with them; notwithstanding the present low figures ruling in the whole of our markets, and the possibility of foreign qualities coming into competition with home produce. It is certain, however, that the potato crop of 1851 on the continent was a complete failure; and this remark must be evident when we state, that since the beginning of last November the total imports of that esculent into the metropolis have been confined to only 300 tons, against 12,000 ditto in the preceding corresponding season. A difference of opinion prevails in some quarters as respects the actual quantity at this time on hand in the potato-growing districts; but it must be borne in mind that since the extension of railway communication very large supplies of potatoes have been grown for the metropolitan and other consuming markets in counties far removed from those from whence we were formerly in the habit of drawing them,

Railway competition in carrying traffic, aided by fair returns, have induced farmers in the midland districts to turn their attention to potatoes, though their growth is frequently attended with much risk. That the crop of 1851 was unusually heavy and of fine quality, even after allowing a somewhat large margin for losses by disease, is evident from the abundant quantities received daily in London, their fine condition, and the low currencies at which they are selling, notwithstanding that the imports from abroad have long since ceased; whilst we have very good authority for stating that the various markets will be somewhat abundantly supplied during the whole of March. It is a remarkable fact that the export trade from the Channel Islands, which in former years furnished us with from 20,000 to 25,000 tons, has sunk into perfect insignificance. The cause is by no means easily explained; indeed, the only reasons we can assign for this declension in the trade are the great losses sustained by the growers from time to time, owing to the ravages of the disease, arising in great part from the humidity of the atmosphere in those islands. During 1850, the total imports of potatoes into the United Kingdom were 1,348,883 cwts.; but in 1851 they had declined to 635,826 cwts.; and yet we have had a lower range of value, if we take into consideration the rapid increase in the consumption, than during the ten preceding years. At present, the quotations in the Borough and Spitalfields markets vary from 60s. to 80s. per ton —the latter figure being for the best York Regents.

Much attention has been directed to the public sales of colonial wool in progress in London, from the circumstance that our flock-masters have commenced shearing, and that they will consequently have large quantities shortly to dispose of. From the published reports of these sales, it will have been perceived that really fine qualities of Australian have advanced fully 1d. per lb.; but we would observe that these auctions — which have been chiefly composed of low fleeces, consequently unsuited to the majority of the Yorkshire clothiers— form but a slight index to the actual value of English qualities. It is true that the result of the biddings is calculated to inspire confidence amongst holders and growers; but we much doubt whether our best Down wools will rise in the same proportion, as large supplies of Australian and Cape will be offered for sale within two months from this time. A decline can hardly be anticipated, because our export trade is still rapidly developing itself, and we have advices from Sydney stating that the shipments to England had exhibited a falling off of 2,450 bales compared with the preceding year, arising chiefly from the scarcity of labour, as the result of the metallic discoveries in the interior of the country. The arrivals of wool into the United Kingdom, in 1850, were 72,674,483lbs.; and they increased, last year, to 81,063,679lbs.—51,993,463 being colonial, and 29,070,216 foreign. In 1850, the exports were 12,002,773lbs., but in 1851 they fell to 8,517,000lbs.; about 4,000,000lbs. of the latter quantity were English; hence it follows that we retained not less than 76,546,679lbs. for home use, and yet such has been the activity in the manufacturing districts the quantity now at hand is the smallest on record.

We are glad to perceive that an effort has been made by the agricultural interest to obtain that invaluable manure, guano, at a lower rate than that demanded by the agents of the Peruvian Government. It cannot be denied for one moment that £9 5s. per ton, in quantities, be it observed, above ten tons, is a very high and most extravagant price to pay for an article, the supply of which is reported as almost inexhaustible, and which could be easily increased to 1,000,000 tons per annum were there a demand for it. On this point there can be very little doubt; but it must become a matter of deep consideration with our farmers whether £9 5s. per ton is a price they ought to be called upon to pay, chiefly for the purpose of enriching the lucky holders of Peruvian bonds, who, it must be understood, derive the sole benefit from the consignments made from Callao, to the prejudice and loss of the small farmers. It may be all very well for certain committees of the Stock Exchange to make proposals to, and agreements with, various Governments abroad to obtain a liquidation of their claims, which may be founded in equity; but we contend that nine-tenths of the present bondholders form but a small portion of those who originally advanced money to the Peruvian Government, and consequently that the exclusive privilege or monopoly granted to one house to sell guano at a stated sum is a positive injustice to our corn growers, and a mere incentive to speculation in the bonds of Peru. This must be obvious, when we assert that some few years since the price of those bonds was only 17, and now it is 99½! We trust that decided remonstrances will be forwarded to the Peruvian Government on the subject, and we doubt not that it could be very easily proved that, were the price lowered to £5 per ton, more than double the present supply of guano would be disposed of in the United Kingdom, which increase in the demand would be beneficial not only to the Government itself, but likewise to the bondholders and the shipping interest. The quantity at this time on passage to England is calculated at quite 30,000 tons.

The early lambing season has passed off remarkably well, and very few losses have been sustained from the severity of the weather. The lambs in

Dorsetshire, Hampshire, &c., have grown rapidly, and, from the want of demand for them in London and elsewhere, have become too heavy for first-rate butchers; hence the highest value obtained for them in Smithfield has not exceeded 5s. per 8lbs.

Although a good business has been doing in hay and straw, prices have ruled very low, meadow hay having sold at from £2 15s. to £4, clover ditto £3 5s. to £4 6s., and straw £1 to £1 7s. per load. The supplies on hand are unusually extensive, notwithstanding the large consumption going on.

The fluctuations in the value of corn have not been extensive, but prices almost generally have been in favour of sellers. The colonial markets have been much depressed, and tallow—arising from the heavy stock—has fallen to 35s. 6d. per cwt. for P.Y.C. The supplies of home-make continue good.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

For the time of year, nearly the whole of our markets have been somewhat extensively supplied with each kind of stock, in, for the most part, full average condition, especially as regards the beasts and sheep. Owing to the violent gales of wind, the arrivals from the Continent have exhibited a deficiency compared with the same month in 1851; but this falling off in the supply has been fully made good by the provincial slaughtermen, who have forwarded nearly 55,000 carcasses of beef, mutton, veal, and pork up to Newgate and Leadenhall. This is the largest number ever received during the month of February; but there appears every prospect of this traffic continuing to increase, from the great and improved facilities afforded to all parties by the railway companies. On the whole, prices, generally speaking, have not materially fluctuated; and we may observe that the stock from Norfolk, &c., has turned out ripe, and well suited to the cutting butchers. The foreign imports continue to carry a large quantity of internal fat, but in other respects they have exhibited no improvement. The late rise in the value of linseed-cake has checked operations in that article; indeed, its use has greatly fallen off during the past two years, owing to the low rates at which stock has been disposed of, compared with the cost of production. Our accounts in reference to the general health of stall-fed beasts are favourable, and we learn that very few serious cases of disease have presented themselves for some time past.

The total supplies on offer in Smithfield have been as under:—

	Head.
Beasts	18,797
Cows	433
Sheep	95,306
Calves	1,503
Pigs	2,439

COMPARISON OF SUPPLIES.

	Feb., 1848.	Feb., 1849.	Feb., 1850.	Feb., 1851.
Beasts	15,404	17,139	16,727	17,393
Cows	570	617	445	324
Sheep	75,160	81,050	80,160	91,568
Calves	859	1,240	998	1,381
Pigs	1,935	1,247	1,819	2,340

The bullock droves have been thus derived:—

	Head.
Norfolk, Suffolk, &c.	6,450
Northern districts	2,100
Other parts of England	2,260
Scotland	1,930

The average prices have ruled as follows:—

Per 8lbs., to sink the offals.

	s. d.	s. d.
Beef, from	2 2 to	3 8
Mutton	2 8 to	4 4
Veal	3 0 to	4 2
Pork	2 6 to	3 10

COMPARATIVE PRICES.

	Feb., 1848.		Feb., 1849.	
	s. d.	s. d.	s. d.	s. d.
Beef, from	3 2 to	4 8	2 8 to	3 8
Mutton	3 6	5 6	3 0	4 6
Veal	4 2	5 4	3 8	5 8
Pork	3 10	5 2	3 4	4 6

	Feb., 1850.		Feb., 1851.	
	s. d.	s. d.	s. d.	s. d.
Beef, from	2 8 to	3 8	2 4 to	3 8
Mutton	3 0	4 6	3 4	4 6
Veal	3 0	3 10	3 0	4 0
Pork	3 2	4 0	2 10	4 0

From abroad, the annexed supplies have been received in the metropolis:—

	Head.
Beasts	2,093
Sheep	5,900
Calves	1,084
Pigs	46
Total	9,123
Corresponding month in 1851	11,828
,, ,, 1850	3,880
,, ,, 1849	5,642
,, ,, 1848	3,546
,, ,, 1847	3,946

About 2,000 head have been landed at the northern outports, mostly from Hamburg and Rotterdam.

The highest price for beef in Newgate and Leadenhall has been 3s. 4d.; mutton, 3s. 10d.; veal, 4s.; and pork, 3s. 10d. per 8lbs. by the carcass.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

ASHBOURN FAIR.—The supplies of cattle were rather under the average, which may in a great measure be attributed to the very unpropitious weather which preceded it, and prevailed on the day, there being a very heavy snow. The prices for good things fluctuated but very little from those at the previous fair.

BATH FAIR.—The business was considerable; and, though the supply of leam stock was large, high prices were asked; and, in consequence, only a limited business was done. Fat beasts, which were not in great abundance, obtained from 8s. to 9s. per score; and good southdown mutton sold from 4s. 4d. to 4s. 6d. ditto.

BEVERLEY FAIR.—The supply of horses was more than an average, and those of a better description met with ready sale. The number of buyers was also very large, and amongst them were several foreigners. The show of stock of all kinds was very great, and although many sales were effected, a quantity of fat stock remained unsold. Beef, 5s. to 5s. 6d. per stone; Mutton, 4½d. to 5¾d. per lb.

BISHOPSTOKE CHEESE MARKET was opened on Thursday for the first time, in the new and spacious market-house erected close to the Bishopstoke station on the South-Western Railway. Bishopstoke being a central station, from which radiate the railways to Portsmouth, Salisbury, Southampton, Dorchester, and London, it was resolved, some time since, to establish a great cheese market there, so as to supersede the present cheese markets for the neighbouring counties of Hants, Sussex, and Wilts, held at such places as Weyhill, Marnhill, Winchester, Salisbury, Lymington; and the projectors of Bishopstoke market encountered great opposition from the railway company, from the neighbouring towns where cheese fairs and markets have been held, and from the wholesale buyers. The opposition of the latter arose from the wish to prevent the small buyers from going into the markets themselves. The market-house is situated so close to the railway that the cheese can be craned to and from the market-house and the railway-waggons. About 260 tons of cheese were pitched on Thursday at Bishopstoke. There was a large number of buyers and sellers on the ground, and business was for some time briskly carried on, it being reported that about two-thirds of the quantity pitched had been disposed of, the prices realized being as follows:—Best Somerset, 63s. to 68s.; second ditto, 50s. to 56s.; best Wiltshire, 44s. to 50s.; second ditto, 36s. to 40s.; and skim, 24s. to 30s. A champagne dinner, to celebrate the opening of the market, was given to all persons who attended it. All the principal cheese sellers in Hants and the neighbouring counties have agreed to pitch cheese at no other markets than at Bishopstoke. Arrangements are forming for making it a market for the sale also of hops.

BONHILL HORSE MARKET.—Although there was a goodly number of horses present, still the market was much thinner than we have seen it. Prices were high, and little business was done—a few good horses changed hands at prices varying from £21 to £35, and although there were some for which a much higher figure was asked, we believe they left the field unsold.

CASTLE-DOUGLAS HORSE FAIR.—The show of horses was not so great as was at one time expected, by reason of some of the dealers having been through the stewartry some weeks previous to the show day, buying up all they could. Still the show, both in number and quality, was a fair one, and a good amount of business was done. Good roadsters and draught animals brought handsome prices; while aged and inferior beasts of both descriptions, as is always the case, were not so easily disposed of. Experienced breeders say that the fair, altogether, cannot be reasonably complained of. The unfavourable weather, no doubt, lessened the number of horses that were intended to be shown.

CARLISLE FAT CATTLE MARKET.—The show of beasts considerably exceeded in number that of a few late markets, but the quality in general of a very inferior description, a worse show indeed we do not remember for many weeks. Two or three nice small Highland heifers attracted the attention of butchers, and anything prime readily found purchasers. Prices not materially altered from late quotations, which we do not alter. The market was a very slow one, and, after a long stand, a great proportion of the stock were driven off unsold. The principal portion of the sheep offered changed hands, although our market has not for a long time displayed so poor a show. There were also a few calves and pork pigs brought forward, but these attracted little attention, and few of them found purchasers. Prices:—Beasts, 4s. 4d. to 5s. 3d. per stone; sheep, 5d to 5¾d. per lb. sinking offal.

CHIPPENHAM GREAT MONTHLY MARKET.—We had upwards of 200 tons of cheese, which met a ready sale. Prices as follows:—Bread doubles, 40s. to 48s. per cwt.; prime Cheddar, 48s. to 56s.; thin, 34s. to 40s.; loaves, 50s. to 54s.; skim, 20s. to 24s. Beef at 8s. to 8s. 6d. per score; mutton, 6d per lb.; veal, 6d.; pork, 7s. 8d. per score.

COCKERMOUTH FAIR was not so large a one as we have seen on some previous occasions, which is accounted for by the fact of Dumfries fair falling on the same day. Draught horses appeared to be little in demand, and were rather a drug in the market, but anything likely, either as riding or carriage horses, were soon bought up at a good price. It was a general remark that the animals shown were principally somewhat low in condition.

DEVIZES FAIR.—There was an average supply of cattle. Oxen sold at from £14 to £18 each, and grazing heifers at from £8 to 13 guineas each. There were not many milk beasts, but the few shown met a tolerable sale. Fat beef brought from 8s. to 9s. per score. There were very few horses, and those of a very ordinary sort. The trade, of course, was heavy.

DORCHESTER FAIR was very well attended. There was about the usual number of cows and calves, barreners, &c., offered, and most of those met with a ready sale at prices a shade higher than of late.

ELLESMERE FAIR was but thinly attended. Although there was a good sprinkling of dealers and farmers, there were scarcely any cows and calves for sale, but a tolerably good supply of fat cattle, which, upon the whole, realized good prices; as high as at any late fair. The supply of sheep was small. Pigs were numerous, and met with ready buyers, at an advanced price.

EXETER FAIR was fully supplied. Of prime bullocks and heifers there was a fine display, best beef ranging at from 7s. 6d. to 8s. per score. There were some, however, of inferior quality, which fetched only 7s. per score. Working oxen were in abundance, and many of them of a superior description. In the early part of the morning sales were slack, but afterwards there was more disposition evinced to purchase. The general rates were at from £10 to £14 each. A lot of four sold for £50, or £12 10s. each; another lot of six sold for £60, or £10 each; and a couple of superior quality fetched £27, or £13 10s. each. Two-year-old steers were offering at about £4 each. Barreners were plentiful at from 4s. 6d. to 5s. per score. Cows and calves were at about the quotations of recent markets; many were offering at from £8 to £12.

GLOUCESTER MONTHLY MARKET was scantily supplied with beef and mutton. Beef maintained its former price, while mutton advanced half-penny per lb. Beef 5d., mutton from 6d. to 6½d. per lb.

LONGRIDGE FAIR.—There was a tolerable show of goods, and business was briskly transacted. No material alteration took place in the prices of calving cows, but the demand for drapes being unusually good, a rise took place in them, and they were easily disposed of.

LOUGHBOROUGH FAIR.—The show of beasts was very small, and but few purchasers were in attendance. Good store stock, however, sold pretty readily, at satisfactory prices. Good milch cows also realized tolerably good prices, but most of the beasts of other descriptions were taken home unsold. The horse fair was one of the worst ever held at Loughborough, and very little business was transacted.

MARKET HARBOROUGH FAIR was the largest we

have seen for a long time; but in consequence of the high prices asked for stock, the sales effected were not numerous.

At NEWARK FAT STOCK MARKET there was a tolerably good supply of stock, and many sales were effected, but without any perceptible alteration in price. There were 288 sheep and 96 beasts penned.

NEWPORT (MONMOUTH) FORTNIGHTLY MARKET was not so largely supplied with fat beasts as has been usual of late. Good beef may be quoted at about 5d. per lb.; in some cases a shade higher was obtained. There was a good show of store stock, and a large business doing in that line. There was also a large show of sheep; good fat ones selling at from 5½d. to 6d. per lb., while some lots of nice small wethers reached 6½d. per lb.

NEWTON-STEWART HORSE FAIR.—There were fewer horses than at our last one, and a great proportion of those exhibited were very indifferent animals. A dozen or so of the best draught horses brought from £28 to £35, and for animals of this kind there was a good demand at fair prices; but inferior horses were hard to dispose of. The usual number of west country dealers were in attendance.

NORTHAMPTON FAIR was but scantily supplied with sheep of any description, but sufficiently so for the demand, the fair being but thinly attended by buyers. Best wether mutton made from about 3s. 8d. to 4s. per 8lbs.; best fat ewes from about 3s. 4d. to 3s. 6d. There was a large supply of fat beasts. Good fat beef made from 3s. to 3s. 4d. per 8lbs.; good fat cow beef about 3s., with a dull trade. Of store beasts the supply was short, with but few buyers; what were sold made rather more money. Milking cows scarce, with a flat trade. The horse fair was well attended.

NORTHALLERTON HORSE FAIR was well attended by all the principal dealers in the kingdom, as well as by several foreigners. There certainly was not the great number of horses that we have frequently seen. Horses of first-rate quality were readily sold up at high figures, particularly those adapted for hunting and carriage purposes, as well as prime nags. Upon the whole it may be considered as having been an excellent selling fair; many buyers being perfectly satisfied with the business they had transacted. There was a great number of inferior horses, which were with difficulty sold, many of them remaining on hand.

NORTHALLERTON FAIR.—We had a tolerable show of fat and lean cattle, with a good attendance of buyers. Fat stock had brisk sale, at from 4s. 9d. to 5s. 6d. per stone; lean cattle were in good demand, at improved prices; and many calving cows were sold, the sale for them being brisk.

SALISBURY CHEESE MARKET.—There were about 100 tons, which met with a brisk sale at the following prices:—Skim, 22s. to 28s.; half cowards, 30s. to 32s.; half skim, 36s. to 41s.; and Somerset, 50s. to 60s.

STIRLING FAIR.—There was a large display of middling and inferior horses exposed for sale, but very few first-rate animals were shown, and upon the whole it was a very dull market indeed, very few having changed owners during the day.

WINSLOW MONTHLY MARKET was well attended, and trade was good. For cows and sheep there was a ready sale. Tegs made up to 40s. per head. Fat beef and heifers made higher prices than of late.

WORCESTER FAIR.—The show of stock was good, there being too many sheep for the buyers, although the latter were numerous; also a good supply of fat cows and barrens. The price of beef was from 4½d. to 5d; good qualities met a ready sale, but the others were a drug. Mutton, from 5½d. to 6d., but some went back unsold. Pork, 8s.; stores somewhat dearer. There was a good show of horses, but, as usual in this department, very little doing.

WYMONDHAM FAIR witnessed a large quantity of stock, but little business was transacted, and farmers complained sadly of the prices offered.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF FEBRUARY.

The time which has expired since the defeat of the Whig Ministry is too short, and the arrangements for the formation of the new Cabinet too incomplete as yet, to allow of an opinion being ventured on as to what may be the effects of the change on the agricultural interest. We may, however, congratulate the country, and more especially our agricultural friends, on having got rid of a Government whose acts throughout the whole of their tenure of office have been hostile to the interest of the farmer. On the meeting of Parliament last year, the existence of agricultural distress was admitted and deplored in the Speech from the Throne; but, not only was no remedy proposed by the Government, but the proposals of measures for alleviating the distress brought forward by independent members were systematically opposed by Lord John Russell and his colleagues.

The Ministry deemed it politic, on the opening of Parliament this year, to omit all mention of the state of agriculture, though they were well aware that the distress previously admitted had not been overcome.

In the present unsettled state of affairs, it would be hazardous to venture on predictions; but the resignation of the Whigs can hardly, we think, fail to prove a benefit not only to the farmers of Great Britain, but to the country generally.

Leaving this matter to be developed by time, we shall proceed with our usual monthly notice. When we last addressed our readers, there was some appearance of excitement in the grain trade; throughout the month of January prices of all articles had steadily advanced, and many had become very sanguine respecting the future; since then the tone of the trade has undergone a change, and a check has been given to the upward tendency. This has not been caused by any actual change in the position of affairs, but has been brought about by that caution and foresight which not unfrequently follow a period of excitement. Buyers having got tolerably well into stock, deemed it prudent to cease purchasing, and, with a diminished demand, the supplies from the growers did not fall off. The consequence of this has been a small re-action in prices. The present calm affords a favourable opportunity for taking a review of our actual position, in order to endeavour to ascertain in what direction the next move is likely to be. Leaving all legislative changes out of the question,

and looking at the matter entirely as one of supply and demand, we can discover no reason to expect any material alteration in the value of agricultural produce in this country. Prices here are still too low to offer much inducement to foreign holders to consign to Great Britain; and they are likely therefore to retain their stocks in their own possession some months longer, under the impression that an inauspicious spring, or other unforeseen circumstances may hereafter arise to afford a more favourable opportunity for realizing. Neither are the rates now current so high as to hold out any very strong temptation to our own farmers to use extraordinary exertions to supply the markets, and as the preparation of the soil for spring sowing requires to be attended to, we may calculate on moderate deliveries throughout the month of March. On the other hand, it is by no means unreasonable to suppose that merchants and millers, who have for some weeks past acted on the reserve, will find it necessary ere long to purchase somewhat more freely, and we should therefore not be surprised if the decline of 1s. to 2s. per qr. which has taken place in the value of wheat since we last addressed our readers should be recovered. We think this may be calculated on with tolerable safety; indeed, prices may perhaps go a few shillings per qr. higher than they have yet been; but we do not agree with those who anticipate a material improvement, being satisfied that so long as we continue to admit the produce of the entire world free into our ports, an average price of from 40s. to 45s. per qr. will in general insure a larger supply than the demand will be able to clear off. It was so last year, with a decidedly deficient crop at home; and we can therefore discover no reason why it should be otherwise with a good harvest, such as that of 1851 has unquestionably proved. We are quite aware that many authorities on this subject take a different view, and maintain that because there has been a partial failure of the rye and potato crops in the north of Europe, those countries which usually furnish Great Britain with a large portion of her supplies of wheat will not be in a position to spare any considerable quantity. This may be true to a certain extent; but it is likewise true that the present high range of prices in the Baltic has been caused by extensive speculation, that much of what has been bought has not gone into consumption, but has been withheld in expectation of an English demand, and that without an export inquiry the local consumption will probably be inadequate to take off that which will, after a time, have to be brought forward for resale. We have no wish to discourage farmers, but we are anxious to make them aware of the fact that stocks of wheat exist abroad, and that whenever our prices reach a point likely to yield a profit to shippers, supplies will be forthcoming.

The next matter for consideration, in reference to the future, is the seasons. Hitherto we have heard of no complaints in regard to the appearance of the autumn-sown wheat; the plant, without being prematurely forward, is represented to be strong and promising; and if it should continue to progress favourably, one of the incentives to speculation would be withheld, whilst anything threatening injury would be immediately turned to account by holders in this country as well asabroad; indeed, we are inclined to think that the future range of prices will be dependent more on the character of the weather in the spring and summer than on any other circumstance, but we need scarcely remark that prudence is against speculation on such an uncertain basis, and we have therefore left the possible effects of an unpropitious season out of the question in our calculation of the probable future range of prices.

The weather, though very wet in the early part of the month, has, on the whole, been favourable for out door work, and in the southern parts of the kingdom the plough has been in active employment during the last week or two; the late frosts have been very beneficial, and the land is reported to work admirably. Farmers have, notwithstanding their engagements in the fields, managed to keep the markets tolerably well supplied with spring corn, as well as with wheat; indeed the deliveries of barley have within the last fortnight been on a more liberal scale than at any previous period since harvest, and at many of the markets in the districts where this grain is most extensively grown, rather an important fall has consequently taken place. It is, however, the prevailing belief that the supply will not be followed up, and there are already symptoms of a rally. In prices of other articles no material variation has occurred at any of the leading provincial markets; the changes at Mark Lane will be more particularly referred to hereafter.

The importations of corn, flour, and seeds, into the United Kingdom have been very moderate of late, as compared with previous arrivals. The following table, showing the supplies received during the three months ending 5th Feb., 1851 and 1852, may prove of some interest—

Description	Dec. 5, 1851.	Jan. 5, 1852.	Feb. 5, 1852.	Total.
Wheat	135014	178839	126354	440207
Barley	24715	33757	27413	85885
Oats.....	44162	42869	20404	107435
Rye	—	—	—	—
Beans.....	24708	31539	65993	122240
Peas	10435	10442	1488	22465
Maize.....	126710	126183	58135	311028
Flour	294510	366750	192102	853362

	1850.	1851.	1851.	Total.
Wheat.....	320136	324558	328482	973176
Barley.....	68489	48045	70742	187276
Oats.....	42889	21460	41917	106266
Rye.....	—	—	354	354
Beans	45949	31233	20123	97305
Peas.....	29255	14927	8956	53138
Maize.....	46443	46405	56007	148855
Flour.....	487334	571582	411979	1470895

It must, however, be recollected that the country is altogether in a different position to what it was in the spring of last year, our stocks of home grown wheat being then very small, whereas there is reason to conclude that our farmers hold quite as large a proportion of the last crop at present as is usual at the corresponding period. We have latterly had a few arrivals of wheat from the near continental ports into London, proving that the late advance has not been lost upon our neighbours.

Business at Mark Lane has, on the whole, been quiet, and, as far as wheat is concerned, but little change has occurred in quotations. The arrivals coastwise into the port of London have been moderate, more especially during the first fortnight, when the provincial markets offered rather better prices than the metropolis; but some decline having since taken place in the former, whilst quotations have been nearly maintained in London, the receipts have rather increased. From the close of January up to the 16th inst., scarcely any alteration took place, the indifferent condition in which the greater part of the samples came to hand, owing to the prevalence of damp weather, caused sales to proceed somewhat slowly, but there was no giving way until the 16th, and the decline then scarcely amounted to 1s. per qr. Since then an improvement has taken place in the condition, which has enabled sellers to realize better prices, and we consider quotations much the same as when we last addressed our readers. The best qualities of red wheat have lately commanded 44s. and even 45s., whilst for superior white from 50s. to 52s. or 53s. per qr. has been realized. The London average has gradually risen, the returns having during the last four weeks been respectively 43s. 1d., 43s. 9d., 44s. 9d., and 44s. 9d. per qr.

The receipts of foreign wheat at this port have amounted to about 20,000 quarters. Of this supply a fair proportion has been from Rostock, and some quantity from Holland—the latter mostly Danzig old wheat, which had been stored in bond at Dutch ports, and afterwards reshipped. The Rostock wheat is of last year's growth, and having been harvested during damp weather, the quality is not so fine as is usually received from thence. The weight of the cargoes which have hitherto come forward has in few instances exceeded 61lbs., and the average has been about 60½lbs. per bushel. The price asked (44s. to 45s. per qr.) has been deemed too high by our millers, and the sales from on board ship have consequently not been important. For the Danzig wheat received from Rotterdam and Amsterdam, 50s. to 52s. has been asked, and these rates being unobtainable, factors have been obliged to land on account of importers. Fine qualities of old wheat ex-granary have been taken to a moderate extent, for mixing with soft-conditioned English; but we have experienced less country demand than might have been expected, and, with the exception of a few lots taken in the early part of the month by speculators, to hold over, and more recently a purchase or two of low quality for Ireland, the sale has been confined to retail quantities to local consumers. In point of price, however, there has been no change, the slight decline in the value of English on the 16th instant having failed to have any influence on quotations of foreign.

During the first three weeks of the month, scarcely anything was done in floating cargoes of wheat on passage from the Black Sea, &c., and prices rather tended downwards. On the 20th instant there was a revival in the demand, and about half-a-dozen cargoes of Egyptian wheat to arrive were placed at 28s. 3d. to 28s. 6d. per qr., cost, freight, and insurance. Subsequently sellers refused to take these rates, and buyers being unwilling to pay an advance, comparatively few bargains have been closed during the last week. Polish Odessa wheat has become scarce. There are hardly any cargoes arrived off the coast, and for those on passage relatively higher prices have been asked than such quality would be worth at present on the spot; the operations have consequently been unimportant. We have lately had a few offers of Lower Baltic red wheat at 43s. to 44s. per qr., cost, freight, and insurance—without, however, leading to much business; but the fact of offers being made from thence shows that, notwithstanding the high quotations in that quarter, merchants there look to the English markets for the ultimate disposal of the stocks they have accumulated during the winter months, and we have no doubt that they will after a time come down in their pretensions, if they find that British orders do not come to hand.

The top price of town-manufactured flour has remained stationary at 43s. per sack since our last; the sale has not at any period of the month been active, most of the large bakers having made forward purchases previous to the advance which took place in January; the fulfilment of these contracts has kept the millers employed, and as they have been enabled to buy wheat on much the same terms as before, they have realized fair profits.

The supplies of country-made flour have rather increased, and purchasers have had the turn slightly in their favour. The receipts from abroad have been very small; and neither American nor French of fine quality has been sold cheaper this month than in January. The purchases of the former which were then made on speculation have not as yet realized any profit to the operators; and some quantity is held by parties who, if a rise in prices should take place, will probably bring forward their stocks for re-sale.

English malting barley was in lively request in the early part of the month, and continued to advance in value until the top price touched 40s. per qr. This occurred about the second week in February, but the maltsters then began to operate on a more cautious scale; and a larger supply appearing at Mark-lane on the 16th than on any previous occasion since harvest, a sudden change took place in the tone of the trade; indeed, the re-action was so great as somewhat to resemble a panic. The prices bid were 3s. to 4s. per qr. below the extreme terms realized only a week before. So great a decline was in most cases resisted, but a reduction of 2s. per qr. was willingly acceded to, without leading to extensive transactions, and a considerable proportion of the supply remained undisposed of. The following week the receipts again fell off, and on the 23rd a fair clearance of what had before been left over was effected, but no portion of the reduction could be recovered. Matters still remain in the same state, and we question whether the very finest qualities would now realize 37s., whilst capital samples might be easily secured at 34s. to 35s. per qr. Distilling barley has also receded in value, but not to the same extent; and in prices of grinding sorts hardly any change has occurred. For fine heavy Danish, and similar descriptions, 27s. to 28s. per qr. has been paid in retail; and Egyptian, both arrived and on passage, has commanded 20s. to 21s. per qr., showing very little alteration from the rates current at the close of January.

Malt has been influenced more or less by the decline in quotations of malting barley; but sellers have in general remained firm, and superior kinds have not been offered cheaper.

The total arrival of oats into the port of London has been moderate; but the supply, though small, has rather exceeded the quantity calculated on, a good many parcels having reached us from Scotland, and 30,000 to 35,000 qrs. from abroad, the latter principally from Holland. That which has, however, told most on the trade has been the receipts by the various lines of railway; not important in the aggregate, but, being mostly in small lots, the show of samples has been rather formidable in so dull a market. The principal dealers have throughout the month confined their purchases to as narrow limits as their pressing wants have allowed; and the consumptive demand has likewise been languid. Prices remained perfectly stationary for about a fortnight, and the decline since has scarcely amounted to 6d. per qr., the moderate character of the supply having rendered factors very reluctant to make any concession. Lincolnshire feed, and similar qualities, weighing 38 to 38½lbs. per bush., have realized 20s. to 20s. 6d., and for Riga, of the same weight, 21s. per qr. has been asked. The heavier kinds of oats have been sold at relatively lower terms, more especially Scotch and Dutch brews. The latter, though weighing 40 to 41 lbs., are at present not worth over 21s., and good Scotch feed of 41 to 42lbs. weight may be had at 22s. per qr. We are still inclined to think that oats will bring better prices during the next month or two, as we cannot conceive where supplies of sufficient extent to provide for the consumption of the metropolis are to come from, unless some advance takes place, so as to encourage consignments from Ireland and the near continental ports.

The demand for beans has been of a perfectly retail nature, and neither English nor foreign have varied in value to an extent rendering alteration in quotations necessary. Egyptians to arrive have met a moderate share of attention at the old price, say 22s. per qr., cost, freight, and insurance.

The supplies of peas have about kept pace with the demand, and where sales have been made similar rates have been realized to those current when we last addressed our readers.

The arrivals of Indian corn off the coast have been unimportant, and the quantity on passage to this country from the Black Sea and Mediterranean is considerably less than was the case at this period last year. The knowledge of this fact has rendered the possessors of floating cargoes unwilling to accept reduced terms, and, though the demand from Ireland has been much less active than it was last year, hardly any change has occurred in the prices asked. Within the last week there have been symptoms of a revived inquiry, and Galatz could not at present be purchased afloat below 30s.; whilst for cargoes to be shipped 28s. 6d. to 29s. 6d. per qr., cost, freight, and insurance, is asked. The stocks of this article in Ireland are heavy, but generally in firm hands.

As the shipping season is now approaching, the position of the grain trade abroad becomes of increased interest, and we shall devote the remainder of our space to laying before our readers the substance of the most recently received foreign advices.

The general character of the accounts from the Baltic has, within the last week or two, become

somewhat less firm than previously, more particularly from those ports where speculation was carried to the greatest extent; still prices were, according to the latest reports, relatively higher in that quarter than in our markets. We are evidently about to have a trial of strength between the merchants there, as to the power of holding stocks, and those on this side in withholding orders.

Letters from Danzig, of the 18th inst., state that about 3000 qrs. wheat, of common to good quality, had changed hands during the previous week, at prices ranging from 41s. to 45s. per qr. free on board. The weather had become cooler, but the frost had not been sufficiently severe to interfere with the navigation; there was, however, little grain being shipped, as the few orders received had, for the most part, been limited too low, and the Danzig merchants were not in general disposed to ship to Great Britain.

At Konigsberg, prices of all kinds of food were very high, indeed much higher than at any of the neighbouring places, and there is no chance of supplies reaching us from that port.

The advices from the Lower Baltic ports are not of quite so lively a character as they were in the early part of the month, and in some cases a reaction of from 1s. to 3s. per qr. had, it seems, occurred in quotations. The fall had been greater at Stettin (where the rise had previously been the most considerable) than at Rostock, &c. The general tone of the accounts would lead to the belief that the operators for the rise had become unwilling to continue their purchases, and as much of the wheat bought during the winter had been purchased to be delivered in March and April, it is not improbable that when the time for payment arrives, some forced re-sales may have to be made. We are consequently inclined to think that prices in that quarter will, after a time, be regulated by those current here. That the failure of the rye crop in the interior of Germany has been extensive, we are ready to believe, and this has no doubt caused an extra consumption of wheat, but not to such an extent as to warrant the high prices which have been paid, and we still attribute the rise which has been established during the winter in a great measure to speculation, based on the expectation of an extensive English demand. The latest quotations from the Baltic for red wheat, of 60½ to 61½ lbs. qualities, are 42s. to 43s. per qr. free on board; and Rostock is perhaps the cheapest and best port for making purchases.

Hamburg letters of the 20th instant state that after a week or ten days of comparative quiet the demand for wheat had again improved, and as much as 44s. 6d. per qr. had been paid for 61 lbs. Wahren; whilst several cargoes to be shipped from Pomerania and Rostock had been sold at 42s. to 43s. per qr.

In the Dutch markets some quantity of wheat seems to have been bought with a view of shipping to England; and at Rotterdam equal to 44s. to 46s. per qr. has been paid for white Zealand.

In Belgium prices of wheat have been steadily supported; and at Antwerp, on the 21st instant, there was a brisk sale for Polish Odessa at from 38s. 6d. to 40s. 6d.; whilst Egyptian was worth 30s. to 32s. per qr.

In France wheat has sold tolerably well at about previous rates; but the value of flour has lately tended downwards at Paris, &c. At Marseilles rather large arrivals of Black Sea wheat had taken place, which had caused some decline; still prices are relatively higher in the Mediterranean than with us.

From Galatz and Ibraila we learn that considerable purchases of wheat and Indian corn had been made, for shipment to Great Britain, at rising prices.

The latest reports from the United States are also of a lively character; the advices from hence and Liverpool, per Europa, having caused a rise in the value of flour in most of the American markets. Stocks at New York had become considerably reduced; and on the 11th of February good brands of Western Canal could not be bought much below 4 dols. 75 c. per brl.

CURRENCY PER IMPERIAL MEASURE.

Shillings per Quarter

Wheat, Essex and Kent, white	42	to	46	fine up to	52
Ditto ditto old	42		45	„	52
Ditto ditto red, new	40		43	„	44
Ditto ditto old	40		43	„	44
Norfolk, Lincoln, & Yorksh., red	40		43	„	44
Ditto ditto old, none				„	—
Ditto ditto white new	42		44	„	46
Ditto ditto old, none				„	—
Barley, malting, new	28		32		
Chevalier	34		36		
Distilling	26		28		
Grinding	24		25		
Malt, Essex, Norfolk, and Suffolk, new	53		55	extra	60
Ditto ditto old	45		48	„	51
Kingston, Ware, and town made, new	60		61	„	64
Ditto ditto old	50		53	„	55
Irish feed, white	19		20	fine	22
Ditto, black	18		19	fine	21
Oats, English feed	19		20	fine	22
Ditto Potato	21		24	extra	26
Scotch feed	21		23	fine	25
Ditto Potato	23		25	fine	26
Rye	26		28	old	26 28
Beans, Mazagan	27		28	„	27 29
Ticks	26		28	„	28 32
Harrow	29		30	„	30 32
Pigeon	32		34	„	32 34
Peas, white boilers	34		35	„	32 35
Maple	30		31	„	30 32
Grey	29		30	„	29 31
Flour, town made, per sack of 280 lbs.	—		—	„	41 43
Country marks	—		—	„	32 36

IMPERIAL AVERAGES.

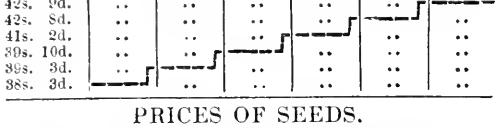
FOR THE LAST SIX WEEKS.

WEEK ENDING:	Wheat. s.	d.	Barley. s.	d.	Oats. s.	d.	Rye. s.	d.	Beans s.	d.	Peas. s.	d.
Jan. 17, 1852..	38	3	27	1	18	1	27	5	27	11	28	10
Jan. 24, 1852..	39	3	27	10	18	2	27	10	28	3	28	8
Jan. 31, 1852 .	39	10	28	6	18	2	27	6	28	11	28	4
Feb. 7, 1852..	41	2	29	8	18	11	29	7	29	0	29	0
Feb. 14, 1852..	42	8	30	7	18	9	29	11	29	10	29	7
Feb. 21, 1852..	42	9	31	0	19	4	30	5	30	2	30	5
Aggregate average of last six weeks	40	8	29	1	18	7	28	9	29	0	29	2
Comparative avge. same time last year	37	9	22	9	16	5	26	8	25	11	26	9
DUTIES.....	1	0	1	0	1	0	1	0	1	0	1	0

COMPARATIVE PRICES AND QUANTITIES OF CORN.

Averages from last *Gazette*.	Qrs.	Friday's Av. s.	d.	Averages from the corresponding *Gazette* in 1851.	Qrs.	Av. s.	d.
Wheat ..	85,270	42	9	Wheat ..	78,216	37	2
Barley....	76,160	31	0	Barley....	71,328	22	10
Oats	25,854	19	4	Oats	31,903	15	11
Rye.....	138	30	5	Rye.....	47	23	8
Beans....	7,534	30	2	Beans	6,498	25	4
Peas	2,167	30	5	Peas	1,764	27	1

DIAGRAM SHOWING THE FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT DURING THE SIX WEEKS ENDING FEBRUARY 21, 1852.



PRICES OF SEEDS.

The inquiry for cloverseed has rather slackened, but holders have not manifested any anxiety to realise, and prices were quite as high to-day as on this day week. Trefoil was sought after, and was again rather dearer. In other kinds of seeds nothing of much interest transpired.

BRITISH SEEDS.

Linseed (per qr.).. sowing 60s. to 65s.; crushing 48s. to 52s.
Linseed Cakes (per ton)..... £8 0s. to £8 5s.
Cow Grass (per qr.) ..... 60s. to 70s.
Trefoil (per cwt.) ..... 21s. to 28s.
Rapeseed, (per last) new £21 to £23 ..... old £21 to £22
Ditto Cake (per ton)..... £4 5s. to £4 10s.
Mustard (per bushel) white 5s. to 6s.; .. brown, 7s. to 9s.
Coriander (per cwt.) ..... new 17s. to 19s., old 15s. to 16s.
Canary (per qr.) ..... new 39s. to 42s.; old 40s. to 42s.
Tares, Winter, per bush., 4s. 6d. to 5s.; Spring, 4s. 6d. to 5s.
Carraway (per cwt.)..... new, 33s. to 34s.; fine 36s.
Turnip, white (per bush.).. 8s. to 11s.; do. Swede, 10s. to 12s
Cloverseed, (per cwt.).... red 48s. to 58s., fine 59s. to 66s

FOREIGN SEEDS, &c.

Clover, red (duty 5s. per cwt.) per cwt. 48s. to 56s., super. 62s.
Ditto, white (duty 5s. per cwt.) per cwt. ..... 50s. to 64s.
Linseed (per qr.) .. Baltic 44s. to 47s.; Odessa, 46s. to 48s.
Linseed Cake (per ton) ..... £7 10s. to £9 0s.
Rape Cake (per ton)..... £4 5s. to £4 10s.
Hempseed, small, (per qr.) 32s. to 34s., Do. Dutch, 36s. to 37s.
Tares, (per qr.)..... small 32s. to 36s., large 36s. to 40s.
Rye Grass (per qr.) ..... 28s. to 35s.
Coriander (per cwt) ..... 15s. to 16s.

HOP MARKET.

BOROUGH, MONDAY, Feb. 23.

Fine samples meet with a steady inquiry at the quotations of this day week. In other sorts we have but little business doing.

Mid and East Kent.... 140s. to 250s.
Weald of Kent..... 126s. to 145s.
Sussex pockets..... 112s. to 130s. per cwt.

POTATO MARKET.

SOUTHWARK, WATERSIDE, Feb. 23.

During the past week, the arrivals coastwise have been limited, but still a large supply by rail. The trade continues in a very languid state.

The following are this day's quotations:

	Per Ton.
York Regents.....	65s. to 80s.
Scotch do.	60s. to 70s.
Perth and Forfarshire Cups	60s. to 65s.
Fifeshire Ditto	55s. to 60s.
Kent and Essex	60s. to 75s.
Cambridge and Wisbeach	55s. to 65s.

PRICES OF BUTTER, CHEESE, HAMS, &c.

	s.	s.
Friesland, per cwt.	106 to	110
Kiel	98	102
Dorset	108	112
Carlow ..... new	76	84
Waterford.... ,,	76	80
Cork..... ,,	78	82
Limerick	64	70
Sligo.....	70	80
Fresh Butter, per doz.	11	13
Cheshire Cheese, per cwt., ...	50	70
Chedder do.....	56	68

	s.	s.
Double Gloucester, per cwt.	46 to	56
Single do.....	42	50
York Hams	60	66
Westmoreland do.	60	66
Irish do.....	50	60
American do.	28	36
Wiltshire Bacon, green, ...	48	52
Waterford Bacon ..	44	47
Hamburgh do.....	40	42
American	—	—

CHICORY.

Per ton.

	£	s.	£	s.
Foreign root (d.p.)				
Harlingen ..	27	0	28	0
English root (free)				
Guernsey ..	10	0	10	10
Kent & Suffolk	none.			

	£	s.	£	s.
English root (free)				
York	8	10	9	10
Roasted and ground				
English ..	30	0	40	0
Foreign ..	40	0	50	0

Duty on all Coffee and roasted Chicory imported, 3d. per lb. on Chicory Root £21 per ton.

HIDE AND SKIN MARKETS.

		s.	d.		s.	d.	
Market Hides	56 to 64lbs.....	0	1¾	to	0	0	per lb.
Do.	64 72lbs.....	0	1¾		0	0	,,
Do.	72 80lbs.....	0	1¾		0	2	,,
Do.	80 88lbs.....	0	2		0	2¼	,,
Do.	88 96lbs.....	0	2¼		0	2¾	,,
Do.	96 104lbs.	0	3		0	3¼	,,
Do.	104 112lbs.....	0	3½		0	0	,,
Calf Skins, light.....	.....	1	6		3	0	each.
Do. full.....	.....	3	6		4	6	,,
Horse Hides	.....	5	6		6	0	,,
Polled Sheep.....	.....	6	0		7	6	,,
Kents	.....	5	6		6	3	,,
Half breds.....	.....	4	9		5	9	,,
Downs.....	.....	3	9		4	9	,,
Shearlings	.....	0	6		0	7	,,

BARK.

Per load of 45 cwt.

English, Tree.....	£13	0	0	to	£14	0	0
Coppice.....	14	0	0		15	10	0

WHALEBONE.

Polar .. per ton .. .. £180 0 0 to £0 0 0

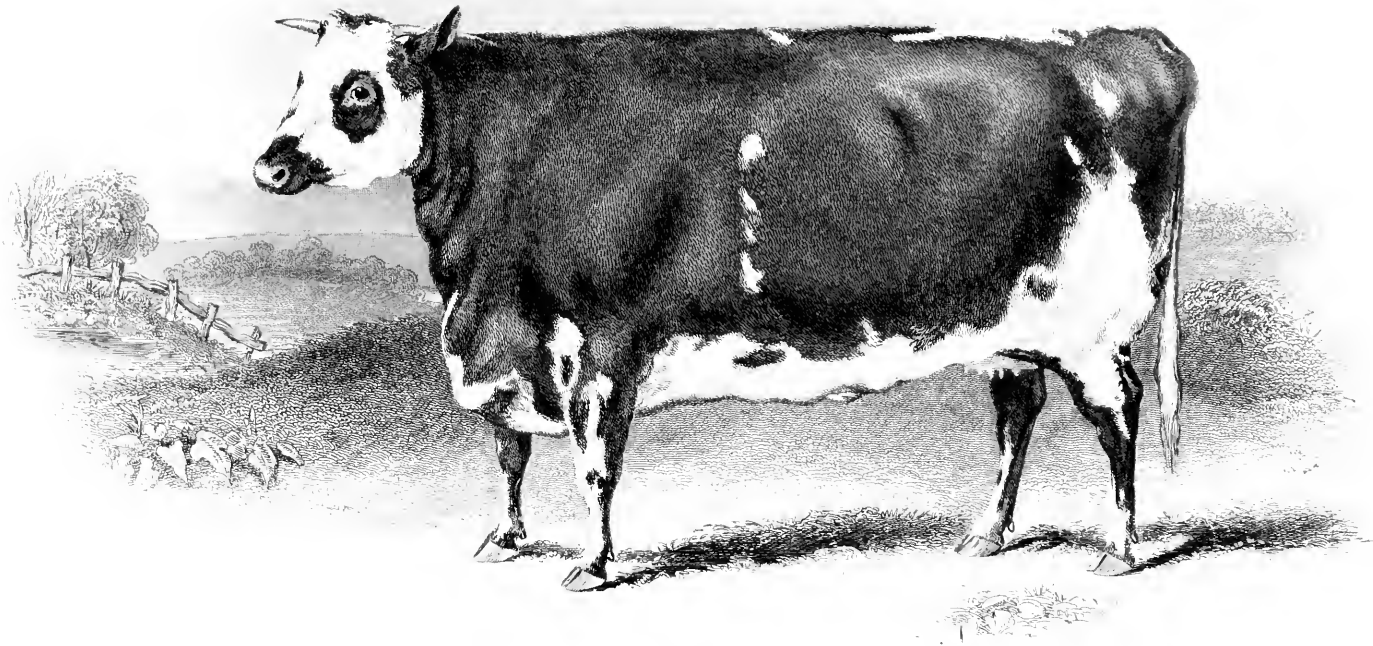
WOOL MARKET.

LIVERPOOL, Feb. 21.

SCOTCH.—There has been rather more doing in Laid Highland this week, at full rates. White Highland not much stock. There is more doing in the best class of Creviot and Crossed, at full rates. The other kinds are less in demand.

		s.	d.		s.	d.
Laid Highland Wool, per 24lbs....		9	0	to	9	9
White Highland	do.....	12	0		12	6
Laid Crossed	do...unwashed	10	9		11	6
Do.	do...washed	11	9		12	6
Laid Cheviot	do...unwashed	11	0		12	6
Do.	do.. washed	13	6		16	6
White Cheviot	do... do.	22	0		24	0

Printed by Rogerson and Co., 246, Strand, London.



THE FARMER'S MAGAZINE.

APRIL, 1852.

PLATE I.

AN IN-CALF HEIFER SHORT-HORNED.

The subject of our first plate, "Butterfly," a red and white shorthorned heifer, calved 1st May, 1849, was bred by and is the property of Charles Towneley, Esq., of Towneley Park, near Burnley, Lancashire. She was got by Jeweller (10354), dam (Buttercup) by Garrick (3863), g. d. (Barmpton Rose) by Expectation (1988), gr. g. d. by Belzoni (1709), gr. gr. g. d. by Comus (1861), gr. gr. gr. g. d. by Druton (198). The following are the prizes obtained by this animal:—at the Meeting of the Royal Agricultural Society at Exeter, in July, 1850, the first prize of Ten Sovereigns as the best yearling heifer in Class 5. In the same year at the Great Yorkshire Meeting held at Thirsk, in August, the first prize of Ten Sovereigns. At the Royal Agricultural Society's Show at Windsor, in July, 1851, the first prize of Twenty Sovereigns in Class 4. In August, the same year, at the Yorkshire Agricultural Society's Meeting at Bridlington, the first prize of Ten Sovereigns; and in the same month, at the Meeting of the Royal Agricultural Improvement Society of Ireland held in Dublin, the first prize of Ten Sovereigns and the Silver Medal as the best female in the short horned class, also the Gold Medal as the best female in all the classes. On the 1st of February, 1851, this animal produced a fine heifer calf, by Garrick, the best yearling bull at the Dublin and Bridlington Meetings. Garrick has since been sold by Mr. Towneley to Messrs. Nick, Black, and Co., of Port Philip, Australia. The dam of Butterfly (Buttercup) was a winner in her day: and an engraving of her was given in the *Farmer's Magazine* in 1842.

PLATE II.

THREE LEICESTER WETHERS.

The subject of our second plate are three Leicester wethers, the property of G. S. Foljambe Esq., of Osberton Hall, near Retford, Nottinghamshire, to which were awarded the first prize of Twenty Sovereigns and the Silver and Gold Medals at the Smithfield Club Cattle Show, in December, 1850.

THE DISEASES OF FARM HORSES ARISING FROM MISMANAGEMENT.

BY V. S.

This is an important subject for the farmer's consideration, for he frequently considers many of the losses he sustains in this respect as the consequence of natural causes over which there is no control, and which no knowledge can avert. I hope to be able in the course of this essay to convince persons entertaining such fated opinions, that thousands of horses annually perish from a neglect of the conditions required for their preservation in health and freedom from disease.

With respect to food; I shall prove that many dangerous diseases arise from improper regulations

of diet; as to quantity and quality, and the times at which it should be given—the rules for which are simple and easy enough, but are continually transgressed through carelessness, or absurd prejudices.

Also that excess of labour forms a prolific source of disease in both young and old horses, and the vigorous health of young ones in particular is often wasted and destroyed from premature work, which if economically managed for a year or two at most, might have preserved them in health and activity nearly to the full term of the allotted periods of their lives, instead of being dissipated in the first six or seven years of their existence.

And lastly, that insufficient shelter and exposure to wet and cold, are very common causes of disease, the effects of which are certain to manifest themselves in some way or other on horses that have been exposed to their influences, though oftentimes obscurely, and at a remote period. Our patients, far more than those of the human practitioner, are exposed to the influence of physical agents. One half of the diseases of the horse and of cattle are referrible to temperature—many more to the changes affected in the atmospheric air, by respiration, perspiration, and the various excretions, and the greater part of the residue may be traced to some unknown, and not sufficiently appreciated, atmospheric agency.

These are the chief points to be considered in this essay; *food, labour*, and *temperature*, agents that are continually acting on the condition and general health of farm horses, either for good or for ill; if properly directed they produce in them strength and capability of enduring labour; but misdirected, their beneficial influences are changed from ministers of good, to insidious or manifest sources of disease.

INSUFFICIENT OR IMPROPER FOOD.

The purpose of food being the supply of materials, which when prepared by the process of digestion, shall repair the waste of the body, and maintain its growth and temperature; it must be evident, if this process is interfered with by the supply of articles of food as will neither suit the powers of digestion or the wants of the system, that disturbances of some kind are likely to occur in any or all of the steps of the nutritive process, from the reception of the food into the stomach, to its appropriation and assimilation to the living textures. Accordingly we will direct our attention, first to the diseases of the stomach, which are easily traced to errors in diet, and inteference with the digestive economy.

Diseases of the stomach. The stomach of the horse is comparatively small, holding about three gallons, whilst the ox possesses four stomachs, the first of which is larger than that of the horse. This affords us a very important lesson at the commencement, that whilst the ox is so constructed as to consume large quantities of fodder at a meal, the horse on the contrary, requires a more moderate quantity, of a more nutritive nature, and to be fed oftener. To insure perfect digestion of the food, it requires to be first masticated with the teeth, and moistened with the salivary secretion in the mouth, which flows during this process in considerable quantities. According to Professor Spooner, the saliva flows during the time of feeding at the rate of two gallons per hour.* In the stomach the food is further acted on in healthy digestion by the gastric juice, when it is converted into a soft pulpy mass called *chyme*, which passes as fast as it is formed into the intestinal canal. This part of the digestive process is very active in the horse; but it is sometimes interfered with, in consequence of devouring his food in too rapid a manner, without being either properly masticated, or mixed with the salivary secretion. This circumstance occasionally happens when the animal has been fatigued with hard work, and restricted from food for an improper length of time. In these cases *indigestion* takes place, which is a very serious affair, for the life of the animal is in considerable danger. *Fermentation* of the food and disengagement of gases quickly ensue, and as the horse can neither belch up the air, or vomit up the food, distention of the coats of the stomach takes place, occasioning violent agonizing pains; spasm, and all the symptoms recognised in aggravated cases of colic, for which it is frequently mistaken. This alarming disease is recognised by veterinary surgeons as *acute indigestion*.

It should be understood that digestion although always in part chemical, is controlled by a superior superintending influence—the vital power; and no sooner does this power fail, or the chemical agencies or decompositions become too strong for it, than we have fermentation of the food, and precisely the same changes in the stomach as would occur out of it, when kept in a moist state and similar temperature. The fermentable nature of the food, and the peculiar construction of the horse's stomach which prevents vomition; and his occasional detention from food and water during the long hours of

* "In injuries where the salivary or parotid ducts had been opened, he," (Mr. Spooner), "had observed no flow of saliva took place, except when the animal was feeding; and it then discharged itself in a stream, by weight, measure, and time, at the rate of two gallons per hour."—*Proceedings Veterinary Medical Association*, 1837-8, *p.* 102.

labour, are circumstances which account for the great liability of farm horses to this disease.

The stomach of the horse is liable to another dangerous disease, arising from a false and injurious system of dieting.

The Staggers. This disorder is slow in its progress, and seldom observed until firmly established. The symptoms are easily recognised by the drooping head, impaired vision, staggering gait, and sometimes violent and dangerous struggling of the afflicted animal. It is more frequently observed in farm stables during the busy tillage season, than at any other time; the consequence of long continued labour, and little rest or food, except at night, when they are allowed to gorge their stomachs to repletion.

The late Professor Coleman used to relate a circumstance in his lectures, connected with this disease, which throws considerable light on its origin. The artillery horses stationed in London during the winter of 1817, suffered very considerably from stomach staggers, so much so, that it was considered to be endemical, and of an infectious character. Mr. Coleman, with his usual penetration, soon discovered the cause. He found that, from some new regulations about that time, the stablemen were not allowed any candles, and during the winter, the horses were bedded up at 5 o'clock in the evening, and not fed again until 8 o'clock on the following morning, when they consumed their breakfasts voraciously, gorging their stomachs, not to the degree likely to produce acute indigestion, but sufficiently distending them as to oppress the blood vessels and the circulation through them. This practice continued, day after day, caused a *specific* inflammation of the stomach, an inflammation of a peculiar character, differing from gastritis or inflammation of the part. Mr. Coleman regarded the symptoms produced as resulting from the sympathetic connexion between the stomach and the brain, united to the effects that would arise from the daily distention, throwing a vast quantity of blood on the brain. He *simply obtained an order for candles for the use of the stablemen, which enabled the horses to be fed at a later hour in the evening, and an earlier one in the morning, when the disease disappeared.*

A common error still prevails in many districts, that staggers is a contagious disease; but should the horses on a farm be attacked occasionally with slight fits of this kind, the farmer may rest assured that there is mismanagement somewhere in the feeding department.

We will now direct our attention to another common and dangerous class of ailments, arising from errors in feeding, and interference with the digestive economy.

Diseases of the Intestinal Canal. The changes which take place in the gastric process of digestion has been noticed; but others are carried on in the intestines, where the chymous mass, becoming mixed with the hepatic and pancreatic secretions, is converted into *chyle*, which is passed onwards by the muscular creeping action of the small intestines into the larger ones; and during this passage it is acted on by the agency of a set of vessels termed *lacteals*, whose orifices are abundantly spread over their villous surfaces, for the purpose of absorbing the nutritious parts. The same absorption takes place in the large intestines, only the chylous mass is retained in the *colon* for a longer period, by which its nutritious parts are finally separated and absorbed, and the excrementitious portions are afterwards expelled per rectum.

Now in this process we observe that the united pancreatic and biliary fluids, poured on the chyme, penetrates it, renders it fluid, animalizes it, separates the nutritious from the excrementitious, which is finally carried into the circulation.

It sometimes happens, however, that serious disturbances occur during this process. Horses are very frequently fed with imperfect or indigestible articles of food, which accumulating either in the small or large intestines, prove sources of irritation and disease. It is a very common case to find the *colon*, or big gut, as it is frequently called, packed with indigestible fibrous matters, which on being evacuated by the use of medicines and injections, prove to be unmasticated and unchymified chaff of straw, and husks of oats. The refuse of the barn, consisting of the husks of various grain, half rotted frosted clover, weather beaten dusty hay, or hay mouldy and rusty, and covered with parasitical growths, musty pea haulm, and sapless fibrous turnips; these are articles that frequently occasion visceral complaints.

But amongst all these, the use of chaffed straw, sometimes of wheat, but more frequently of barley, proves the most common cause, and consequently should never be given alone, but mixed with hay in the proportion of one third of the former to two of the latter. Some horses are in the habit of bolting their corn, which passes into the intestines intact. This is also a cause of indigestion, and its consequences; and hence the bruising of oats is not only an economical practice, but lessens a tendency to visceral disease.

In *colic cases of this kind* we do not find the rolling, agonising pain of spasmodic colic; but the animal lies and rises at short intervals, frequently points his muzzle round to the flank, the seat of pain, and when standing, either paws the litter with one of its fore feet, or strikes at its belly with its hinder ones. The pain, in cases of this kind, arises

from the indigested food impacked in the colon; and the symptoms are seldom entirely removed, until the greater part becomes evacuated. This disease is never to be reckoned void of danger, as it may unexpectedly terminate in inflammation and gangrene.

Colic is very commonly attributed to horses from drinking cold spring water when in a heated state. This is the *spasmodic colic* of veterinary authors and others. That spasmodic constriction of the small intestines is occasionally caused in this way, producing very intense and acute pain, I do not question; but in a general way, the colic pains are caused by the washing of imperfectly digested food from the stomach into the intestinal canal, before it has undergone chymification, rather than to any direct influence of the cold water on the muscular coat of the intestines. I believe that food of the best description, when washed into the intestines in this manner, is certain to cause pain and spasm from the fermentation and disengagement of gases which invariably takes place on vegetable matters exposed to heat and moisture, which if it had been properly acted on by the antiseptic properties of the gastric juice, would have been incapable of being fermented.

It should be understood that a horse will drink at one time a much greater quantity than his stomach can contain, supposing it to be entirely empty; but even when he drinks a less quantity, it remains not in the stomach, but passes on to the large intestines, and is retained in the cæcum, commonly called the water gut. Hence the danger to be apprehended at all times from allowing horses to drink a quantity of water soon after feeding, or before the food is sufficiently digested in the stomach, from the chance of portions of it being washed into the intestinal canal, when the consequences are, as I before stated, fermentation and disengagement of gases, causing pain and spasms, which, when it occurs in the small intestines, produces *spasmodic colic*, or it may occur in the large intestines, causing *flatulent colic*. In the former disease we cannot detect the swelling; but it is evident enough when the colon is the seat of the disease, by the enlargement of the belly on the off flank.

Veterinary surgeons are seldom called on to attend cases of this kind in farm stables at the onset. The nostrums used by the farmers, are stimulants of various kinds, such as turpentine, peppermint, gin, pepper, and ginger. Simple cases of colic can generally be successfully treated on the stimulating principle; and many cases admits of this being carried on to an extreme extent with comparative safety; but in other cases we have constipation to deal with, which bids defiance for a time to our remedies; and when if strong stimulants have been previously given; inflammation is quickly set up, and the disease terminates in gangrene, which if otherwise treated at the commencement, might have had a successful result.

These visceral diseases are frequently confounded with that of *enteritis*, or inflammation of the bowels; and by farmers always treated alike. This error invariably proves fatal to the patient, for the stimulating drenches which might prove beneficial in one, is certain to cause death in the other.

It is desirable that the farmer should be able to make a distinction between simple colic and *enteritis*, which may generally be done by attending to the symptoms of each. In cases of colic, there is very little acceleration of pulse, except during the paroxysms of pain. The extremities are also warm, and there are intervals or cessations from pain, which is much abated by a discharge of wind or fæces. But in inflammation of the bowels, the pain remains equable and fixed, the pulse is rapid, hard and thread-like, sometimes almost indistinct, the breathing is considerably accelerated, the extremities are icy cold, and obstinate costiveness prevails from the commencement. Enteritis is fortunately not a very common disease in farm stables; but when it does occur, it may generally be traced to errors in diet.

With respect to visceral diseases generally, it would appear from their being more prevalent during the latter part of autumn and commencement of winter, that the state of the atmosphere has some predisposing influence. At this period of the year the atmosphere is frequently moist and relaxing; and under its influence the muscles, and with them the heart and arteries, lose power and tone, the textures also become relaxed, and the perspiration which accumulates in the long close hair of farm horses during work, perpetuates the relaxation. In this state the stomach and intestines also participate in the loss of tone; and hence disease perhaps so often occurs at this season on very slight errors of diet.

There are a few simple rules founded on the experience of some of our best practical farmers, on the management of horses, that may be introduced here with advantage.

(1). The earlier the horses are watered and fed in the morning, and the longer intervals between that time and yoking, the greater chance is there of the food undergoing perfect digestion. Ordinary farm-work is not likely to interfere with the digestive process; but active exercise, or severe cart-work are likely to do so, and should be always avoided soon after a meal.

(2). The mid-day meal and *full one hour's rest* should never be interfered with. The practice of

accomplishing a day's work in one yoking, by keeping the horses at work for eight or nine hours on a stretch, is highly injurious, being certain to cause remote, if not immediate disease.

(3). On the return of the team to the stable in the evening, it is wise at all times to divide the night's allowance of food, giving just sufficient at first, as will remove the sensation of hunger, and in an hour or so afterwards the remainder may be given with impunity.

It has been shown in cases where the digestive organs fail in appropriating nourishment from various improper articles of food, that they become distended, irritated, and otherwise disordered. Sometimes imperfect food is digested, and yet produce disease, from the imperfect blood sent thereby into the circulation.

Diabetes or *profuse staling* is caused in this manner—from horses eating mow-burnt hay, heated oats, and decaying vegetable matters of various kinds. In this disease saccharine matters are supposed to be formed in the intestines, which are taken up by the lacteals, passed into the blood, and again eliminated by the kidneys into the urine.

OVERWORK.

The influence of work is clearly observed in the general condition of farm-horses, from the breaking to the termination of life; and much depends on the amount of work given during the first two years whether they shall become healthy, useful animals, or unthrifty and weakly—a burden to themselves and to their owners. On well-managed farms, and where humanity and kindly treatment prevail, the working horses live a monotonous kind of life. They are sufficiently fed, and rarely overworked; and, except perhaps during the busy tillage season, or catching hay or harvest time, their employment is easy, and diseases seldom produced. It is not uncommon to see horses managed in this manner performing their daily labour at twenty years of age with apparent ease and comfort.*

The average work of a plough-team is about eight hours a-day, and the pace rarely exceeds a mile and half or two miles each hour. The severity of this labour will depend on the strength of the teams, their age, and food, as well as the nature of the soil and cultivation. It is mismanagement to make a pair of three-year-old horses perform the same amount of labour in the day as a pair of older horses that are staunch and accustomed to their work. If a pair of six-year-olds can plough an acre of light land in a day, a half an acre to two-thirds of an acre is sufficient for a pair of young horses to do. It is also folly to expect a pair of horses fed in the open fields through the summer, to perform their work freely through the autumnal wheat sowing; or a pair that have been fed on straw and hay and roots, with only an occasional quartern of oats during the winter, to bustle through the busy spring tillage and turnip sowings as they ought.

There is no economy in those practices, which compel horses to perform greater amount of labour than either their strength can bear or rest recruit; and hence the reason why so many are used up long before they reach what may be fairly considered as their allotted term of life. This may be estimated at fifteen years, but a very considerable number die or are destroyed before they reach half of this period.

When a horse is overworked, one of two things generally happens; he will lose flesh and become weak, or his legs will fail and he will become lame. Loss of flesh implies loss of muscular tone, and weakness, which renders the body susceptible to various diseases, arising from extra exertion, improper food, exposure to cold and wet without the stables, or foul and heated atmosphere within. And here we have the common predisposing causes to catarrh, bronchitis, and distempers in young horses, and to chronic cough, diarrhœa, and general or local œdema in old ones; besides lamenesses of various kinds, arising from bursal enlargements of the joints, ligamentous thickenings, and ossific enlargements, which either restrict the animals' usefulness, or render them irreparably lame and worthless.

It is impossible to particularize the cases of mismanagement which occur in which horses are overworked on a farm. Some of the diseases arising therefrom, particularly cases of lameness, are seldom sudden in their effect, but of slow growth; and, notwithstanding this, it is an almost every day occurrence to hear men blame some particular event of yesterday which brought to a crisis the folly and mismanagement of months, or years. Like the last feather on the camel's back, it bears the blame which belongs to the load that preceded it.

INSUFFICIENT SHELTER.

The heavy cart-horse must be regarded as the product of artificial treatment. Their capacious trunks and heavy bodies have been produced by an abundance of natural and artificial herbage. Their digestive organs are large, and their functions

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* Burns' mare Maggie attained more than 29 years.

"Its now some nine-an'-twenty years
Sin thou was my guid father's meere:
He gied me thee, o' tocher dear,
An fifty mark.
Tho' it was sma', 'twas weel, won geer,
An' thou was stark."

powerful; possessing the property of quickly assimilating nourishment. This race generally have an excess of cellular tissue, and a soft temperament, with a tendency to fatten, and are incapable of enduring fatigue and privation like the smaller and more active breeds.

Within the last few years, horses of a more active description have been employed by the farmers; yet they all more or less possess the characteristic temperament of the heavier races; and to be reared in perfection, they must be supplied with an abundance of food, besides proper shelter and warmth, on which the body depends for its early development as food itself. The want of fulfilling these conditions is certain to incur loss from disease in almost every stage of their existence.

To commence with rearing.—Cases of mismanagement are frequent everywhere. It is no uncommon case to see cart-colts indiscriminately mixed with store beasts, brood mares, and sometimes store pigs, in large open straw-yards during the winter months. Many of these places have little or no shelter or protection from the weather—and a want of sufficient drainage is more common than otherwise—they are places, indeed, far better adapted to the manufacturing of manure than the winter lodging of cart-colts.

The food, too, that is sometimes supplied to them in these places is of very inferior character, being chiefly oaten-straw and the refuse hay of the working horses—an abundant supply of turnips, and sometimes plenty of decayed potatoes. I have witnessed this picture many a time in farm establishments, and it is a wonder that more diseases and accidents do not occur than there really do.

The functions most active in colts are those which administer to growth, such as the organs of digestion and assimilation; and hence derangement of the digestive organs is common to colts reared in this manner—seen in the numerous cases of leanness, hidebound, general œdema, diarrhœa, worms, hee, &c.; and in this spiritless state catarrh and other disorders of the respiratory organs are commonly produced, from the influence of cold and wet and insufficient food.

A tubercular predisposition is frequently produced in colts reared in this manner; producing disease of the mesenteric glands, and mucous follicles of the small intestines, which become enlarged, and filled with unhealthy pus and tuberculous matters; arising from mal-nutrition—the consequences of poverty of blood. Bad food, rapid growth, and the vicissitudes of wet and cold are the common origin of tubercular disease.

When you see colts that have undergone two or three winters of this short-sighted system of management, having their skins rigid—sticking, as it were, to the ribs—the hair dull and dead like, and the summer's keep fail to recover them, you may form a shrewd guess as to the nature of the disease.

In old horses the lungs are the chief seat of tubercular disease, and death is the natural consequence of the disease in the quadruped as in man, and the same lesions are discovered after death. The lungs are thickly set with tubercles, which are hard, softened, or ulcerated; they are isolated, or they form caverns of various sizes, as in man. Sometimes there are portions of the lungs more or less extensive, which are hepatized.

Farmers who mismanage their young horses in the manner described, do so from a mistaken notion of economy. They imagine that the summer's keep will compensate for the partial starvation of winter. But the growing animal requires food not only to sustain itself, but to maintain its growth. The organic materials of a living body are constantly changing; portions of it becoming effete and taken away, whilst new parts are endowed with the property of life, and are built up in their places. The living principle is permanent, whilst the material changes, and the reparatory process cannot be maintained in its integrity unless the body be supplied with food adequate to its peculiar wants. This should contain a large supply of the phosphates, from which bone is formed, and of gluten, or fibrine, by which the muscles are enlarged. These materials are obtained from corn, bran, beans, natural and artificial grasses, and roots of various kinds. In the absence of materials of this kind, the bones do not increase in size, and the muscles are not sufficiently developed, and hence the common origin of so many ill-shaped, long-legged, light-carcassed horses, that are almost always sold at inferior prices, and frequently to persons who do not scruple to use them quickly up in work beyond their age and strength.

Hitherto we have considered the immediate operation of wet and cold arising from insufficient shelter, together with insufficient food in the rearing of colts. We will now trace these influences on older horses.

In some counties, the farmers' working horses are kept at grass from the month of May to the latter part of October, excepting during the hours of labour, or the short interval occurring in the mid-day meal, when cut grass, vetches, hay, or a small allowance of corn may be afforded them. To say nothing of this objectionable practice, as far as the loss of manure, injury to the pastures, and great expenditure of labour on the part of the horse in procuring food, it is highly injurious in other

respects.* The sudden transitions experienced between the exciting state of labour by day, and the cold and wet occasionally at night, weakens the circulation of the surfaces of the body, and the blood accumulating more in the internal parts, produces conjestions, and hence inflammation of the mucous membranes of the air passages, causing catarrhal complaints, such as coughs, sore throats, bronchitis, besides their common consequences, as chronic cough, thick wind, and sometimes broken wind.†

Fluxes of the bowels are also occasionally produced in this manner, from grazing on marshy pastures during the cold autumnal nights. Idiopathic tetanus is also produced in horses from exposure to the cold mists, fogs, and hoar frosts which prevail during the autumn, and this more commonly occurs when they are kept in marshes and unclaimed lands bordering on the sea.

I should observe that these tetanic diseases frequently occur during the moulting season—a process that always produces a great expenditure of vital power in horses—and in this state they are particularly susceptible to the influence of cold and moisture.

The indirect operations of cold and moisture deserves a passing notice. Suppose a horse-team, after a long and tiresome journey, instead of being taken direct to the stable, is left standing for some considerable time, exposed the while to severe winter weather, whilst the driver is sheltering and regaling himself in the wayside inn. This is no very uncommon case. Internal congestions may occur from the chill suddenly arresting the perspiration and throwing the blood inwardly, and oppressing some of the internal organs. But the chances are, the horses will escape this danger, from the healthy reaction which follows the effect of cold, provided their vital energies have not been much exhausted by excessive labour and want of food. And yet, on their arrival home to what may seem to be most comfortable quarters, they meet there with a greater enemy than either cold, or wet, or hunger—*the heated stable*—and the reaction which follows the exposure of the body in these instances frequently produces inflammation and their common result.

Farm stables are not only frequently heated to excess, in consequence of the number of its inmates, but they are foul and vitiated from gases or vapours of a positively noxious quality, engendered from the decomposition of the litter, dung, and urine, together with animal exhalation. The deleterious operation of effluvia, arising under these circumstances, may be short of a directly poisonous effect, yet it gradually undermines the health, and can only be counteracted by a more efficient means of ventilation and general cleanliness. The distinction should be drawn between a hot stable and a foul one, as the former is capable of producing one series of effects, and a foul one another. In the foul stable we have heat and impurity, arising from the same source, and operating in combination, producing not only a tendency to inflammatory diseases, but others of a more serious character.

It commonly happens that a variety of agents and circumstances may be required to act in combination to produce some diseases. Thus horses that are badly fed and over-worked by day, are very likely to be exposed to heated, vitiated stables at night; and these are the common victims of consumption, farcy, glanders, and specific ophthalmia.

A few words about farm stables.—The ceilings should never be less than ten or twelve feet. They should be well lighted, properly ventilated, and be kept dry both from above and below, with the means of perfect cleanliness at all times. The average temperature should never exceed 62 degrees, being 36 degrees below blood heat. The advantage of keeping the atmosphere of stables considerably cooler than the body itself consists not only in the greater amount of oxygen contained in a given bulk of air, but also in the greater force with which the foul air of respiration is carried away from the breathing passages, and a pure air supplied, in consequence of the difference of temperature maintaining a current.

These remarks on ventilation and the temperature of stables will strongly apply to hunting or other stables, it being rarely necessary to exceed 62 degrees; and if more warmth is required, it should be supplied by warm clothing.

NEGLECT OF INCIPIENT DISEASE.

The progress of many diseases in the horse is exceedingly rapid, owing to the activity of his

* The summer feeding of horses was formerly confined to pasturage, but of late years the practice of soiling in small sheltered yards has become very general where good management prevails. The utility of soiling consists in a more economical consumption of grass, whether natural or artificial, than by grazing, in the accumulation of manure, and in the quiet and coolness which the horses enjoy under the sheds during mid-day, and the shelter from wet at cold at night.

† *Broken wind* more commonly occurs to grass fed horses than any others. I have examined the lungs of several, and have always found them in an emphysomatous state, and though apparently sound, and free from any trace of morbid deposit or inflammatory change, they appeared to have lost a great part of their elasticity and contractile power, and consequently could not contract with sufficient energy for the purpose of complete respiration.

vital powers and great vascular development, predisposing to determination of blood and sthenic, or active inflammation, and hence a knowledge of the incipient stages is a matter of paramount necessity.

In a general way, this is obtained by observing the differences between the signs of disease and the usual healthy appearances of horses, or it may be from a particular knowledge of the standard of health in any individual case.

The digestive organs frequently give the earliest notice of approaching disorder. When there is a partial loss of appetite, dulness and disinclination to work, the mouth hot and dry, and perhaps the legs and ears colder than usual, these symptoms require immediate attention, indicating as they plainly do the approach of fever or inflammation.

The condition of the skin and hair will also afford a true indication of the state of the health in a general way. "The horse is unhealthy in his coat" is a very common expression, and this sign should never be neglected. The hair of a healthy horse is smooth and sleek, and the skin soft and expansive. This is indicated by the touch, as in cattle. When the system is deranged, the skin loses its pliancy, its surface becomes hard and dry, and the hair, to use another common expression, "stares on end," and is rough and rusty. These symptoms accompany almost every constitutional disease, especially disorders of the digestive organs. The sympathy existing between the skin and alimentary canal is very considerable, and it follows almost in every case, that when either of these become affected, the other takes on sympathetic derangement.

The alvine excretions also furnish early signs of approaching disease. The quality of the excretions supplies symptoms, in regard to colour and consistence, which often lead to a knowledge of the nature of the disorder in the alimentary canal, or in the system. When the fæcal evacuations consists of undigested food, and particularly if coated with mucus, it is a certain sign of disturbance in the digestive organs. Hard, dark-coloured fæces, evacuated in small quantities, is also a sign of disordered digestion, arising from defective secretions. When the fæces are excessive in quantity or liquidity, the constitute diarrhœa; and the opposite condition, that of costiveness, is also an important symptoms in many diseases, indicating defective secretion of bile.

The urinary organs likewise furnish symptoms of importance, not only of disease of the parts connected with it, but with disorders of other organs, being the chief emunctory through which effete or offending matters are discharged from the blood. The urine voided after the process of digestion is completed in a healthy horse, has a pale amber colour, possessing a pungent odour; whilst that voided soon after drinking a quantity of water, is limpid and colourless. In cases of inflammation of the kidneys, the urine is sparingly discharged, high coloured, and having the elements of blood mixed with it. When the quantity of urine is small, it is usually high coloured, and this tint characterizes an inflammatory state of the system. In diabetes, the urine is nearly colourless and odourless, and discharged in immense quantities. In disordered action of the digestive organs the urine has frequently a turbid appearance, and sometimes sedimentary.

The lining membrane of the septum of the nose, as it respects its colour, also affords an indication of importance, and being immediately continuous with the membrane of the respiratory organs, if inflammation be present there, the changes will be quickly perceived. A horse in health, and at rest, will exhibit a pale, pink coloured membrane; an increasing blush of red indicates a slight degree of inflammatory action, and an intense deep red, indicates inflammation of an acute character.

The state of respiration gives early notice of approaching disease. Quickness of breathing occurs almost simultaneous with quickness of circulation. The respiration in health, is shown by the quiet, uniform, and scarcely perceptible motion of the flanks, at the rate of eight or ten breathings in a minute. There are few diseases in horses in which the respiratory organs remain undisturbed, and it forms a primary and leading symptom.

The state of the pulse is the surest indication of any, as to the degree of inflammatory action on the system. The heart of a healthy agricultural horse, in a state of rest, beats about 36 strokes a minute; and when it rises to 45 or 50 times, proper precautions should be taken to check the coming disease.

All these signs have their value in making known the approach of disease; and when any of them make their appearance, the horse requires more than ordinary care and watchfulness. Inattention at such times is the chief and principal cause of so many fatal cases occurring on farm establishments.

Another cause for so many losses, is, that when the sick animal is attended to, it is generally done by the blacksmith or farmer himself, and, from long experience, I can most truly vouch for this fact, that more horses are lost by the employment of ignorant pretenders to the veterinary art, and by the farmer's indiscriminate resort to the drug shop, than from the natural operation of disease itself.

COTTAGE COMFORTS: THE MILCH GOAT, AND ITS FOOD.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The comfort derived by the inmates of a cottage from a regular supply of new milk, need hardly be dwelt upon. Every cottager's wife, over her tea, every poor parent of a family of children fed almost entirely on a vegetable diet, will agree with me, that it is above all things desirable to be able to have new milk as a variation to their daily food of bread and garden vegetables. Now it is very true that many a kind-hearted farmer helps them with skim milk; but it is only now and then that this source of comfort and health is available to the poor cottager, or even to those who are able and willing to pay liberally for good milk. The inhabitant of towns, and of suburban districts, we all know, is at the mercy of the milk dealer; the milk he procures is rarely of the best quality, and under the most favourable circumstances he receives it with suspicion, and his family consume it with sundry misgivings as to its wholesomeness.

Having personally experienced these difficulties, and having about three years since commenced the attempt to supply my family with goat's milk, and as our experience is cheering, I desire to advocate in this paper the claims of the milch goat to the attention of the cottager, and the other dwellers in the suburban and rural districts.

I propose, therefore, to repeat what I have in another valuable agricultural periodical (*Bell's Messenger*), some little time since, had occasion to remark, and then to add some observations on a plan of irrigated grass production which I have also practised on a garden plot, which may also be readily imitated in other gardens, and which will be found most useful in keeping the goat in green food during the spring, summer, and autumn months.

Few persons are perhaps aware of the gentleness and playfulness of the female goat—how very cleanly are its habits, how readily it accommodates itself to any situation in which it is placed. Confined in an outhouse, turned on to a common or into a yard, tethered on a grass plat, it seems equally content. I have found it readily accommodate itself to the tethering system, fastened by a leathern collar, rope, and iron swivel, secured by a staple to a heavy log of wood. The log is the best, and this with a smooth even surface at the bottom), because it can be readily moved about from one part of the grass plat to another. The goat, too, uses the log as a resting place in damp weather. The goat should be furnished with a dry sleeping-place, and this, in case of its inhabiting open yards, can be readily furnished; anything that will serve for a dry dog kennel will be comfortable enough for a goat.

The milk of the goat is only distinguishable from that of the cow by its superior richness, approaching, in fact, the thin cream of cow's milk in quality. The cream of goat's milk, it is true, separates from the milk with great tardiness, and never so completely as in the case of cow's milk. This, however, is of little consequence, since the superior richness of goat's milk renders the use of its cream almost needless. The comparative analysis of the milk of the cow and the goat will show my readers how much richer the last is than that of the former; 100 parts of each, according to M. Regnault, gave on an average—

	Cow.	Goat.
Water	84.7	82.6
Butter	4.0	4.5
Sugar of milk and soluble salts	5.0	4.5
Caseine (cheese), albumen, and insoluble salts	3.6	9.0

So that, while the milk of the cow yields 12.6 per cent. of solid matters, that of the goat produces 17.10 per cent., goat's milk yielding rather more butter, rather less sugar of milk, but considerably more caseine (cheese), &c., than that of the cow.

It must not be supposed that the *taste* of the milk of the goat differs in any degree from that of the cow; it is, if anything, sweeter, but it is quite devoid of any taste which might very reasonably be supposed to be derivable from the high flavoured shrubs and herbs upon which the animal delights to browse.

The amount of the milk yielded by the goat varies from two quarts to one quart per day; it is greatest soon after kidding time, and this gradually decreases to about a pint per day—a quantity which will continue for twelve months. This is not a large supply, it is true; but still it is one which is available for many very useful purposes; and be it remembered, that when mixed with more than its own bulk of lukewarm water, it is then, in every respect superior to the milk supplied by the London dairymen.

In regard to the best variety of goat to be kept, I would recommend the smooth-haired kind, which are quite devoid of beards or long hair. In this opinion I am confirmed by an experienced correspondent, Mr. W. H. Place, of Hound House, near Guildford, who remarked, in a recent obliging com-

munication:—"I found that the short-haired goats, with very little beards, were the best milkers; but from these I seldom had more than four pints a day at the best (I should say three pints were the average), and this quantity decreases as the time for kidding again approaches (the goat carries her young 21 to 22 weeks). They should not be fed too well near the time of kidding, or you will lose the kids. In winter I gave them hay, together with mangold wurtzel, globe and Swedish turnips, carrots, and sometimes a few oats, and these kept up their milk as well as anything, but of course it was most abundant when they could get fresh grass. The milk I always found excellent, but I never had a sufficient quantity to induce me to attempt making butter, except once, as an experiment; my cook then made a little, which was easily done in a little box-churn: the butter proved very good. I found the flesh of the kids very tender and delicate."

I can add little to Mr. Place's information as to their food; mine have generally fed out of the same rack as a Shetland pony, with whom they are on excellent terms. The pony throughout the summer is soiled with cut grass, and I notice that the goats pick out the sorrel, sow-thistle, and all those weeds which the pony rejects. There is hardly a weed or a plant, in fact, which is rejected by the goat. It has been calculated indeed, that—

The cow eats	276	and rejects	218	ordinary plants.
Goat	449	,,	126	,,
Sheep	387	,,	141	,,
Horse	262	,,	212	,,
Hog	72	,,	271	,,

In the garden (if they are, by any chance, allowed to browse) I notice that they select the rose trees, common laurels, arbutus, laurestinas, and the laburnum. Of culinary vegetables, they prefer cabbages and lettuces; they also bite pieces out of the tubers of the potato. They carefully pick up the leaves, whether green or autumnal, of timber trees; of these they prefer those of the oak and elm, and delight in acorns and oak-apples. We are accustomed to collect and store the acorns for them, against winter; spreading the acorns thinly on a dry floor, to avoid the mouldiness which follows the sweating of acorns laid in a heap. As I have before remarked, none of these astringent substances affect the taste of their milk; and I may here observe, that with ordinary gentleness there is no more difficulty, if so much, in milking a goat than a cow.

Mr. J. H. Fennell has given an amusing account of the various substances upon which the goat is content to pasture (*Quart. Journal of Agric.* 1847, p. 511)—"When left to graze for themselves," he observes, "goats generally select for food bitter and slightly astringent plants, as the leaves and buds of spurge, hemlock, birch, privet, and bird-cherry, and the tender tops of furze and heath. Theocritus alludes to the eagerness with which they seek the laburnum, and Virgil celebrates that tree, for increasing their quantity of milk. Fraurius, who observes that goats are delicate feeders, bting off only the tops of branches, says, 'they most of all love to feed on the bark of the beech tree, as also on the leaves of shrubs and hedges. He adds, that those in Arabia do exceedingly love cinnamon, and if you have any cinnamon about you, they will follow you anywhere. Phillips speaks highly of the leaves and young branches of the sinple-seeded broom (*Partium monospernum*) as food for goats. Loudon says, that in France, willow leaves, either green or dry, are considered the very best food for them; but their most favourite food appears to be the honeysuckle, hence the French call it *Chévre-feuille,* or goat's-leaf. Goats are fond of hellebore, and will fatten upon it, although it is poisonous to man. Linnæus states that they will eat of the yew tree with impunity, though horses and cows refuse to do so. The author of 'Campaigns and Cruises in Venezuela' says, goats will browse without injury on the leaves of the poisonous machineel tree. It is also stated that they will readily eat manufactured tobacco without suffering from its noxious effects. Dr. Macculloch, in a letter to Sir Walter Scott, mentions a he-goat on board ship, whose diet consisted, except on holidays, of pig-tail tobacco, carpenter's chips, and rippered salmon:—'The depredation on the fish,' he says, 'became so serious that we were obliged to hoist them into the shrouds out of his reach. Indeed, I never could discover anything which the goat would not eat, except oakum, which always puzzled him.' During winter, goats will feed on indifferent hay or straw, furze, heath, thistles, cabbage-leaves, potato-peelings, cold boiled potatoes, old ship biscuits, or, in fact, almost anything that is presented them.

"The variety and coarseness of the goat's food," continues Mr. Fennell, "the hardiness of its nature, and the ease with which it accommodates itself to either an out or in door life, enable the small landed cottager to keep it nearly as well as the farmer. The parishes about Montor, near Lyons, without pasturage or meadows, support nearly 12,000 goats, kept in stables throughout the year, and yielding a produce of more than a million of francs. However closely confined, goats are still very healthy animals, and are excellent live stock for ships; for when the weather is so stormy as to kill geese, ducks, fowls, and almost pigs, goats will continue well and lively; and when no dog can keep the deck for a minute, a goat will skip about with impunity. The goat seems able to bear any climate, and wherever it has been introduced it seems to have rapidly multiplied. Mackinnon, in his 'History of the

Falkland Islands,' 1840, observes, that goats are found in one or two islands near West Falkland, and have increased amazingly, for the original stock were only landed a few years ago by a whaler."

The he-goat engenders at a year old. The she-goat can produce when seven months old. She generally yeans two kids.

The manure of the goat is perhaps the most powerful of all our domestic animals. This was shown by M. Boussingault, a celebrated French farmer and chemist, in connection with the nitrogen which they contain. He published a table indicating the quantity of each kind of manure required to replace 100 parts of good farmyard manure, from which he concludes that to produce the same effect there must be used (*Quar. Jour. Agri.*, 1848, p. 377)

18½ parts of the excrements of the goat.
36 do. sheep.
54 do. horse, and urine mixed.
63½ do. do. of the pig.
73 do. of the solid excrements of the horse.
97½ do. of the mixed excrements of the cow.
125 do. of the solid do.

Such are the chief facts which I have deemed likely to be useful in inducing the extended keeping of the milch goat. It is an animal that, I feel well assured, may be kept with equal advantage by the cottager and the dwellers in larger houses. It is useless to compare it with the cow, or to suppose that the goat can supplant it in situations where the cow can be readily kept; but in the absence of pastures, and in places where there is too little food for cows, I feel well convinced that, with ordinary care and attention, and a moderate firmness in overcoming the prejudices of those unaccustomed to the goat (and without these are found in the owner, live stock never are profitable), the value and the comfort of a milch goat are much greater than is commonly known.

The waste produce of a garden is exceedingly useful in the keep of a goat. By them almost every refuse weed, all the cuttings and clearings which are wheeled into the rubbish yard, are carefully picked over and consumed. To them, the trimming of laurels and other evergreens, pea-haulm, and cabbage stalks, &c., are all grateful variations in their food. In winter, a little sainfoin hay, or a few oats, keeps them in excellent condition. In summer, the mowings of a small grass plot, watered with either common or sewage water, as described in the following little account, will with the aid of the refuse garden produce keep a goat from the end of April until October.

As I observed on another occasion (*The Cottage Gardener*, edited by G. W. Johnson, vol. v., p. 39), the advantage of applying house sewage to grass has long been known to be very considerable. For the purpose of testing the various little points of detail which might arise when carried on on a small scale by small landowners, I laid down the turf on a plot of grass in my garden, near Croydon, in February and March, 1850. This was only 16 yards long and 13 yards broad. The bed, therefore, contains only about 208 square yards, and is surrounded by a raised border of turf about two inches high, to prevent the escape of the irrigating sewage; and for a similar purpose the bed is divided by two turfed ridges of about the same size into three compartments. These ridges would have been repeated crosswise, so as to divide the bed into nine compartments (to suit the size of our beds to the bulk of our sewage), had we not wished to avoid impeding the action of the scythe, the whole produce being intended for the soiling of a pony. Soon after the bed was formed, earthenware pipes of about two inches bore were laid down, extending from a tank constructed on some higher ground than the grass plot, the contents of which, whenever the tank is sufficiently filled, is allowed (by the lifting of a plug) to flow on to the grass—the orifice of the pipe from whence the sewage issues being about eight or nine inches above the level of the turf. From this pipe the sewage is distributed, by means of an open wooden trough, to any part of the plot that is just cleared. Our practice has been to cut sufficient grass for two day's consumption, and then immediately the grass is removed to direct on to the cleared space all the sewage which has accumulated since the last cutting, occasionally adding to its bulk by allowing some pump water to flow for a minute or two from the sink through the house-pipe drain into the tank. By this plan the collateral advantage has arisen, that the sewer-pipe, tank, and delivery-pipe, as well as the house sewage itself, by being so constantly cleansed or removed, has not time to undergo putrefaction. The plan, therefore, is carried out (generally the first thing in the morning) without any of the inmates or visitors to the house being aware that such a manuring is systematically going on. The result, in fact, shows that the noxious effluvia from sewers arises, not as a necessary result of the matter conveyed in them, but from their ill construction, and the barbarous practice of allowing the long accumulating contents of overflowing cesspools and choked drains to flow into them.

The general result of this little experiment has been such as to induce me to confidently and warmly recommend the repetition of the plan to such of my readers who are so situated that the contents of their house-tanks can be directed by its own gravity on to a conveniently placed grass-plot. The herbage produced by this mode is not only exceedingly luxuriant, but the pony and some goats we notice decidedly prefer it to either lucern or

meadow-grass, produced without irrigation; and the same remark is made by one of my neighbours, who has a field irrigated with the water of the river Wandle, which contains occasionally a notable portion of the drainage of the town of Croydon.

It is, perhaps, of little use (as our turf was only laid in March) to report one season's produce of grass; still as we have kept an account of it, it may be cheering to the reader to have the account. The grass was not ready to cut the first time until May 25th, since the turf had to establish itself, and to contend with dry weather. The weight and the days of cutting were as follows:—

		lbs.
May	25	28
,,	27	40
,,	30	42
June	1	50
,,	3	60
,,	8	65
,,	10	50
,,	12	50
,,	15	50
	Total	435

The ground was then irrigated, as I before described, only once. It began to grow again *immediately*, and kept on in spite of a very dry season, which *parched up all the surrounding* grass lands. By July 27th it was ready to cut again—the produce being evidently better than before. The days of cutting, and the weight of this second crop, were then—

		lbs.
July	27	75
,,	30	65
Aug.	1	55
,,	3	40
,,	5	60
,,	7	50
,,	8	40
,,	10	75
	Total	460

The same plan was a third time carried on of cutting and irrigating; the same dry weather still attended us, and the same growth of grass took place. On the 1st of October the cutting of our third crop of grass was commenced. The produce was as follows:—

		lbs.
Oct.	1	70
,,	5	50
,,	7	50
,,	9	50
,,	11	50
,,	14	45
,,	16	45
,,	18	45
	Total	400

The same immediate irrigation was applied to the land, and the same rapid shooting of the grass for the fourth time took place. The reader will remark that we thus secured three crops, and lost the time (in February and March) sufficient for the growth of a fourth; but, omitting that from our calculations, we have mown 1,295 lbs. of grass off 208 square yards of land since the turf was first laid in March, or at the rate of 13¾ tons per acre.

The produce of the grass from this plot, in 1851, showed clearly that the land had increased in fertility by this system of irrigation. The first cutting was as follows:—

		lbs.
May	23	70
,,	26	80
,,	29	70
,,	31	80
June	3	80
,,	5	30
,,	7	60
,,	9	60
,,	11	100
,,	14	60
,,	16	60
	Total	750

or 325 lbs. more than the first cutting in 1850.

The second crop yielded the following weight of grass:—

		lbs.
July	24	100
,,	28	100
,,	31	90
Aug.	2 & 4	80
,,	5	80
,,	19	70
	Total	520

or 60 lbs. more than the second cutting in 1850. The third crop was equal to 405 lbs. of grass; so that, in 1851, the produce of the plot was at the rate of about 17 tons of grass per acre, or 1,675 lbs. from the plot.

With only a little care, therefore, it is evident that the supply of new milk to a family is within the reach of more householders than is always regarded as possible, and that, to those who will set about it with only ordinary patience and industry, many a little dairy may be comfortably established by those who have no other conveniences for such a purpose than an enclosed yard, or an out-building for a milch goat, and perhaps a plot of grass in a garden to help to find it food.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A MONTHLY COUNCIL was held at the Society's House, in Hanover Square, on Wednesday, the 3rd of March: present, The Earl of Ducie, President, in the Chair; Lord Southampton, Lord Portman, Sir Charles Lemon, Bart., M.P., Sir John V. B. Johnstone, Bart., M.P., Sir Robert Price, Bart., M.P., Mr. Alcock, M.P., Mr. Raymond Barker, Mr. Barnett, Mr. S. Bennett, Mr. Brandreth, Captain Stanley Carr, Mr. W. G. Cavendish, M.P., Colonel Challoner, Mr. Druce, Mr. Garrett, Mr. Brandreth Gibbs, Mr. Grantham, Mr. Fisher Hobbs, Mr. Hudson (Castleacre), Mr. Jonas, Mr. Kinder, Mr. Lawes, Mr. Milward, Mr. Pendarves, M.P., Mr. Sanford, Mr. Thomson, Mr. Turner (Barton), Professor Sewell, Mr. Shaw (London), Mr. Villiers Shelley, Professor Simonds, Professor Way, and Mr. Jonas Webb.

FINANCES.—Mr. RAYMOND BARKER, chairman of the Finance Committee, presented to the Council the report of that committee on the accounts of the Society to the last day of the month just ended; from which it appeared that the current cash-balance in the hands of the bankers was £3,224.

POULTRY PRIZES.—Mr. VILLIERS SHELLEY, chairman of the Poultry Prize Committee, laid the following report before the Council.

"The POULTRY PRIZE COMMITTEE beg to report the following recommendations to the Council.

1. That the following prizes be offered by the Society for Poultry to be exhibited at the Lewes meeting in July next:

1. FOWLS.

(1). To the owner of the best cock and two hens of the Dorking (white, speckled, or grey), Surrey, or old Sussex or Kent. 5*l*.
To the owner of the second-best do. do. 3*l*.
To the owner of the third best do do. 2*l*.

(2). To the owner of the best cock and two hens of the Malay, Cochin-China, or other Asiatic breed. 3*l*.
To the owner of the second best do. do. 2*l*.

(3). To the owner of the best cock and two hens of the Spanish, Hamburgh, or Polish breed. 3*l*.
To the owner of the second best do. do. 2*l*.

(4). To the owner of the best cock and two hens of any other pure breed. 3*l*.
To the owner of the second-best do. do. 2*l*.

(5). To the owner of the best cock and two hens of any mixed breed. 3*l*.
To the owner of the second best do. do. 2*l*.

2. TURKEYS.

(1). To the owner of the best cock and two hen turkeys. 4*l*.
To the owner of the second best do. do. 2*l*.

3. GEESE.

(1). To the owner of the best gander and two geese. 3*l*.
To the owner of the second-best do. do. 2*l*.

4. DUCKS.

(1). To the owner of the best drake and two ducks of the Aylesbury or any other white variety. 2*l*.
To the owner of the second-best do. do. 1*l*.

(2). To the owner of the best drake and two ducks of any other good variety. 2*l*.
To the owner of the second-best do. do. 1*l*.

5. GUINEA FOWLS.

(1). To the owner of the best cock and two hen Guinea fowls. 2*l*.
To the owner of the second best do. do. 1*l*.

"II. That the following special suggestions be adopted—

1. That the certificate form be similar to the general form hitherto used by the Society, making the requisite adaptations in its terms.
2. That the Poultry be subject to all general regulations of the Society's Shows, and be sent to and removed from the Show-yard at the same time as the other live stock.
3. That the Director and Stewards of the Yard be requested to appoint a person specially to the Poultry Department.
4. That the coops for the exhibition of the Poultry be provided by the Society.
5. That the Honorary Director be desired, in his plan of the Yard, to include arrangements for the requisite accommodation of the Poultry."

This Report was adopted by the Council.

ENTRIES OF STOCK.—Mr. Barnett, Chairman of the Limitation of Entries' Committee, laid before the Council the following Report:—

"THE LIMITATION OF ENTRIES COMMITTEE having ascertained the number of animals entered last year by particular exhibitors for the Windsor Meeting, consider the circumstances under which that meeting was held, and the large amount of entries of Live Stock made on that occasion, as having been exceptional from the ordinary case of other years; and they beg, accordingly, to recommend to the Council that no change should at present be made in the established principles and practice of the Society, in reference to the entries at its Country Shows, in order that they may have given to them the further trial and experience of another year."

This Report was also adopted by the Council.

Vice-President.—On the motion of Lord Portman, seconded by Mr. Brandreth, Mr. Miles, M.P., of Leigh Court, was unanimously elected one of the Vice-Presidents of the Society, in the vacancy on that list occasioned by the decease of Sir Thos. Sherlock Gooch, Bart.

General Member of Council.—On the motion of Mr. Raymond Barker, seconded by Mr. Jonas, The Earl of March, M.P. for West Sussex, was unanimously elected a General Member of Council, to fill the vacancy on that list created by the transfer of Mr. Miles's name to the list of the Vice-Presidents.

Judges.—At the previous monthly Council, the following resolutions were adopted, on the motion of Lord Portman, seconded by Mr. S. Bennett—

1. That a Committee be appointed to select the Committee of Council who are to form the Judges' Selection Committee.

2. That such Committee consist of all past Presidents and the Stewards of the Yard.

At this Council, the consideration of the general question was resumed, when, on the motion of Lord Portman, seconded by Mr. Thompson, the following additional resolutions were carried—

3. That a circular be sent in the first week of April to each member of Council, requesting him to send to the Secretary, before the monthly meeting in May, the names of persons qualified and willing to act as Judges of Stock, to serve as an addition to the names sent in by other members of the Society.
4. That the list of names of persons recommended as Judges, be placed in the Council Room, and a copy be sent to each Member of Council two weeks before the Committee of Selection proceed to select the Judges; and that any member of the Society be at liberty to apply to the Secretary for a list of names, and to send in writing to the Secretary his objections to any name on the list: such objections to be laid before the Committee of Selection.
5. That the Stewards of the Yard shall report to the Council annually their observations on the Exhibition of Stock.

Days of Show.—Mr. Milward having brought under the consideration of the Council the question of the period during which the Society's Show of Live Stock at Lewes should be open to the public, and the days on which the animals should be brought to the yard and removed from it, it was carried, on the motion of Mr. Fisher Hobbs, that this question should be referred to the General Lewes Committee, with a request that they would report to the Council, at their next monthly meeting, the arrangements proposed for adoption under that head.

Veterinary College.—The Governors of the Royal Veterinary College transmitted to the Council a report of their measures and proceedings connected with the application of the grant of £200, voted to them by the Council in March last for one year. On the motion of Mr. Brandreth Gibbs, this report was referred to the Veterinary Committee of the Society, with a request that they report to the Council their recommendations on the subject at the next monthly meeting. Mr. Brandreth gave notice, that he should move, on the bringing up of the report, that the Council take into their consideration the question of the renewal or discontinuance of that grant for the future.

Essays and Reports.—Mr. Pusey, M.P., Chairman of the Journal Committee, transmitted to the Council a report on the number of essays and reports received by the 1st inst. (the latest day for their reception), in competition for the Prizes of the Society in that department. These documents were 28 in number, and included many interesting and elaborate papers. They were as usual referred to the Journal Committee for investigation into their comparative merits, and adjudication of their relative claims for the prizes offered in the several classes.

Specimens of Wheat.—The Rev. Professor Henslow and Miss Molesworth favoured the Council by the transmission of a further supply of specimens of Wheat for the Cereal Herbarium of the Society; for which the Council ordered their best thanks to be returned. At the request of the Council, Mr. Brandreth kindly undertook to superintend the arrangement of these specimens, on the same plan as the former specimens had been arranged under his care.

Agricultural Geology.—The Council accepted with their best thanks, the offer made to them by Mr. Trimmer, author of the Prize Essay on Agricultural Geology in the last number of the Journal, to deliver a Lecture before the members, at one of the weekly meetings, on the Practical Connection between the Results of Geological Action and their Influence on the nature of the Soil, and its Conditions for Farming Purposes. At the suggestion of Mr. Raymond Barker, the delivery of this lecture was arranged not to take place till after Easter, in order that a larger number of the members may be enabled to attend.

Hanoverian Agriculture. — Mr. Hudson, of Castleacre, placed at the disposal of the Society the current series of the periodical publication of the Hanoverian Agricultural Society, transmitted to him every fortnight by that institution, as one of its honorary members; a favour for which the Council expressed to Mr. Hudson their best thanks.

The Council then adjourned to their weekly meeting Wednesday, March 10.

A Weekly Council was held at the Society's House in Hanover Square, on Wednesday, the 10th of March: present, Colonel Challoner, Trustee, in the Chair; Sir Robert Price, Bt., M.P., Mr. Raymond Barker, Mr. Henry Raymond Barker, Dr. Calvert, Captain Stanley Carr, Mr. Fuller, M.P., Mr. Gadesden, Mr. Fisher Hobbs, Mr. Love, Mr. Majendie, Mr. Rowlandson, Professor Simonds, Mr. Reynolds Solly, Mr. Stansfield, M.P., Mr. R. Trench, Mr. C. Hampden Turner, and Professor Way.

Breeding of Animals.—Mr. Valentine Barford, of Foscote, near Towcester, in Northamptonshire, addressed a communication to the Council on the importance of attending to those principles which regulate the production of perfectly formed stock. After referring to the steps which the Council had taken for this desirable end, and detailing the discussions on the subject in the Northamptonshire Agricultural Book Club, he concluded his communication with the two decisions arrived at by that Club, and his own general observations.

1. That, although in all cases the system of in-and-in breeding is not desirable in our domestic animals, yet that, when animals properly formed have been obtained, it is the only method to retain that form.
2. That forcing breeding animals of either sex, either by artificial feeding or warmth, is highly detrimental to the health of the offspring.

From the foregoing remarks you may gather that the standard or criterion which I recommend is a certain form or conformation, and is that which Mr. Cline, in his valuable "Treatise on the Formation of Animals," recommends; for, whatever may be the opinion of the multitude, there is but one form right, be it light or heavy (and there never can be

two), that admits of health, stamina, and constitution. All the best animals I have seen that have taken prizes the last forty years, whether large or small, approximate to a certain form; and this form I will call the *sine qua non*, or standard; and knowing how to produce this form is the science. If you will make breeding and rearing domestic animals a science, you will soon breed 100 good ones, where you now breed only one. We see the science of agriculture progressing; and why should the science of breeding animals be neglected? I know that the prevailing fashion is for large animals (although fashion has led many astray), but I have yet to learn that they are either the best or the most profitable; and, in order properly to test this, I would very respectfully suggest to the Council the propriety, if they have the funds, of taking a farm of moderate quality, and allowing breeders to send in young stock, to be raised and fed by the Society's servants upon the principle laid down by the late Robert Bakewell—viz., by weighing their food. It would then be soon apparent which paid best for what it consumed; but whether, from local circumstances, you may prefer a large or a small animal, the same science is requisite to produce the good one. The form of the chest which Cline advocates, approaches as nearly as possible to a circle, and is not that porpoised or inverted form so fashionable in the present day, neither is it that apparent form which is too frequently (in sheep) clipped into a circle, but is that real external form which is an index of the internal structure.

Flax Cultivation.—Mr. Leyland Woods, of Chilgrove, near Chichester, called the attention of the Council to a subject of much inquiry by many persons in different parts of the country, namely, the mode in which farmers, who had grown Flax, could dispose of the straw of that crop. He, like many others, had heard of parties said to be willing to purchase that article, but it still remained on his hands unsold. Mr. Woods gave the following statement of the produce of his Flax crop in 1851:—

Once acre of land gave a produce of 21 bushels of good seed, and 31 cwt. of undressed Flax straw. The soil was of middling quality on the chalk hills. The land was prepared, and the seed sown in April, after one year's Turnips, which were fed off by sheep. The Clover, sown with the Flax, looked well at the present time, March 3.

—Colonel Challoner stated that he had converted his Flax-straw into manure, and capital manure he had found it make.—Mr. Rowlandson had, with others, understood from M. Claussen that there were parties who would give £3 per ton for Flax-straw, but he (Mr. Rowlandson) had not been yet able to find where they were.—Mr. Gadesden understood that M. Claussen and his friends would not now offer that price.—Mr. Rowlandson thought there was no probability that the ordinary Flax-straw would be bought up to any extent in this country. Fine Flax might indeed be exported, and a good price obtained for it. He advocated the growth of Flax, but thought it desirable that persons should not embark in its cultivation and management without making themselves thoroughly acquainted with their business in this branch of speculation. He recommended that the farmers within a given district should at first grow only a few acres each of this crop, and make combined efforts to promote its success. There was now he believed no doubt of the advantages of Flax after Turnips. His friend Mr. Gadesden had made a trial of this cultivation, and found no crop of Flax on light land better than the one which followed the Turnips.—Col. Challoner suggested that Mr. Rowlandson should again favour the members with farther practical points for their guidance, similar to those he had kindly given them on a former occasion, but founded on his increased experience of the nature of the flax crop.—Mr. Rowlandson cheerfully complied with the chairman's request. He considered the growth of flax to be easy: the ground should be in good tilth, but not too highly manured; it should be well weeded, and would take care of itself till pulled. At that stage it was that a little instruction would be required by the farmer. The process of retting, too, might be improved by easy instructions in the requisite application of scientific principles. A small sum of money would, indeed, be well expended on experiments to ascertain distinctly the definite proportions of alkali and acid to be alternately employed in the most efficient mode in the retting process. Great niceties were to be observed in this manipulation, as minute quantities were employed in large quantities of water, and slight differences in the amount of the ac or alkali would produce a great amount of difference in the result.—Col. Challoner inquired the best mode of separating the seed without injuring the straw.—Mr. Rowlandson had found either knocking out the seed by striking the dry plant against the convex side of a barrel, or striking it against boards with a flat piece of wood, answer perfectly well.—Mr. Gadesden considered that farmers were not in a position to prepare their Flax for the manufacturers.—Colonel Challoner remarked that M. Claussen had told them at a former meeting in that room, that the farmers had only to grow Flax, remove the seed from it, and then put up the straw into bundles, when the latter would be purchased of them at a price so remunerative as to cover the expense of cultivation, and leave them the seed into the bargain.—Mr. Trench had his Flax thrashed by means of a broad flail, having a flat end like the flail used in foreign countries, and the straw then put together again by women, and sold ten miles off at £3 per ton. His land was of good quality, and well prepared for the crop; yielding 2 qrs. of seed, and 2 tons of straw per acre. His Flax was of fine quality; and in competition with his neighbours within a range of 10 or 12 miles round, had obtained the prize as the finest and best.—Mr. Rowlandson hoped that Mr. Gadesden would furnish the Council with the results of his trials in the growth of Flax; the greatest pains had been taken by him to obtain correct results, by accurately weighing the Flax at the different steps of its management.—Mr. Gadesden stated that his crop had yielded 24 bushels of seed and 32 cwt. of straw; he had sold the seed in Mark-lane at 56s. per qr., and

if the straw yielded one-fifth of prepared Flax, which in the Leeds market would fetch £60 per ton, the crop of seed and straw together would give a return of more than £26 8s. per acre.—Mr. Stansfield, M.P., was trying an acre and half of Flax, on land in good tilth, after Turnips. Agricultural labour, in the neighbourhood of Leeds, where his estate was situate, was scarce and as high as 13s. or 14s. per week. The parties to whom M. Claussen had particularly referred, as the purchasers of Flax straw—namely, Messrs. Quitzow and Co., of Apperly-bridge, near Bradford—being close to Mr. Stansfield's residence, he had applied to them on this point, but found that they had given up the purchase of Flax straw, and would not buy any more. He expected to have 3 qrs. of seed to the acre, and hoped to be able to sell his straw at £3 per ton. The farmer, in his opinion, ought never to have anything to do with the manufacture of Flax; but simply to raise it as a rotation crop, and sell off the straw at once. He hoped the steeping process would be dispensed with, as it spoiled all the water in the ditches of the neighbourhood where the operation was carried on.—Capt. Stanley Carr having resided abroad for 25 years, and occupied 1,000 acres of land, was desirous, as an honorary member of the Society, to state to the Council the result of his experience in the growth of Flax on his estate in Holstein. He had never seen Flax grown with profit on a large scale, anywhere. On his own property it had been grown on a small scale at first by the labouring population, who had a right to grow a little Flax for the coarse linens they required for their own use. When the Flax had been grown, manure was always subsequently required. It required much labour to keep it clean, as it grew up too fast and got foul. Although the Flax and seed were easily disposed of, no farmer in the fine country of Holstein grew Flax on a large scale, on account of its exhausting character.—Colonel Challoner remarked that last year he had grown some Flax, but found that it did not draw the land, which appeared rather improved than deteriorated by the crop.—Capt. Carr observed that his own land was of a loamy nature, that Flax grown once in ten years would succeed, but once in five years was found oftener than the land would bear; but, as he had stated, the straw and seed were both sold off, and not returned to the soil.—Mr. Fuller, M.P., had found his own land in Sussex bear Flax without exhaustion.—Mr. Gadesden, in Surrey, had Rye, following Flax, as fine as could be seen anywhere. He always sowed the seed broadcast.—Mr. Rowlandson remarked that the exhaustion from the Flax crop in Germany, alluded to by Capt. Carr, might, he thought, be satisfactorily explained by the circumstance of the whole of the straw and seed being removed from the farm, and nothing returned to the soil, not even the matter extracted from the straw by the retting water, which had been furnished to the Flax crop by the land on which it had been grown.—Professor Way had, in his chemical examination of Flax, published in the Journal of the Society (vol. xi., pp. 517 to 528), endeavoured to show, by the composition of its ashes, the character and amount of the different substances taken up from the soil by each part of the Flax plant. These results, in connection with information supplied to him by Mr. Warnes, led him to believe that, when the seeds were returned in any shape to the soil, Flax might be regarded as not an exhausting crop, the fibre and other parts of the plant taking little or nothing from the soil.—Capt. Carr fully concurred in these views, and believed that the return of the seed would repay the soil.—Mr. Rowlandson thought the Flax crop better adapted for small farmers, but he saw no reason why it should not be equally worthy the consideration of great ones. He knew 200 acres in Lincolnshire on which £7 per acre was paid to grow Flax; but he believed that to manage 100 acres required a man of more than ordinary energy; even 25 acres under Flax in every farm of 300 or 400 acres would require much attention. He thought that Flax-culture ought to be a component part of British husbandry. It was, indeed, peculiarly the poor man's crop, whose wife and children could devote to its details that time which was not otherwise employed. He did not, however, rest any hopes on those utopian extensions of the employment of Flax and convertibility of its objects that had been recently brought forward in so many shapes.—Mr. Majendie alluded to the successful manner in which Mr. Warnes was growing Flax still more extensively than formerly, in conjunction with box-feeding.

Flax-Sowing.—Mr. Charles Ogle, of Rawcliffe, near Selby, Yorkshire, having been a grower of flax for the last twenty years, and in one year had 45 acres under that crop, ventured to suggest to the Council that means should be taken to induce implement-makers to construct a machine for sowing linseed broadcast, and depositing it at one inch below the surface of the ground. He thought the great advantage of such a mode of sowing would be that all the seed being deposited at the same depth, it would all come up out of the ground at the same time; a point considered of much importance—for when sown in the usual method the plants come up partially when the weather happens to continue for some time dry, and the remainder only following after a fall of rain; the late plants being of no value to the manufacturer, as its substance works away in the process of scutching, and is thrown aside with the refuse. Mr. Ogle expressed his readiness to give information on the requisites for such a machine, to any implement-maker who would apply to him on the subject. It was well known among flax-growers that a mere drill to deposit the seed in rows was not the machine required, as linseed was always sown broadcast; and that the implement desired was one that would not only effect the same equable distribution of the seed as in good broadcast sowing, but also deposit it an inch deep in the soil.

FARMERS' FLAX MILL.—Mr. Hill Dickson, of Artillery-street, Bishopsgate, favoured the Council with the following communication :—

"I am engaged in making a Mill for the Chevalier Claussen, that will break, scutch, and hackle flax as it comes from the farmer, without being watered. I consider the improvements I have made will be such as will make my machine a desideratum to the farming interest; for not only will the trouble and expense of watering and grassing be dispensed with, but as it can be worked by two horses, and being on four wheels, and on a frame 6 feet by 5 broad, it can be moved from farm to farm, and consequently the great objections to flax-culture entirely overcome. Another advantage in favour of the farmer is that with my machine he requires no practised hands—such as the Irish scutchers, at three or four shillings a day—but only six boys or girls, at from eightpence to tenpence a day, to attend, and one man to feed the machine. When I have finished the machine I shall be happy to be honoured with a visit from any of the gentlemen connected with your Society, and to explain the nature of my improvements, and work the machine before them. I am making experiments at Chev. Claussen's works, in order to ascertain the difference and advantage of his discovery over that of Schenck, and the old system, a matter which I think the Council of your Society will approve of, when my whole statement is placed before them. I shall show the expense and profit attending each of the three systems of preparing flax, and what is to be made by the spinning and weaving by each."

Mr. Love remarked that he had seen the machine, then stated by Mr. Dickson to be in the progress of completion—namely, six months ago, and two months ago. The flax-straw was first passed through rollers, and then strained or grazed as it passed out of them. By this machinery, however, it appeared to him at those times that the fibre received injury by the means that were thus employed to prepare it; but as the arrangements were not completed by Mr. Dickson, it would be unfair to pass judgment on his apparatus until completed. The injury might not, perhaps, be considered material in those cases in which the fibre was to be converted in the Claussen cotton, but would be so when required for long flax. The flax-straw was reduced by the machine to one-third of its bulk, and lost one-tenth of its weight by the operation.

TANK-WATER CONDUITS.—Col. Challoner, having to convey manure-water from a tank round a hill, to irrigate six or eight acres of land as water-meadows, was desirous of ascertaining the best means of accomplishing this object, as he had found wooden troughs soon become decayed.—Capt. Carr suggested earthern pipes below the surface.—Prof. Way believed the Rev. Mr. Huxtable had substituted earthern pipes for wooden ones.

FRENCH WHEAT STEEPING.—Mr. Majendie laid before the Council a bundle of wheat from France, as a sample of wheat grown from grain which had been steeped by a method adopted in France for seed-wheat sown over 30,000 acres. This sample exhibited good straw, but furnished with a bundle of ears that were found to be mere husks, almost entirely empty, containing only a few diminutive shrivelled grains. Mr. Majendie was not aware of the particular nature of the steeping employed.

PERUVIAN POTATOES.—Prof. Way, agreeably to promise, laid before the Council the result of his trial of the Peruvian Potato alluded to on that day fortnight. The potato placed in his hands had not undergone, as he was supposed to have said, any chemical examination. He had merely cut it into four quarters, which he planted in his garden. The result was fifty potatoes, of which he had then the pleasure of laying a supply before the Council, in the hope that those who continued the trial of the cultivation would in the same manner furnish supplies to the Council, in order that the stock of good might thus become gradually distributed and established. A statement was made of a similar potato from Peru having become the origin of an extended stock over one of the mountain limestone districts in the central part of England, which failed to grow, and only became rotten when transferred to the rich garden-mould of the neighbourhood of the metropolis: it was therefore thought desirable that in reports of this potato cultivation the members should particularly state the nature of the soil in which the trials are made.

Mr. Chadwick, C.B., transmitted from the General Board of Health, copies of "Minutes of Information collected in respect to the Drainage of the Land forming the Sites of Towns, to Road Drainage, and the facilitation of the Drainage of Suburban Lands." Mr. Barthropp offered suggestions for the entry of animals at the Country Meetings of the Society; and the Hon. Edward Everett offered, as one of the Honorary Members of the Society, to promote any of the objects of the Society in the United States of America.

The Council adjourned to Wednesday, March 18.

A WEEKLY COUNCIL was held at the Society's House in Hanover-square, on Wednesday, the 17th of March: present, Mr. RAYMOND BARKER, Vice-president, in the Chair, Lord Berners, Hon. W. H. Yelverton, Sir Charles Lemon, Bart., M.P., Mr. H. Raymond Barker, Mr. R. J. Brown, Dr. Calvert, Capt. Stanley Carr, Col. Challoner, Mr. Evelyn Denison, M.P., Mr. Dyer, Mr. Fuller, M.P., Mr. Gadesden, Mr. Fisher Hobbs, Mr. W. Cuthbert Johnson, Mr. Maddison, Mr. Majendie, Mr. Mainwaring Paine, Mr. Parkins, Mr. Pendarves, M.P., Mr. Rowlandson, Mr. Sanford, Mr. Slaney, M.P., Mr. Trench, Mr. Warsop, and Prof. Way.

FARMERS' FLAX-MILL.—Mr. Hill Dickson, of Artillery-street, Bishopsgate, informed the Council that the Flax-mill to which he had referred in his former communication, as being in progress towards completion, was quite distinct from the one which Mr. Love stated, at the previous Council when that com-

munication was read, that he had seen tried two months ago, and which he considered to be injurious to the flax-fibre. Mr. Dickson was not aware what particular mill it was that Mr. Love had then inspected. It would be sufficient to state that it was not the one to which Mr. Dickson had invited the attention of the Council, as this mill had only been commenced six weeks ago, and was not yet completed. When that was the case, he would inform the Council of the circumstance, and request the favour of its capabilities being tested by practical trial in the presence of some members of the Council. He had great hope that this machine, when completed, would prove successful in its object of breaking and scutching the flax grown by farmers—an object, he believed, which, however, desirable, had not otherwise, up to the present time been satisfactorily attained.

Preparation of Seed.—Mr. Martin, of 4, Hanover-square, informed the Council of the progress made in this country to test the efficacy of the late M. Van Oost's Belgian method of preparing seeds before sowing, not simply by steeping, but by enveloping them in an artificial husk of powerful manuring matter, adapted to sustain the plant after the means employed to give increased activity to the germination of the seed had taken effect. Mr. Martin stated that this method was totally different in principle from that of M. Bickes, or those of other continental inventors, by one of which the French wheat alluded to at the last Council by Mr. Majendie had been steeped; and concluded his communication by the following remarks:

"In no single instance, where the seed was prepared by M. Van Oost, or since his death by myself, agreeable to the receipt left by him, has the prepared seed failed to vegetate; the plant, in most instances, during its progress to perfection, has shown a greater luxuriance of growth than the unprepared, the straw brighter and stronger, containing a larger portion of silicate of potash; the produce in quantity and quality equal, and in some instances superior to that grown on the land termed highly-farmed. In preparing turnip-seed I have not been so fortunate; but whether that is the fault of the preparation or season, I do not know, as, in instances when I have prepared seed for parties whose farms adjoin, some have had very fine crops, and on others the seed never came up, or very sparingly. In all cases, each party found their own seed. I have prepared seed for the last five years for the Rev. Mr. Gwilt, Icklingham, Suffolk; as also for three or four years for Thos. Brown, Esq., Denver, near Downham, Norfolk. Both these gentlemen feel satisfied that this invention is an improvement upon the old system; and, acting upon their advice, I placed Mr. Van Oost's specification, in January last, in the hands of Mr. Donny, Professor of Chemistry at the University at Ghent; and I am daily expecting to receive from him oats, barley, and buckwheat seed, prepared, and a concentrated manure to be applied to the land at the same time; part of this seed is prepared to be sown on light land of the most inferior quality, and part on heavy clay land in Middlesex: the results of these experiments I shall be happy to communicate to you after harvest. The term steep as applied to Mr. Van Oost's method of treating seed is, in my opinion, incorrect. He always called it manuring the seed, and from the way in which the seed is prepared, this meaning is fully borne out."

Mecklenburg Potatoes.—Mr. Raymond Barker stated that, the Council having received in June last, from the Consul of Mecklenburg-Schwerin, a supply of Potatoes which had not at any time been known to be affected by the prevalent disease, with a request that they would test their cultivation in this country, and report the result, the Council had placed these Potatoes in the hands of Sir Robert Price, Col. Challoner, Mr. Brandreth Gibbs, Mr. Shelley, Mr. Fisher Hobbs, Mr. Carden (of Templemore), Mr. Wilson, Mr. Parkins, Mr. Hamond, Mr. Burton, and himself, each of whom had undertaken to make the required trial, and to report to the Council, and through them to the Mecklenburg Consul, the results of their respective cultivation. Mr. Raymond Barker had, accordingly, prepared his own return, which he submitted to the Council in the following form, along with a sample of the sound Potatoes forming part of the produce:

62 Mecklenburg Potatoes, being each cut into halves, were, on the 18th June, 1851, planted in two rows, in a kitchen garden of light calcareous soil, without any special manuring. The plants came up on the 3rd of July. The haulms went off at the end of August. The tubers were taken up on the 9th of September, and measured 3½ gallons, of which 1½ gallon were faulty with disease, while the remainder were at the time quite sound, but several of them had since gone off diseased.

Colonel Challoner remarked, that on his dry sandy soil in Surrey, the potatoes he had last year planted early in the spring were all had, while those planted later had all proved as good as ever were eaten.—Mr. Parkins adopted autumn planting, and he had found no blight among his potatoes.

Russian Agriculture.—The Council having in June last received, on the occasion of the personal visit of the Chev. de Masslow and M. Annenkoff to the Windsor Meeting, an interesting collection of Statistical Maps, Sectional Drawings, Reports, and Specimens of Silk, from the Imperial Agricultural Society of Moscow, were at this Council favoured with a second collection of presents from the Russian Government, through the mediation of M. Kamensky, Corresponding Secretary of the Minister of Finance, to whose care they had been assigned by the Imperial Agricultural Society of Moscow and the Minister of Agriculture at St. Petersburgh. These presents may be enumerated in the following order.

I. Soils.

1. Specimens of the *Tchornoi Zem*, or Black Earth of Russia, from the property of M. Von Wisin, of Tamboff—
   (1) From the surface, or upper bed.
   (2) From the middle bed.
   (3) From the lower bed

2. Specimens of Russian Gold-sand—
   (1) From Alexandrofsk.
   (2) From Great Nicolaif.
   (3) From Preobrajensk.

II. PLANTS (dried cereal specimens, Wheat, Rye, Barley and Oats).
1. *Triticum*, amyleum, durum, vulgare; from Moscow and Orenburg.
2. *Secale*, cereale; from Orenburg, Saratoff, and Wladimir.
3. *Hordeum*, vulgare; from Orenburg.
4. *Avena*, sativa; from Wladimir.

III. SEEDS.
1. *Wheat:* harvest of 1850; from the Oural Steppes.
   Wheat: harvest of 1850; from the Samara Steppes.
   Wheat: harvest of 1851; the "Kolous," from Bessarabia.
   Wheat: harvest of 1851; the "Bieloturka," from Novo-Russia.
   Wheat: harvest of 1851; the "Gourka," from Novo-Russia.
2. *Rye:* harvest of 1851; from Nijni, Novogorod.
   Winter Rye: harvest of 1851; from Model Farm, near Lipetzk, Tamboff.
   Spring Rye: harvest of 1851; from Esthonia.
3. *Barley:* harvest of 1851; from Nijni, Novogorod.
4. *Millet:* harvest of 1851; from the farm of Charkoff.
5. *Buckwheat:* harvest of 1851; from the farm, near Lipetzk, Tamboff.
   Buckwheat: harvest of 1851; from Tchernigoff.
6. *Turnip:* harvest of 1851; from Olonetz.
7. *Linseed:* harvest of 1851; from Pskoff.

IV. SILK.
1. Twelve samples of Silk, in hanks; produced in the districts of the Military Colony of Ukraine.
2. Twelve samples of Caucasian Silk, in hanks (of Arabian, Chinese, Italian, and Thibetian varieties); from the establishment of Mr. A. Rebroff.
3. One hundred Cocoons of Alexandroffskian, Arabian, French, Muscovian, and Thibetian Silk-worms.

V. AGRICULTURAL IMPLEMENTS.
1. Two one-horse Ploughs.
2. Two one-horse Cultivators, with one convertible Share.
3. One pair of handles, and three delving tools (spades or shovels).

VI. BOOKS.
Two copies of the Chev. de Masslow's Historical Review of the Proceedings of the Imperial Agricultural Society of Moscow.

Colonel Challoner remarked that the peculiar character of a great portion of the soil in Russia, and the small extent to which it was found necessary for their agricultural implements, with the draught of a single horse, to penetrate into the ground for the purposes of cultivation, might render the simple implements then presented to the Council sufficient for all the purposes required; otherwise he should have thought the great leverage given by the length of the shafts, and the distance of the horse from the body of the plough, would render its management difficult to the ploughman who held the short handles. At all events, in our own soil, and at our ordinary depths of ploughing, it would require a dozen Cossacks to hold such a plough; the ground and its resistance would also, with such an implement, have great advantage over the horses. In the Scotch ploughs, the horses were nearer to their work, and the ploughman had greater power over the handles.—Lord Berners referred to the difficulty experienced last year in getting ploughmen who were able to keep the neat little American ploughs steadily to their work in the ground.—Col. Challoner believed the American and Belgian implement-makers had altered their ploughs in this respect, and brought their leverage more nearly to that of the Scotch ones.—Captain Stanley Carr, now Vice-President of the Industrial Society of Victoria, had formerly, while engaged in German farming, paid a visit to Russia, and became acquainted with its agriculture. One of the Russian ploughs then presented to the Council was, he believed, an improvement on the ancient Roman plough introduced by degrees into the northern parts of Europe. It was calculated to plough a shallow furrow in light soils, turning it at an angle of 60 deg., and leaving it broken and short—a mode of cultivation considered by those who used this plough to be best adapted to the aëration of the soil, especially where the grass land is broken for a fallow of twelve months from autumn to autumn, and used in Germany and Poland as a run for merino sheep during the summer. The other plough was of the same character, but used for deeper cultivation. The two one-horse implements were used respectively as a scarifier, and as a hoe for cleaning potato rows. The shaft frame was employed with a horse rake placed below it. The implements of Russia were simple and even rude; but as the object appeared to be only to "scratch" the ground, as we should consider the operation, they were perhaps sufficient for the purpose required.—Mr. Fisher Hobbs remarked that the farmers on the continent appeared to entertain an aversion to having many implements; but he believed in the north of Germany they were now fully impressed with the necessity of their having good implements if they expected to have good work.—Lord Berners and Mr. Brown, of Cirencester, made inquiries of Capt. Carr respecting the nature of the grass on which the sheep were fed in Poland and south of Russia, and the circumstances under which it was produced.—Mr. Fisher Hobbs referred to the value of the hints the practical farmer may derive from communications received from foreign counties. In reference to Russia, he cited the useful varieties of the oat we owed to that empire as an instance immediately in point.

On the motion of Colonel Challoner, seconded by Mr. Fisher Hobbs, the best thanks of the Council were unanimously voted to the Russian Government, for the favour they had conferred upon the Society by presenting to it these most interesting presents.

It may be added that, in the third volume of the Society's Journal, pages 125 to 136, will be found Sir Roderick Murchison's valuable statement of the geolo-

gical occurrence and chemical nature of the Black Earth of the central regions of Russia.

The Council then adjourned to their Weekly Meeting, on Wednesday the 24th of March.

NEW MEMBERS.

George Parker Tuxford, Esq., of 246, Strand, London, was elected a Governor of the Society.

The following new Members were elected:—

Abbott, William, Salcott, Maldon, Essex
Arkcoll, Thomas, Guestling, Hastings, Sussex
Benson, George, Ludwycke-hall, Shrewsbury
Bettinson, Richard, Thurlby, Bourne, Lincolnshire
Burgess, William, 103, Newgate-street, London
Cobham, A. C., Shinfield Manor-house, Reading
Crawley, John, Stockwood Park, Luton, Bedfordshire
Evans, James Eaton, Haverfordwest, Pembrokeshire
Fry, James Thomas, Baston, Bromley, Kent
Greaves, Richard, Cliff-house, Warwick
Gibson, John, Pensher, Fence-houses, Durham
Haycock, William, South-street, Huddersfield, Yorkshire
Heseltine, E., Blackheath-park, Kent
Hubback, Thomas, Sunlaws-hill, Kelso, Roxburghshire
Jarvis, Thomas A., Higher Bolberry, Kingsbridge, Devon
Jollands, William, Buradalla, Lindfield, Sussex
Jones, Henry, Cynghordy, Llandovery, Carmarthenshire
Langton, W. H. P. Gore, Newton-park, Bath
Macdonald, Major James H., Dancer's-hill, Barnet, Herts
MacLandsborough, John Otley, Yorkshire
Morgan, James Thomas, Dany Crwg, near Brecon
Painter, John, Burley-on-the-Hill, Rutlandshire
Powell, John, 41, Threadneedle-street, London
Pratt, Frederick, Seddlescombe, Sussex
Richards, Edward P., Plasnewydd, Cardiff, Glamorganshire
Rous, Capt. G., Grenadier Guards' Club, Pall-mall, London
Ryland, Thomas, Great Lister-street Works, Birmingham
Sampson, Thomas, Winfield, Battle, Sussex
Sidney, S., Thurlow Cottage, Clapham, Surrey
Smith, Rev. Samuel, Weedon-Lois Vicarage, Towcester
Smith, James, Lower Bakeham Farm, Egham, Surrey
Smith, Joseph, The Oaks, Epsom, Surrey
Tiffen, Joseph, North Skirlaugh, Hull
Vallentine, Robert, Royal Agricultural College, Cirencester
Webb, R. J., 53, Brompton-row, Middlesex
Wilson, John, Erdington-by-Ayton, Berwickshire
Wood, Western, North Cray-place, Kent
Woods, Rev. George, Shapwycke, Chichester, Sussex
Woodward, Edmund, Chorley, Lancashire
Wrench, John Money, King William-street, London-bridge
Wrench, Robert, King William-street, London-bridge
Young, Francis Ayerst, Hawkhurst, Kent

LONDON FARMER'S CLUB.

"THE NECESSITY FOR, AND MEANS OF EXTENDING AGRICULTURAL EDUCATION."

The usual monthly meeting took place on Monday, March 1, at the Club Rooms, Blackfriars. Mr. Pain, of Felmersham, in the chair. Subject: "The necessity for, and means of extending agricultural education."

After a few prefatory remarks from the chairman,

Mr. S. SIDNEY rose to introduce the question. He said he must commence by apologising for not having followed the usual course of preparing a written address on that occasion, a course from which he had been precluded by a severe illness in his family. The same cause had prevented him from visiting, as he had intended, with a view to the discussion, four or five of the most important industrial schools in the country. Under these circumstances, he should be obliged to confine himself to the results of the experience which he had previously gained as to the state of education among the agricultural classes, and to the information to be collected from a series of extracts from the reports of the Commissioners on Education, which he proposed to submit to the club. The question assigned to him by the committee had reference to all classes of the community engaged in agriculture. It was, however, his intention to speak of education principally in relation to the labouring classes, knowing that there were several gentlemen present who were much better able than he was to do justice to the question as far as it regarded those to whom a scientific education was now almost indispensable. Questions like this might be objected to on the ground that they were not sufficiently practical for discussion by that club. Now, on that point he was quite prepared to take issue with the parties who differed from him. Indeed, if there was one point on which there was less reason to find fault with agriculturists than another, it was their course with regard to theoretical matters. They were not in the least inclined to theories; and one of the great advantages of an association like that was that it afforded an opportunity for the interchange of ideas to those who were almost cut off by local separation and intervening distances from participating in the current information and discussions of the day. They all knew what they themselves did; but they knew little of what was going on out of their own districts. To him it appeared, he confessed, that the education of persons engaged in agricultural operations was at least as important as the proper training of the animals from which arose a considerable portion of their profits. If it were important to know the breeds of animals, and the best methods of feeding them; surely it must be important to know how labour might be best and most profitably employed—how an intelligent direction might be given to it. Very little argument could be required to prove that it would be much easier to give orders to, and to secure obedience from, a labourer who had a certain amount of intelligence, than one who was ignorant and stolid; and no one could deny that, as regarded the great bulk of agricultural labourers, at present there was the greatest difficulty in explaining to them anything at all beyond their

common routine. The whole course of agriculture as at present carried on, in its largest, its most scientific, and its most profitable developments, involved the employment of new implements, and nothing impeded the farmer more than, in the first place, having to do with unintelligent, and, in the second place, with untrustworthy labourers. There could not be an intelligent, or, if he might use the expression, a truthful performance of work whilst the agricultural labourer remained in his present mental condition. The agricultural labourer of the present day was, he had no hesitation in saying, very inferior to his forefathers of the middle ages; and for this reason—the labourer of the middle ages lived at a period when the processes of manufacture were less advanced, when roads were not spread over the country, and when, from various causes, the labourer was far more dependent on his own exertions than he was at present. With the assistance of his wife and children he had to provide clothes, furniture, and tools for the family; and, having to exercise his abilities in manufacturing these indispensable articles, he became naturally more intelligent than he otherwise might have been. It was a great mistake to suppose that intelligence consisted merely in being able to read and write (Hear, hear). Anything which called a man's faculties into play tended so far to make him an intelligent being; to learn this fact they had only to observe what many labourers were when living in this country, and what they became after being transplanted to a colony, where they had free scope for their abilities (Hear, hear). If he travelled eastward or westward fifty miles from London he found the agricultural labourer a stolid, stupid being, with scarcely the knowledge of a Deity—unable to form the least idea what the country was a few miles from the spot where he lived; having no idea even of the government under which he was placed, and none of that sort of knowledge which was likely to be useful to him; so timid that he scarcely dared venture out of the bounds of his own parish; and so ignorant that when parties came forward, actuated by the most philanthropic motives, to assist him, in nine cases out of ten he looked upon them as his enemies. He did not know how these observations would be received, but he might state that, in consequence of the great interest which he took in emigration, it happened that in the course of the year he was in the habit of seeing hundreds of emigrants from different parts of the country, and he found none so low in the scale of intelligence as those from agricultural counties which he would refrain from naming; and to what could be attribute their condition but the miserable education, or non-education, which they received? In the present advanced state of manufactures these parties had nothing to do but perform the task set them, and to receive and spend their wages; whereas, if any of them were removed to Canada, or to Australia—and it was of the latter colony that he would speak most confidently, as it was that with which he was most closely connected—they became in three or four years intelligent beings, and very often they succeeded in rendering themselves independent. He thought, then, that those who employed labourers in this country, and who were interested, whether by ownership or by occupation, in the soil, should take more interest than they had hitherto done in the mental cultivation of the labourer. He would remind them that that which most pressed upon them, next to the cost of labour itself, was the expense to which they were put for the suppression of crime and the support of pauperism. He distinctly traced a vast proportion of the pauperism of this country to the want of education. A short time since, in going over a number of workhouses in rural districts, he found in them many persons who, though not idiots exactly, were akin to idiots. They belonged, in fact, to that class of persons whom the farmer discharged first when he wanted to reduce his hands. In the midst of a large agricultural district within 120 miles of London, the master of a workhouse was under the necessity of hiring parties to do work; because those in the house, although able-bodied, were not intelligent enough to do what was wanted without having some one constantly engaged in over-looking them. Now, from the observations which he had made, it would be seen that his view of education was not confined to books. Education might be given in a variety of modes; and everything was education which tended to develope the faculties which man had received from an all-wise Creator. He could not conceal from himself that among a great number of persons connected with the soil in this country, there was a very strong prejudice against education. There were even parties who, if their will were consulted, would not allow any education at all to be given to the labourer, or if any were given, they would wish it to be of the very worst quality. He did not say this with any ill-feeling towards the landowners or the agricultural classes generally—all those who were acquainted with him knew that he had a very strong sympathy with agriculturists, believing as he did, that upon the maintenance of a territorial aristocracy, and upon the prosperity of agriculturists, the stability of this country greatly depended. He should, however, consider himself a very bad friend to agriculturists if he did not, when the occasion arose, tell them of their faults, and it was on no small authority that he said there was a strong prejudice on the part of many of them against the extension of education amongst agricultural labourers. The best proof of the value of education was to be found in the results. The means employed to reclaim the juvenile criminal at the Philanthropic Farm School at Red Hill, were the union of labour with instruction, which had been found to produce the most beneficial results. In the army, the result of the establishment of schools, by the order of the commander-in-chief, was an astounding diminution in the amount of crime. Some years ago it was considered indispensable to flog soldiers: at present flogging was exceedingly rare. As regarded the quality of the education given in the army, he believed it was superior to the education commonly given to the children of the middle classes, when he (Mr. Sidney) went to school. Similar results had flowed from naval education; and the explanation of the change was that the soldier and the

sailor were less likely to yield to their passions when the mind was cultivated than when it was almost a perfect blank: he did not mean to deny that men of the highest education might not indulge their passions—he was speaking of general consequences. In the course of a tour which he made throughout England in 1850, he had the opportunity of examining the state of the education of the agricultural labourers, and he was continually being shocked with the ignorance which they exhibited: he found persons who had not the slightest knowledge even of God or Saviour. It was not to be denied that within the last few years great efforts had been made to effect an improvement in this respect, but he was able to show that those efforts had proved inadequate—that they had not kept pace with the increase of population, and had not prevailed to the suppression of crime. In order to do this, he should submit a series of extracts from the reports of the government commissioners on education for the years 1849-1850, commencing with one from the report of the Rev. Henry Bellair's, for Gloucestershire, Worcestershire, Warwickshire, Herefordshire, Monmouthshire, and Oxfordshire. Speaking of the shortness of the period devoted to education as one great difficulty, Mr. Bellairs said—"The school education of children commences, under the most favourable circumstance, at two years old; the attendance of children from this age is tolerably regular, and they are taken away after eight, according to the demand for their labour, until the age of twelve, when ordinarily they are withdrawn altogether." Turning to York, Durham, and Northumberland, he found the Rev. F. Watkins reporting that 50 per cent. of the children there did not go to school at all; that 60 per cent. of the education given was of a most inferior description; that 79 per cent. of the children under instruction were of and under ten years of age; and that the number under seven was as great as that of those of eight, nine, and ten together. The proportions of the older children were—eleven years, 6 per cent.; twelve years, 5 per cent.; thirteen years, 3 per cent.; 14 years, 2 per cent.

The cause of the deficiency of the education given might be distinctly traced to the want of funds. Here was an extract from the report of the Rev. H. Moseley:—"The resources of schools in agricultural districts are entirely unequal to the expenditure necessary for an efficient school. The following is a list of subscriptions to a village school in the midland district, a fair sample of the support such schools receive:—

	£	s.	d.
The Lord of the Manor and principal landholder	3	3	0
The Rector	17	10	0
The Rector's wife	1	1	0
A friend of the Rector	5	0	0
Six farmers and landholders, 5s. each	1	10	0
Farmer, &c.	0	10	0
	£28	14	0"

The following was from the letter of a clergyman in a rural district:—"I have had to make great sacrifices to provide as a school at all; and after I had raised the building I found nobody in the parish, or out of it, to assist me in supporting school expense—neither owners nor occupiers of land contribute a farthing; a coal merchant and a land agent are the only subscribers of £1 a piece, every other expense falls on me." The inspector added—"I have often borne testimony in my reports to the fact that when a school is maintained in an agricultural parish, it is generally by an act of great pecuniary self-sacrifice on the part of the clergyman, made often in diminution of a very limited income." In Cambridge, Essex, Huntingdon, Norfolk, and Suffolk, there was found the same deficiency; and the inspector said—"The crying evil is the absence of sympathy on the part of owners of property generally in the education of the working classes." A clergyman wrote to the inspector:—"I have to call your attention to the very inefficient and deplorable state of the school in this place, undertaken under auspices so promising and so full of hope. The owner of the soil at —— derives a rental of some £4,000 per annum, and gives the school the sum of £7; the principal owner of the adjacent parishes derives from them a rental of upwards of £3,000 per annum, and contributes £1 to the school. In —— there are three occupiers; one alone supports the school, and another disapproves altogether. In the adjacent parishes there are but three occupiers, two of these support the school, the third is strongly opposed. Thus the funds contributed to the school are inadequate to provide a competent master, books, &c." A large landed proprietor wrote to the same inspector:—"The school was built, and the grant made for three parishes, and it was expected that the proprietors of property in these parishes would contribute in support. The Earl of —— is Lord of the Manor where seven-tenths of the children are, but from him no assistance can be obtained; the Earl's tenant refuses to contribute. I am the proprietor of the next parish, which is small. In the third parish, the Lord of the Manor and his tenant made a small donation to the building, but refuse annual support (they support a dame school in their own parish). By the union of the proprietors of these three parishes (hitherto in a very benighted state) we could have supported easily the one school at ——." As regarded Norfolk, it was said—"Unless some additional means be devised to support working-class schools in this part of the district, they must all fall to the ground. The expense is almost entirely thrown on the clergy—as the funds are very deficient, the teachers are of the worst description, the books very inferior—I think such schools rather an evil than a blessing." Another case was thus stated:—"Four colleges at Cambridge hold most of the land in this parish: none of them subscribe to the national schools." In another case he read—"The Dean and Chapter possess 800 acres in this parish; they have never contributed to the annual expenses of the school, which fall heavily on the income, £260 per annum, of the clergyman." These were sufficient instances, he thought, to prove that in many cases but little assistance in the work of education was derived from persons connected with the land.

We now come to results. It was quite evident that in education, as in other things, they could not have a good article without paying for it (Hear, hear). The result of the present state of instruction was that in many cases schools which existed did more harm than good—the children obtained only a smattering of knowledge—they were disgusted in after life with what little they had learnt, and in consequence they became careless with regard to the education of their offspring. In the report of the Rev. M. Mitchell, on schools inspected by him in the counties of Cambridge, Essex, Huntingdon, Norfolk, and Suffolk, mention was made of "a class of schools from which no conceivable advantage can be obtained; in which the master is ignorant and slovenly—the schoolroom dirty and unfurnished—the children ill-disciplined, unwashed, uncombed, slouching in person, uncleanly in habits, ungainly in figure, debased in character, degraded in circumstances." There were many gentlemen present who were much better acquainted than he (Mr. Sidney) was with the details of agriculture; but as regarded the question of education, he must remark, that he spoke confidently, that he never visited any part of the country but that his first inquiry was for the national school; because he really believed that upon the quality of the education given in them, more than upon anything else, did this country depend for her escape from the evils which had visited continental nations. On that subject he found the following passage in the report:—"The number of schools with inefficient and even totally incompetent instructors in this district is very great; it is partly accounted for by the very low salaries which are offered teachers, which would hardly secure the services of a decently skilled day-labourer. Hence persons broken in character, health, or morals, of that class who, having failed at other pursuits, take to school-keeping as a last resource. Even where good teachers are engaged, the want of material (books, maps, &c.) prevents them from imparting an effective education." Here was an instance of the effects produced by having a cheap schoolmaster and mistress;—"There were under instruction 82 children, 4 above thirteen years of age, 4 above twelve, 9 above eleven, being more than the usual proportion of big children. Out of the first class, composed of 11 children, 4 only could write the belief on their slates correctly; 2 only had a slight knowledge of geography; 7 did not know the name of the country in which they live, and were unable to tell who governs our country; 6 children only out of 82 could read with tolerable ease and correctness in books of general information; 7 could only read in the scriptures—not one in the first class could write in figures the numbers ten thousand and ten, or multiply £3 6s. 8d. by 6. The children of the second class were ignorant of the simplest facts in Scripture history—none could read correctly a simple sentence. This was a school of some reputation—an average specimen of agricultural schools, next below the class which take pupil teachers." He was sure he would not ask them of what use such education could possibly be? In reference to the indifference of parents, he found the following passage:—"The deficiency of attendance is to be attributed to the imperfection in teaching in schools, in former as well as present time. Parents educated in national schools have not derived any advantage from the instruction they received—they find no practical use of the knowledge acquired—they get on no better in life—they were never taught sufficiently to make knowledge agreeable as a relaxation. The remedy must be an amended style of teaching, and industrial schools." Having laid before them these extracts, to show both the want and the deficiency of education, he would now proceed to speak of what he humbly considered to be the proper remedy. He would first give a few facts to show what had been done. The Rev. Mr. Cautley, of Thornely Abbey, wrote to the Rev. M. Mitchell, inspector of schools:—"The boys and girls school costs £231 per annum; the amount of property rated is £25,040 18s. 6d.—a rate at 1s. 6d. amounts to £1,878; thus a rate of a fraction more than 2d. in the pound covers the school expenses. I am confident this is the proper mode of raising funds for educational purposes." Now, if it were worth while to secure a good education for the labouring classes at all, he must say that he thought a rate of 2d. in the pound would not be too much to pay for it; and it was for those who paid rates and taxes to consider whether they would not save a good deal more than 2d. in the pound in poor's-rates, and rates for the support of gaols, by giving a decent Christian education to the labouring classes (Hear, hear). A good illustration of what might be done was found on the estate of the Earl of Ellesmere, at Worsley, where allotments had been attached to the school for the benefit of the children. At Bickerstaff, also, a school had been erected, and was supported by the Earl of Derby, with the most beneficial results. The most striking example, however, was afforded by the school at King's Somborne, established by Mr. Dawes, now Dean of Hereford. He would read a few extracts, to show what had been effected by the exertions of that energetic man. "On entering the school," said the inspector, "a stranger, attracted there by the reputation it has gained, would, I think, be struck by the absence of those things intended to catch the eye, which have sometimes awakened his suspicions in other schools of local celebrity. There is a reality in the scene which will impress him favourably in respect of it. It is a village school that he sees before him; the better learning of the children, obvious in the intelligence of their looks, has not taken away their rusticity; a school crowded with sturdy, healthy, shy-looking cottagers' children, clad somewhat better, perhaps, than the children of other schools, but in garments of the same rude fashion and coarse texture. In regard to cleanliness, a marked difference is, however, on closer observation, apparent. It is particularly to be seen in the hair of the girls: down to the least child in the school, the head of each is as cleanly, and the hair as glossy, as though a nursery-maid had bestowed daily care upon it. All this cleanliness is the result of the attention which the governess has been directed to give

to the subject, and to a public opinion favourable to it, which has, by judicious management, been created among the children themselves." Further on he found this passage:—"The popularity of this school is altogether unprecedented. Everywhere else the inspector is accustomed to be told of the indifference of the poor to the education of their children. Here he finds them manifesting an earnest desire to obtain for them the benefits of it. Agricultural labourers send their children from other parishes, from three to four miles daily, to the school, and one-seventh of the resident population of the parish daily assembles in it. Wherever he goes, the inspector's ear is familiar with the complaint that funds for the maintenance of the school are deficient—that the fees are wrung with difficulty from the hands of the parents, who are too poor to pay them—that the landlords and farmers are unwilling to contribute to the school, and that competent teachers cannot therefore be provided, or sufficient in number. Here, in a district where the rate of wages is at least as low as in others, and where, if the people be not as poor, it must be due to the operation of moral causes, he finds a self-supporting school, having more than the usual staff of teachers, adequately paid." All this had been done by the exertions of Mr. Dawes, who thought that the best mode of proceeding was not to form a school in the cheapest manner that it could be formed, but to form one which would tempt not labourers only, but persons above the condition of labourers, to send their children, justly hoping that the sums paid by such persons would do something towards improving the general scale of education. The effects had been all that could have been anticipated: not only did the children in the school receive a good, useful education, but the benefit was reflected back on the pecuniary interests of the parish. "The average annual amount of the parish rate for the seven years terminating with 1835 was £1,600, on a population of 1,025. The population has now increased to 1,125, and the rates are reduced to £1000." There, then, was a saving of £600, which might be distinctly traced to the improved moral tone in the parish arising from this school. On this point he found the following note:—"It had been the habit for a long series of years to employ a large number of able-bodied men, thirty or forty at a time, upon the parish roads for six or seven months in the year (nominally for the purpose of repairing the roads, but in reality to run them on until the season of the year comes when they are wanted), at wages varying with the number of children each had to support. The influence for evil which a system like this exercised on a number of families in the parish may be imagined—it was to pauperize them." He had now performed the task which he undertook. He had laid before them proofs that only a very small portion of the agricultural population of this country received any education at all; that of those who received any education, the greater portion had received it at a very early age; that the education given was for the most part of an inefficient and useless character, and that this last circumstance arose from the want of funds, which again was attributable to the indifference and hostility which were felt in reference to education amongst parties resident in agricultural districts. He had referred to the schools of Lord Ellesmere, at Worsley, and of Mr. Dawes, at King's Somborne, to show what had been done and might be done in other places by means of voluntary support. In the present state of public feeling, however, he thought it quite hopeless to expect that the voluntary principle would suffice for the wants of the country; and therefore he thought it best that there should be a rate of twopence in the pound, to be expended under the management of a local board, which sum would, he thought, be amply repaid in diminished pauperism and crime. He would suggest that instead of education being left in the hands of intellectual theorists, those who were connected with agriculture should take a practical interest in it, and that land should be attached to the different schools, in which every boy who was designed for a future labourer, should be taught to employ his hands and limbs for some hours every day. Were the agricultural population thus trained, there would be no difficulty in their removal, in case of necessity, from one parish to another, for employment; and in case of a general deficiency of labour, they would be fitted and disposed, under such circumstances, to remove to any colony of the empire, instead of remaining as a burden on the parish rates. He could quite understand why some parties objected to education; but the truth is, the matter had gone too far to be stopped; and even on the lowest ground, that of the interest of the owners and occupiers, it was now requisite that the quality of the education given should be improved. Looking at the progress which this question had already made, he firmly believed that more would be done, and that all parties would act on the conviction that labourers had hearts to feel, minds to think, and souls to save. He hoped it would not be thought that he had drawn this dark picture of agricultural ignorance, with the intention of making an invidious comparison between agriculturists and those who lived in towns. He described the evil because he believed it might be remedied, and he had the satisfaction of knowing that what he said would not be confined to that room, but diffused throughout the country amongst the readers of the proceedings of the club (cheers).

Mr. SHAW said: Being deeply impressed with the value of education, he should be extremely sorry if, in any remarks which fell from him, he might be considered to detract from any thing which Mr. Sidney had so eloquently and ably addressed to them in its advocacy. He very much feared, however, that that gentleman had regarded himself as in a somewhat similar position to counsel in a cause, who sought out and put prominently forward whatever was calculated to make a strong impression on his hearers (Hear, hear). If his object, in thus departing from the strict state of the case, were to hit harder those who had not done their duty, perhaps he was right in the course he had taken; but while he agreed with Mr. Sidney as to the defects of the present system of education, and the absolute necessity, in many districts, of adopting measures of improvement, he must confess that he thought his friend had been very unfortunate in the districts which he had happened to go into (Hear, and laughter). Of course, taking a body of 500 men, whatever might be their station, there must be many different degrees of intelligence, and doubtless in that number of agricultural labourers many "stolid, stupid beings" would be found. He had had some little experience to justify his speaking on this question.

Thirty years ago he occupied nearly 1000 acres of land, and, under such circumstances, of course he had some opportunities of intercommunicating with the labouring classes. He did not reside in a part of the country which stood exceedingly high as regarded the intelligence of its labourers. No county was more apt to be pointed out as wanting in intelligence than Somerset (Hear, hear); yet the picture which had been drawn of the agricultural labourer was so much beyond what he had ever met with, except in extreme individual cases, that he should be sorry if Mr. Sidney's view went forth without some modification (Hear, hear). There were perhaps districts in which the state of agricultural labourers might be as bad as had been represented; but, at the same time, it would have been well if Mr. Sidney had stated that even in the most benighted districts, there were many examples to be found of what he would call fine high-minded men, possessing great and acute intelligence (cheers). It was impossible to note the manner in which a great many operations of agricultural labour was performed, without feeling satisfied that there must have been an amount of information obtained, larger than they were apt to consider that those who moved in such a station possessed. He would ask whether it were a mere matter of instinct for a man to take a pair of horses, and draw through a field of twenty acres a number of lines as straight almost as any which could be drawn by a mathematician? (Hear, hear); or whether there was no intelligence displayed in sowing with the hand a given quantity of seed over a field with such precision that none could find the least fault with its uniformity? (Hear, hear). There must be some intelligence where such operations were performed; some intelligence where labourers were trusted to go to a market-town, and to transact business requiring the exercise of thought and judgment. He would ask practical men what was the amount of intelligence possessed by their herdsmen and shepherds? He would appeal to them whether, in many cases, such men were not almost as good judges of the points of an animal, and in what consisted its proper care and management, as they themselves were (Hear, hear)? He believed there were many such cases, and therefore he could not concur in the sweeping animadversion upon the state of agricultural labourers of which they had had a specimen that evening (Hear, hear). Now there were peculiar circumstances in the condition of the agricultural labourer which rendered his education a case of greater difficulty than was commonly imagined. It was said that the children left school at an early age because schooling was too expensive. There was another cause, however, which tended to withdraw children too early from school. There was perhaps a large family to be supported, and the parents were compelled to take away their children early, in order that they might add to the joint stock earnings out of which the family was to be supported (Hear, hear). That was a difficulty, he feared, which could not easily be overcome; it seemed as inherent in the position of the labourer as the absence of opportunities for communication appeared in the position of the occupier (Hear, hear). He could not agree with Mr. Sidney's remark as to the difference between the intelligence of agricultural labourers now, and that of the same class centuries ago. He had always been disposed to think that the division of labour, which was a peculiar characteristic of the present day, rather added to the intelligence of the age than diminished it (Hear, hear); and instead of the spinning and the weaving, and all that kind of work at home, being essential to proper cultivation of the mind, the fact of such work being performed by operatives devoted to that particular object had advanced the mental position of all parties (Hear, hear). That was his opinion, and he saw no reason why, with due assistance and care, the agricultural labourer might not, *pro tanto*, be placed on a footing of equality with the manufacturing operative (Hear, hear). He could not imagine how the system in which manufactures were formerly carried on in the cottages of the poor could at all have conduced to the development of the mind. He was glad that Mr. Sidney had paid a just compliment to the clergy for their exertions in the promotion of education. As regarded landlords and occupiers, he was free to confess that in some counties he had witnessed a degree of negligence which must be condemned; but he thought Mr. Sidney went too far when he said that there was a general disinclination on the part both of owners and occupiers to contribute towards the support of schools. He had not now frequent opportunities of visiting the different districts of England, but he never scarcely passed through a village without finding it distinguished by a national or village school; and when he happened to make inquiries on the subject he generally found that considerable interest was taken in its condition, not only by the clergy, but by the resident gentry, and most other parties in the neighbourhood (Hear, hear). He could have wished that Mr. Sidney had been more specific with regard to localities; he would not then have placed himself in the position of making wholesale and general charges, which might be applicable only in a few cases. The advantages of agricultural education were not, as that gentleman well observed, confined to labourers. A wider sphere must be taken, with a view to the benefit of employers; and he (Mr. Shaw) thought that if some improvement were made in the old established schools for landlords (laughter) it would tend not only to benefit landlords themselves, but also to benefit the tenant farmer, and even the agricultural labourer. (Hear, hear.) He had long felt that the ignorance, if he might be allowed to use the expression, of many of the landlords of this country, in respect to the management of landed property, the necessity which they were frequently under of leaving the care of their property to some individual selected perhaps solely on the score of friendship, a captain in the army or the navy, or some other person equally unacquainted with agricultural matters, and, he would add, the want of adequate knowledge among tenant-farmers themselves — presented the greatest obstacles to the development and improvement of the agriculture of this country. He was glad to observe that there was a growing feeling among

the rising landlords of the day that they ought to be better informed as to the management of their property, and he felt persuaded that the more landlords became acquainted with practical farming, with the risks to which their tenants were exposed, the more they informed themselves as to the extent to which crops were injured by game, the more they knew of the prejudicial operation of covenants handed down from by-gone ages, altogether unfitted for the system of farming of the present day, the better would become the position of the tenant farmer, the better would the interest of the landlord be promoted, the better would the tenant be able to treat the labourer, and the more beneficial would be the results for the country at large. (Cheers).

Mr. W. Bennett said he entirely agreed with Mr. Sidney as to the desirability of promoting and extending education among agricultural labourers. The time was past when there would be any great difference of opinion on that subject, if indeed any ever existed, among all the more intelligent farmers of this country (Hear, hear). What he complained of in Mr. Sidney was, that his statistics were obtained from districts which presented by no means a fair sample of the agricultural districts generally. No one who was acquainted with the agricultural world would admit that the case was anything like so bad as represented, or that the agricultural labourers of the present age were inferior to those of former times. He altogether dissented from the notion that the labourers of former days were, as regarded intelligence, or as regarded anything which raised men in the scale of being, superior to the labourers of the present time. There could hardly be found a village in which there was not a National school, a British and Foreign school of some kind. He was quite aware, however, that the thing dragged on heavily where everything was left to the voluntary principle. It was to be lamented that they could not give to every man who had property a desire to do what he ought with it (laughter). As to a rate for education, however, he must say he thought they had rates enough already; and every other means ought to be exhausted before they resorted to that expedient. Mr. Sidney's picture was, on the whole, highly coloured; and as to the term prejudice, which he had used, he must, as one pretty well acquainted with agriculturists, protest against the notion that country gentlemen, or the great body of occupiers, deserved such an imputation. There was a great and growing desire for the improvement of the labouring population; and, though there might be here and there a person who would not contribute towards the education of the poor, he was quite sure that such conduct was the exception, not the rule (Hear, hear). In the opinions which he had expressed on that point, Mr. Sidney too much resembled some writers of the metropolitan press, who made sweeping charges which had very little foundation in fact (Hear, hear, and laughter).

Mr. Acton said that in the west of England, from which he came, there was a great number of schools supported on the voluntary principle, in some of which efforts were made to instruct the children upon the ingredients of soils, the nature and habits of different plants, and so on. He should be delighted if the wages of labourers could by such means be ultimately raised from one shilling to two shillings per day.

Mr. Nesbit felt disappointed that Mr. Sidney had not given them a lecture on the question really upon the card, which was—The necessity for agricultural education. In the limited view which he had taken Mr. Sidney had confined himself to the lowest class engaged in agriculture; but he should have included in his remarks those to whom Mr. Shaw referred, namely, the landlords. Now with respect to the matter under debate, he agreed with Mr. Sidney as to the necessity of extending education; but, then, the question arose what education it should be. It was not to be supposed that the kind of education adapted to the case of the tenant farmer would be suitable to the labourer. The labourer should be taught to employ his hands, to use the best kind of instruments in the best manner; and, after providing for this, education ought not, he conceived, to extend beyond a certain amount of reading and writing, and perhaps a little geography and arithmetic; there would be no time for anything more; the rest should be left to the labourer himself. The education of the tenant-farmers ought, he thought, to be of a much higher kind than that of the labourer; in some respects it should be superior even to that of the landlord (Hear, hear). It should include botany, geology, and chemistry; and such an education would not only give the occupier knowledge which he constantly required in his farming operations, but would discipline his mind, and prepare him to reason and to act in the wisest and best manner under all his difficulties and in every situation in which he might be placed (Hear, hear.) If to what he had specified were added the measuring of surfaces and solids, the results would be still better. There was no science superior to chemistry as teaching the art of reasoning. From the landlord not being practically engaged in agriculture, it was not necessary that he should possess the same amount of knowledge on these subjects as the tenant; but it was extremely desirable that he should have such kinda and such an amount of knowledge as would prevent him from insisting on the insertion of those absurd clauses in leases which formed such great obstacles to the improvement of agriture (Hear, hear). What he wanted was, such knowledge as would enable him to steer clear of what was injurious to all parties interested in the proper cultivation of the soil. One word on the subject of rates. He resided in a parish where the rates were as high as in any parish in London, amounting to as much as three or four shillings in the pound; yet he should be happy to pay, in addition, a rate which would have the effect of preparing young agriculturists to employ their minds and limbs in the most useful manner, especially as he believed that that would tend ultimately to diminish the gross amount of the rates (Hear, hear). Whoever might bear the burden of education, no one who looked at the continent could deny that without religious, moral, and mental education there could be no safety for this country. Laws might be made, but how could they expect to see them obeyed if the young were not imbued with the principles of obedience? It was absolutely necessary, then, that every one who felt interested in the welfare of the country should strive to advance the cause of education in every possible way. (Hear, hear).

Mr. P. Love thought that whatever difficulties might stand in the way of education, there were very few cases, and very few periods, in which farmers might not allow young persons to leave their work early enough to receive instruction; so that the mental powers might be developed, while the muscular powers were at rest. He could hardly concur in the view that education should be marked out, and limited by strict bounds. If the mind had a wrong bias at first, it would generally go wrong whatever instruction might be given; but every child ought, in his opinion, to be educated, simply because it was to be a man. (Hear, hear) One great advantage of drawing young persons to school in the evening would be the keeping them from the ale-house. It was through education alone that they would rise to the greatest degree of civilization of which their nature and position would allow.

Mr. Pain (of Hants) could not refrain from making one or two observations with regard to a school referred to by Mr. Sidney, namely, King's Somborne School. He (Mr. Pain) had lived in the neighbourhood of that school for some years; and until he became a guardian of the poor, and received the reports of the Government Committee on Education, he was not aware that there was a school at King's Somborne superior to any of the other schools in the neighbourhood (laughter). He could assure Mr. Sidney that in the immediate neighbourhood the school was thought very little of. No doubt Mr. Dawes was a very philanthropic man, but the picture of his school was very highly drawn. He should not object to a rate for education, provided it were levied fairly on different kinds of property; but at the same time he must observe that four or five of the best labourers he had on his farm could neither read nor write (laughter).

Mr. Capern said, after such a protracted discussion he should not have risen to address the Club, did he not stand in a somewhat different position from most of the other speakers. He happened to be a clerk to the magistrates of Lincolnshire. In fulfilling the duties of that office he had been led to the conviction that by educating the people they could reduce not only the poor rates, but the county rates (Hear, hear). His experience led him, too, to declare that he, for one, did not consider Mr. Sidney's picture much too highly coloured (Hear, hear). He had formerly resided in an agricultural portion of the county of Nottingham, and had there witnessed a great deal of crime, which was traceable to ignorance. Efforts should be made to educate the mental as well as the moral faculties, as the labourer would not otherwise be sufficiently prepared to receive those moral impressions by which he would be made a good servant and a good subject.

Mr. W. Bennett wished to say that he had not objected to a system of education under any circumstances; what he meant was, that every other resource should be tried first.

Mr. Sidney then replied.

On the motion of Mr. Shaw, seconded by Mr. Nesbit, the following resolution was adopted:—"That a more extended and improved system of intellectual, industrial, and moral education is highly expedient, and would contribute not only to the advantage of the agricultural classes, but to that of the public at large"

Votes of thanks were given to the Chairman and Mr. Sidney respectively, and the proceedings terminated.

ON THE CULTIVATION OF OATS, BEANS, AND PEAS.

BY A PRACTICAL FARMER.

CULTURE OF OATS.

We would again repeat that in the space usually allotted to an ordinary periodical contribution, it is impossible to compress our matter sufficiently without injury to our subject. We therefore beg our readers to make every favourable allowance for apparent omissions or short descriptions. We assume to be writing to practical readers, who, we trust, will kindly take up the subject in the thinkings of their own minds, and upon the bearing we desire to give it.

The oat is one of the most useful kinds of grain known to the British Isles, and appears to be indigenous to them, as also to all cold latitudes. It is very extensively used both for human and cattle food, and the oat crop is one of the most universal as well as one of the most profitable under common culture. Speaking generally, the climate of the United Kingdom is well adapted to its cultivation, particularly the northern and more elevated parts of it, as also many rather cold and damp localities.

It is, however, a crop very much dependent upon *climate*. Hence the comparatively small breadth planted with oats in the southern part of England, and the very large quantity grown in Scotland and Ireland. In the latter country, in the year 1847, out of 3,313,579 acres producing corn, 2,200,870 acres were under culture for oats; and this arising more from the humidity and coldness of the climate than any peculiar adaptation of the soil, great as it is, for its beneficial growth. The same remark will apply to Scotland and the north and west of England. It is the influence of climate rather than soil upon which the prosperity of the oat crop mainly depends. We incline to think this the most important part of this subject, in connection with modern improvements in the practice of agriculture; and we would urge our readers to make full inquiry into it, as it may prevent many errors, and consequent losses. Good wheat years are seldom, if ever, good oat years. Cool and wet seasons are good for oats, and bad for wheat; and *vice versâ*. Wheat requires heat and dry weather to ripen its seed to perfection: oats prefer humid and cool weather, and they will ripen where the mean temperature for two months is 50 degrees, and reaches 66 degrees at mid-day for a short time in the summer; wheat requiring a mean temperature, for two months, of 68 degrees, with much hotter weather for a short time, to fully ripen its seed.

These are matters worthy of grave consideration by all oat-growers. We would caution our readers against sowing oats in localities likely to be injured by heat or drought, or on soils liable to burning, or on such thin sands, or chalky downs and gravels, or cold poor clays, as cannot well abide the summer's heat; and

we do so solely because we are assured that without a moist summer the crops on such soils and situations must be bad indeed, if not altogether lost.

The soils best adapted to the growth of the oat crop are the rich loams, the peaty or fern lands, and the alluvial deposits; but it will grow freely on almost every kind of soil capable of general culture. The varieties of the oat are also so many, and varied in their character, that every kind of soil may be supplied with a sort well suited to its nature. Hence, crops are grown on soils and in situations, or again in a climate, but ill adapted to its production. The richer soils require to be sown with the short and stiff-strawed varieties, and the poorer soils with the free-growing, long-strawed, prolific sorts, or such as experience has proved to possess full and luxuriant growth. For the rich loams we would select the *Potato*, the *Poland*, and the *Friesland Oats*; for the peat or fern, in addition to these varieties, we would add the *Dutch Brew*, the *Hopetoun*, and the *Sandy Oats* (a new Scotch variety); for the rich alluvial deposits, we would include with the above sorts the common white oats known as the *Short-small* and the *Long-small Oats*; for the poorer soils—*i. e.*, cold clays, light, thin loams, chalky downs, and gravels, loose sands, &c.—we would select the *Long-small*, the *White* and *Black Tartarian Oats*, and the *Old Black Oat*. These, with the exception of the *Sandy Oat*, we have grown, and can speak from experience as to their proper adaptation for profitable cultivation on the soils to which we have attached them. Many other varieties are named, and slight descriptions given of them, by various writers—as the *Angus Oat*, *Siberian Oat*, *Georgian Oat*, *Red Oat*, *Winter Oat*, *Dun Oat*, *Skinless Oat*, *Old Black Oat*, &c., &c. We will give a very short notice of each variety, both of straw and grain:

The *Potato Oat* is a rather early sort. Straw moderate length, bright, and strong. Grain plump, short, white, and generally of beautiful quality, and very mealy.

The *Poland Oat* is a very early sort. Straw yellow, and rather short and stiff. Grain large, plump, white, singly set, and very prolific in mealing.

The *Friesland Oat* is a rather early sort, but not so early as the Poland. Straw longer, bright, and stiff. Grain thin-skinned, plump, and white; yields well, and is mealy.

The *Dutch Brew Oat*.—A later sort. Straw rather long, bright, and good; is capital fodder, if well got. Grain short and double-set, plump, white, and yields well; is good horse-corn.

The *Hopetoun Oat* is a late sort. A long, reedy, stiff, sharp straw; not good fodder. Grain rather small; husk thick; but bright and prolific kind on good soil.

The *Short-small Oat* is a rather late kind, similar in all respects to the Dutch Brew Oat—most probably the same variety.

The *Long-small Oat* is a rather late kind, with a long and good straw for fodder. Grain long and thin, weight light, but very prolific, and is good horse-corn.

The *White Tartarian Oat* is a late kind. Straw long, stiff, hard, and brashy, with grain on shagg leaning to its side. Grain long, thin, spiky, very coarse, but very prolific even on poor soils.

The *Black Tartarian Oat* is similar to the white in all respects except colour, and a little coarser straw.

The *Old Black Oat* is rather late. Straw fair length, and thin or wiry; is fair fodder. Grain rather long and thin; weight light; yields fairly.

The *Sandy Oat* is described aa a rather early kind. Straw tall and stiff. Grain small; well set in husk; not liable to shed when ripe.

The Georgian Oat is described as rather late and prolific, with short straw. Grain large, growing chiefly towards one side, and thrashed with difficulty.

The Angus Oat.—Straw short, weak, and fine; rather late, with pretty plump grain.

The Red Oat is an early sort: straw thin, hard, and wiry. Grain brownish-husk; well attached to the husk, and not liable to shake.

The Winter Oat is sown in October: tillers well, and yields well. Grain long, and of a dark-brown colour.

The Dun Oat is a similar variety, but is always sown in the spring.

The Siberian Oat is a very early prolific variety, with very coarse straw. Grain very coarse, and thick husk.

The Skinless Oat is an early sort, and the grain is free from husk.

Many other varieties to the number of 50 to 60 are named, but we fear we have already said too much on this point, and shall proceed.

The General Management: The Rotation of the Oat Crop.—We think the largest yield and best quality of grain are produced from "new land," *i.e.*, land broken up from grass or lea. The next in point of yield and quality is land from which the crop of rape or turnips, mangolds, &c., have been fed or carried off. And the next in gradation is the bare or dead fallow; but, objecting, as we do, to bare fallows, and more particularly to the course being extended through the winter, we should decline entering upon its culture in this way. We know, however, that many districts will not produce any other corn crop of equal value, and it therefore demands our notice. The next is after beans, peas, or potatoes: this on good soils only; and, in most other cases, such as after barley or wheat, we consider it such a direct cross-cropping as to be alike injurious to the land and the crop.

The preparation of grass land for the oat crop should be by deep ploughing in the winter or early in the spring, to give time for the herbage and grass roots fully to decay, and for the furrow to be compressed to the furrow sole. As the season for sowing approaches, it should, if the weather is suitable, be rolled down, and left for a few days. The harrows may then be set to work, and drilling immediately to follow. The same course should be pursued with clover leys or seed land, great care being taken to have the furrow well pressed down upon the furrow sole, and that the herbage is sufficiently buried so as to promote speedy decay. By these means much will be done to prevent the ravages of the wire-worm,

the grub, and the slug or snail, which usually make such havock on such lands.

Rape, Turnip, Mangold, or similar cropped Land.—These should be ploughed over very shallow at any time during the winter, so as to retain the value of the deposits of manure made by the sheep whilst feeding off the crop. Immediately prior to sowing, it should again be ploughed at a requisite depth, but so as to avoid burying the manure. The land to be well harrowed, rolled if necessary, and drilled, and the seed carefully but lightly harrowed in, both in this and the other cases: we name this to save repetition.

Bare or "dead" fallows.—We think the adoption of this mode of culture can only be justified by the occupiers of land in cold climates, or of poor thin soils. We would recommend these lands to be well summer-fallowed, cleaned, drained, and then laid up in narrow lands or stetches for the winter. As the spring approaches we would plough two of these lands into one, and harrow and drill immediately, as before directed.

Beans, Peas, Potatoes.—On all soils of medium quality it is best, in most districts, after these crops, to sow wheat, and it is invariably done on all good soils where the climate is favourable; but where the oat crop is more advantageously grown than wheat, it is usually cultivated in this way: The lands are cleaned and worked after harvest, then laid up for the winter, in the spring to be ploughed again and drilled, as above stated.

Oats after wheat, rye, barley, canaryseed, or other similar cropping, we consider highly detrimental; and it must be under very extraordinary circumstances that we could sanction even an occasional crop under such a course, and then only after several ploughings or scarifyings and the application of manure. The oat crop is an exhausting one; and such is its nature that it will appropriate to itself every particle or ingredient in the soil which would not readily be taken up by other plants without renewed tillage: on this account it must be highly prejudicial to future culture. Von Thaër says: "This grain has such vigorous organs that they can dissolve and appropriate nutritious particles which would be of no use to any other kind of corn: they even appear capable of dissolving insoluble acid humus." If such is indeed its character, it ought never to follow a grain crop, but be confined to the turnip, grass, or pulse rotations.

The usual time for sowing oats is the month of March or the beginning of April; if sown earlier, as in the autumn or even in February, the cold winds or late frosts are apt to do the crop serious injury, and frequently destroy the plant altogether; or, again, if deferred till May, the drought of summer is sure to destroy much of the crop on many soils, by actually burning up the plant, in others by preventing its usual growth; but should the summer be a moist one, the crop then runs to straw, and the yield of grain is very defective. It is universally allowed that the oat crop requires more moisture than any other in the soil; and it is very important that it arrives at its proper growth for the formation of its grain before the parching heat of summer is in full force. If the summer does prove a moist one, its safety against luxuriant and excessive growth may readily be provided for. We recommend in such cases, where the crop is becoming rank, coarse, and likely to go down, that it be "topped" either with hook or scythe; indeed our practice is to have our crop looked over every season, and the heavy or laid places lightened: it makes the sample of corn more even in size and colour. We prefer this mode to dragging the crop with a horse-rake, as is a too general case. The great thing is to commence in time, or before it does fall to the ground from excessive luxuriance. Dragging injures the stems, by breaking down some and crushing others; and the horse tramples much down, besides the trouble of getting off the rakings. We frequently top our oat crop twice: this renders it strong, and the yield is immense.

We think the decaying toppings conduce to promote the fuller formation of grain in the plant, acting in some degree as a top-dressing.

The *quantity of seed* sown should not be great. It was customary to sow from five to six imperial bushels to the acre: experience has proved this to be a most erroneous practice. We now *drill* from eight to fourteen pecks per acre, and find that amply sufficient. We vary our quantity according to the richness of the soil, the safety from wireworm, grub, &c., the period of sowing, and the manner in which we are able to get in the seed. Every practical man can form a fair judgment on these minor matters. We also prefer drilling at nine-inch intervals; it gives room for the better action of atmospheric influence, and hoeing and weeding. We have a decided objection to rolling or harrowing the crop after it has appeared above ground. We have frequently proved this to be wrong; and, in consequence, presume to caution our readers against its practice. We aim to put this crop in well, to get the land in fine tilth, to so leave the seed either harrowed finely down or rolled, so as to be able with facility to hoe it without materially disturbing the plant or soil. It is easily injured at the season proper for hoeing. The roots are all young and tender (not like the wheat-plant, which has stood a rough winter); they are soon broken by deep hoeing, which also lets in the drought. More care is requisite in these little matters than is generally thought necessary. A word as to harvesting the crop. We usually wait till the crop is fully ripe, preferring the early ones to shake rather than cut the late ones too soon. This course, we know from experience, secures the largest yield at a trifling loss. We mow the crop with the common scythe. The mower is followed by his mate, who ties the swathe as it is mown into sheaves of moderate size; sometimes "mowing out," sometimes "up to the standing," as appears at the time best. It is set into shocks, or stookes, and the land carefully raked. When ready for carting, it is brought from the field to the stack-yard, and stacked in stacks of convenient size, generally holding about 15 to 18 cart-loads; the shape round, and the width at top three or four feet wider than at bottom, so as to make it safe from the drippings of the thatch.

CULTIVATION OF BEANS AND PEAS.

"Thus Melzar...gave them pulse."—DANIEL i. 12-16.

The bean crop and the pea crop are similar in many respects: they form the intermediate course in the rotation of the usual corn crops. Both being tap-rooted they derive their principal food from the subsoil, sending down their tapering roots to a great depth on open soils to find their required nourishment. This is the main cause of their general application in the rotation: the corn crops derive their food from the surface soil—the pulse crops chiefly from the subsoil, so that the one does not materially exhaust the soil to the lasting injury of the other. We often on good soils find that the wheat crop succeeding a good bean or pea crop is exceedingly good: the falling leaf, the opening of the soil by the penetration of the tap-root downwards, the overshadowing of the land in the heat of summer, and possibly exudation from the plants themselves may be the proximate causes. On the other hand a bad pulse crop is sure to be followed by a bad wheat crop, unless the land has undergone an autumn fallow or manuring for wheat. These crops are also of great value to the cultivator: the produce of grain in favourable seasons is often very great, and will frequently realize good prices; and the fodder, if well got, is far superior to the straw of wheat. The haulm or straw from peas well got, and clear from mildew, is nearly equal to meadow hay in nutritive value, and of far greater bulk. In proceeding to make a few observations upon their culture and management, we would say that our remarks will apply pretty nearly alike to both. We class them together. Their mode of culture is similar; the soils adapted to their growth are similar; their effect upon the soil is similar; they are subject to the same casualties: they are used for the same purposes.

The Soils adapted for their Growth.—The soils best adapted for the growth of beans are strong clayey loams, but they grow well and produce great crops on the heaviest clays, for which soils peas are not so well qualified to compete, but both may be advantageously cultivated on any land possessing a moderate consistency and fair depth of surface soil; and if the subsoil is capable of being penetrated by the tap-roots, if indeed only through crevices of stone all the better, it will better prepare the soil for the succeeding wheat crop. All soils well suited to the growth of wheat are also suited to the growth of beans or peas; the heavier soils for beans, and the lighter soils for peas, *as a rule;* but great variations may very successfully be made, such as crossing the rotation by substituting one for the other in the second course—peas in the *first course* or rotation, beans in the *second course.*

The Preparation of the Soil.—The land intended to be sown with either beans or peas ought to be preceded by a corn crop. If the succeeding crop is to be a bean crop, we recommend a dressing of well-made farm-yard manure, equal to about eight tons per acre, to be applied at convenience in the winter, the land to be ploughed immediately afterwards at great depth, and to be left undisturbed till near seed time. If it is to be a pea crop we do not think the manuring of equal importance. The manure thus laid on will impart some of its value to the subsoil, which the strong, tap rooted bean-plant will extract, by penetrating far into it, in search of food; while the weaker growing pea plant, though possessing a tap-root, cannot derive this advantage, except in a far lesser degree, because it cannot penetrate the soil so deeply. It is, however, much benefited by a top dressing of well-rotted dung, which should be applied directly after sowing. A short time previous to seed-time the land should be cross-ploughed, to be well harrowed in a few days afterwards, and drilled at the same time. On the most tenacious soils it is customary to leave the ploughing and manuring till January or early in February; it is done about this time with the view of obtaining aid from the late frosts of winter, and if once the recently ploughed farrow is frozen through, it falls like slaked lime into powder, and the sowing then commences. We much prefer the double ploughing, as we thereby secure a more perfect pulverization and greater safety, by the destruction of slugs and grubs, those determined enemies to the young bean and pea plants.

The varieties of Beans and Peas—their Adaptation to the various Soils and circumstances of their Growth.—The varieties are exceedingly numerous, and selections may be advantageously made to suit almost every soil and circumstance of their growth. We cannot enter upon a description of peculiarities in any variety for want of space. We repeat that our desire is to aid our practical brethren, and trust the recommendation we now give will be found worthy their notice; our aim being to suit the variety to the soil, climate, and subsequent use. For cultivation on strong loams and clayey loams we recommend the Heligoland bean, the common tick bean, the common horse bean (known under many names, *i. e.*, Cambridge whites, Augustas, Scotch, &c., &c), the Kidwell bean (these for horse corn, &c., &c.; for table use, &c.), the early Mazagan bean, the early long-pod and green long-pods. For autumn sowing the Russian or winter bean. In peas we name the Dutch white dwarf, the partridge gray, the Prussian blue, the Sweet Jessie (drab) the early France (white): many others are recommended, but not so well known to us. The pigeon bean and the marrow-fat peas are good sorts. For heavy tenacious clays we recommend the Heligoland and common horse bean, and the Prussian blue and partridge grey peas; and for the lighter soils, we recommend the common horse bean, the common long-pod, the Kinwell bean; indeed, such well-known varieties, both of beans and peas, as grow freely and produce favourably, as proved by experience in the localities where grown: the most productive sorts, independent of quality of grain, being generally found to be the most profitable.

Time of Sowing, and the different Methods adopted.

—The time of sowing should vary in some degree according to the climate, and the perfection of the drainage: danger must be avoided from either cause. The young plant will suffer irreparable injury from the late frosts and cutting winds of early spring, and the wetness of soil will starve the roots. The usual time of sowing on the average of soils is from about the 20th of February to the 6th of April: we have known good crops to be produced from the sowing being deferred so late as the middle of May. These are exceptional cases, and not to be depended upon. We could rather trust to a very late seeding than to sow upon land out of condition, or through inability to get the seed in properly. The main object should be to get in the seed when the season and state of the soil appear most likely to advance the growth of the crop without hindrance or injury; and as the season for sowing may extend over several months (we would say from the 1st of February to the 20th of May), we think it almost unpardonable management to put in these crops improperly. The extremes should, if possible, be avoided, as the early sowing in February is liable to great damage from weather, grubs, slugs, rooks, &c, &c.; and the late sowing of May will frequently grow too fast and yield a good crop of straw, but without corn. The present season has been a very tempting one for very early sowing, and much has been got in during the month of February. The soil has worked most satisfactorily, and the seed has been deposited in the finest state to produce a crop. We hope the result will be equally cheering.

The different methods adopted for putting in these crops is in accordance with the condition of the soil; the course of culture to be followed; the variety to be sown; the time or season of sowing; the custom in particular districts; &c., &c.—We think, as a general rule, that the best way to put in these crops is by the *drill*; it is in so many ways effective. The drill will deposit the seed almost in every respect according to its requirement—depth, distance, quality, can easily be regulated and attained, and, so far as our experience goes, it has proved superior to the dibbling irons, and the other methods we have tried; and we have tried many, and with care too, for the very purpose of testing its merits in bean culture.

In many districts it is the practice to dibble-in the bean crop; the chief advantage is, the more equal and separate distribution of the plants, which is of great importance. The bean plant to be productive should always have plenty of room in its growth, and particularly during the time of flowering, so that every flower shall have a good chance of podding or setting for seed; this point in bean culture is worth every attention. The crop must not be too thick or too strong in its growth to be productive; if too thick, we recommend thinning both by hoe and hand; we have seen extraordinary results from thinning by hand, from which we recommend, as the period of flowering or blooming approaches, that careful weeders be sent over the field to take out superfluous plants; it may appear to be a tedious and tiresome business, but in reality it is not so, and will amply repay the expenditure. The weeder will take several rows at a time, merely taking up here and there a plant as he passes along, and only from the thickest or most crowded places; a little attention to the crop in this way will be of great advantage. Where the soil is somewhat out of condition, and much horse-hoeing is required, the better plan is to drill at intervals of six inches and twenty-four inches; this will give abundant room for the hoeing to be continued up to the time of blooming, when all should cease. We deprecate sowing broadcast, or sowing along the furrow to be ploughed in.

The Quantity of Seed required per Acre.—This will depend very much upon the variety to be sown, the state and fertility of the soil to be sown, the season or time of sowing, the after culture to be given to the land, &c., &c. If the variety to be sown consists of small grains, or if the variety produces a large plant, the quantity of seed may be limited; eight pecks of beans or ten pecks of peas is a fair average seeding on good soils, nor would we exceed ten pecks of beans or twelve pecks of peas on any soils, of course taking care to sow perfect seed; if the seed time is necessarily late, we would sow less seed. We desire to guard ourselves here, as we do not include the many varieties of garden beans or peas brought into field culture; these generally require a somewhat more liberal seeding.

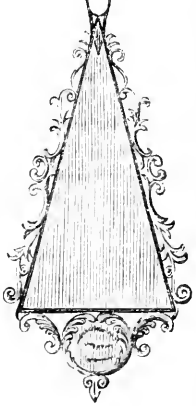
The subsequent Culture and Management of the Crop.—The first process, when the plants appear fully above ground, and the soil requires loosening, is to cross-harrow the rows with light seed harrows; or if the surface does not require loosening, but rather breaking down, and the subsoil is partially set and requires breaking or jarring, a common but rather heavy field-roller should be passed over them; in a few days the hand-hoes should follow; the horse-hoeing also may commence, particularly those in ridges or at irregular intervals should be attended to, and should be alternately horse-hoed and ridge-harrowed till very near the full blooming, when the moulding-plough should be carefully passed between the wide rows, gently throwing in the light mould amongst the plants, but by no means so as to "hill them up;" this "hilling up" is often practised to the destruction of the crop, the large quantity of mould destroying the stalks. We urge great care and caution in this erroneous department of farm practice. The hand-hoeing and weeding must be kept up till the whole crop is in full bloom; but not later, as the flower should not be disturbed when setting into pod. We do not know a crop that is more benefited by repeated hoeing and stirring of the soil than the bean crop. The pea crop cannot be hoed at so late a period of growth, owing to its spreading over and covering the land. The hoeings therefore ought to be early and more frequent. The bean crop, if too luxuriant and heading in its growth, may be, like oats, advantageously topped in the last

stages of its blooming. Sometimes this cannot be done, as, in consequence of any sudden check at this time the blooming will recommence and be carried on to the very top itself. It is very desirable, when the beans are about six inches high, to turn into the field a flock of sheep. They will weed the land well, without eating a plant of beans. This must be avoided in the pea crop.

The produce of these crops depend very much upon the season; they are subject to great injury from blight and mildew; the latter is generally followed by the attacks of innumerable insects, known as the aphis, and commonly called the bean-dolphin and black-collier. We know of no effectual means of prevention; early topping will deposit them on the ground, and thus arrest their progress, while the blooming is thereby promoted. No crops are so uncertain in their produce as the bean and pea crops. They rejoice in moist growing seasons, and frequently when all seems prosperous a few days brings the mildew, with all its accompanying evils; the dolphin follows, and increases with such astonishing rapidity, that the whole crop is speedily overrun, and all is gone in a few days.

COTTAGE-GARDENING IN CORNWALL.—Onions.—These find a place in, I may say, every garden in this neighbourhood. They seem to be used very much by the cottagers, and many of them pride themselves a good deal on the crops which they raise, in the management of their onion-beds, in preparing the ground, for instance, and the proper time for planting them, and their after-management. In all these respects a great difference prevails here. I have seen but very few, if indeed any, seed onions growing in the gardens of the cottagers in this place. When I enquire of any of them if the onions they grow are seed onions, 'Oh, no, sir," is the reply; "we never till any seed onions." "What, then?" "Oh, the potato onions. We are always sure of a crop with them." I shall just state some outline of what is practised by a few persons; and this may be taken as a fair index to the rest. In preparing the ground, I have not seen any of the cottagers ridge it, as is generally done by professionals 'up the country'—that is, towards London, from here. They generally bank it. These banks may be from three to five feet wide at the bottom, and all the soil for a foot or two on each side thrown upon this space, making a round-like bank. This is a very common method of winter fallow. Some use this mode of preparation previous to planting their onions. Those who plant them early in winter, of course, cannot allow their ground to derive much good by either ridging or banking of it, Now, as to the digging and planting, all seem anxious to give the ground at this time some good dressing, and dig it over "very nicely." After this is done, they plant their onions in rows, of some four or five in a bed, generally six or seven inches from row to row, and from four to six apart in the rows. Some plant them early in winter; others about the beginning or middle of February; and a few in March. A few days ago I saw a good bed of potato onions all covered over with seaweed to the depth of some four or five inches, and the onion tops six or eight inches above this covering. This is both as a means of protection in severe weather, and of enriching and manuring the ground; and again, many of these cottagers (especially if they do not keep a pig) are very careful in saving all the soap suds, and whatever else they can in the shape of dirty water, and with this they regularly water, or rather manure, their onion beds. By this means they are often very good and large onions, and arrive at maturity earlier than seed onions sown early in spring. So they can plant brocoli after them (of these they have a variety that grows very large in this county) or flat-pole cabbages: these are almost universally grown by all classes hereabout for common use; others sow turnips—many preferring the Sweed turnips, or Rodibakers, as they are generally termed here by the cottagers. G. Dawson.—Gardeners' and Farmers' Journal.

PROTECTING SEEDS FROM BIRDS.—As the time is now at hand when gardeners are generally much annoyed by the depredations of birds, I beg to contribute my mite of information as to the means of obviating the evil. I have for some years practised the following method with considerable success:—Take a piece of thin board 12 inches long by 4 wide; paint one side white and the other red; suspend it by a string at the end of a rod so small at the upper part as to bend readily to the action of the wind, and so that the piece of wood may dangle over the seed-bed or plat. The change of the colours has a wonderful effect in scaring or starting the birds. Other conspicuous colours will do equally as well as the white and red.—James Rollins.—[This is a very good plan, and deserves a fair trial. We have ourselves seen it adopted in various places, and always with the best results. But in the way of variety, we give a sketch of a contrivance which also possesses strong claims to notice at the present time. It consists of a triangular *looking-glass* on both sides, the frame being cast-iron. And when suspended in the air the reflection of the bright sunshine, or even the ordinary light, has a singular effect in keeping the birds on the wing. For sparrows of course we cannot promise that anything in this way will be of much use; these birds are too "knowing" to be frightened by a shadow, and something more telling must be employed. But for those that are not so bold these contrivances may at least save a vast amount of trouble and personal attention, which very few can afford to give during seed-time. We believe this double looking-glass is patented, but may be had of the trade].—Ibid.



ON THE MANAGEMENT OF SHEEP.—CHIPPENHAM HUNDRED FARMERS' CLUB.

The above club, which now numbers 70 members, held a monthly meeting on the 4th Feb., on which occasion the "Management of Sheep" was the subject arranged for discussion. This being an anxious period of the year to the owners of flocks, and the occasion being one on which they might possibly add to their previous knowledge of the sub- to be discussed, a large number of members assembled.

After electing new members, and arranging to bring forward "The Management of a Dairy Stock" at the next monthly meeting, Mr. Thomas Little, the Chairman, called on Mr. Blake of Grittleton to open the question for that evening.

Mr. BLAKE then rose and said:—

Gentlemen, I shall now procede to state what I know of the favourite breed of sheep in this district, and to which I shall confine my remarks, namely, the "Wiltshire South downs." 1, [Breeding and feeding flocks not to be kept on the same farm.] In the first place, I would strongly inculcate the necessity of keeping either a distinct breeding or a dry flock; for I consider it impossible to keep both at the same time, on the same farm, with advantage. The reason is simply this, that feeding sheep, when they arrive at a certain stage of fatness, must be carried on to a finish, otherwise you would lose the condition they had already acquired. They, therefore, receive all the best hay and produce of the farm, and the breeding flock is thus injured, and gradually reduced in size and value. 2, [May occasionally fatten draft or sale ewes and tegs.] Notwithstanding this caution on the subject, farmers may occasionally feed out their draft ewes when circumstances favour it; and also a few tegs; and by this means they may obtain a profit, and improve their land by the corn and cake which such stock consumes. 3, [Best mode of acquiring a flock.] Suppose then that it is decided on to keep a breeding flock, the best way to obtain one is either to purchase a few lots, of all ages, at some well-known flockmaster's sale, if any such occur; otherwise, select small lots from private individuals, or in fairs. An honest dealer can be of material assistance in the latter case. 4, [Selection of rams.] Having procured a stock of ewes, the next step is to select rams for them. This must be done with great care and judgment, but not with a niggard hand; as the produce of a first-rate ram is sure to comprise some superior animals, from which ram lambs may be selected, and sold at prices that will go far to repay the first cost of their sire. Several may also be kept with advantage in the stock. The male produce of inferior rams, on the contrary, can never be fit for any thing more valuable than wethers, and the ewe lambs, from such sires, may not even maintain the quality of the original stock. I think a fair calculation can easily be made to show that the owner of even an ordinary stock is justified, in point of profit, in paying a liberal sum for the hire or purchase of a ram, and the owner of a superior stock a proportionally higher one. It is most important that you procure rams which are good in those points; both of carcase and wool, in which your own stock is deficient; otherwise the best rams may do little or no good, simply for want of studying this point. 5, [Time of putting ewes to the ram.] In this district, where the land is cold and late, I would not put the ewes to the ram so early in the season as I would on earlier soils. The time I would recommend in this district for all ewes, except two-tooths, would be the beginning of September, so that they might begin to lamb about the beginning of February. The young ewes should be put three weeks later to the ram. This enables them to grow and acquire strength to stand the winter, and brings them a little nearer grass time, when they drop their lambs. The best keep to bring ewes into season for the ram, I have found to be vetches and rape mixed, sown about the middle of June; penning the ewes on this during the night, and letting them run out on a down or pasture field during the day. This should be followed up by early sown turnips, allowing them to run out as before stated, or on the wheat stubbles, until the middle of November, at which time the rams should be removed. The latest lambs will then fall about the middle of April. 6, [Wintering ewes.] The old ewes may occasionally, up to lambing time, be kept in the straw yards for an hour or two daily, to pick over the oat, barley, and pea straw; but the young ewes should have hay after November. The old and young ewes should always be wintered separately, as the former consume their food much quicker than the latter, and drive them away from all the best cribs of hay and other food. They should both have plenty of room between the hurdles. When the ewes are half gone with lamb, avoid giving them young or watery turnips, otherwise their lambs will drop weak over the loins and altogether rickety. They should then have old turnips, or swedes and hay, until they lamb; and breeding ewes,

when in lamb, should never have more turnips or swedes given to them than to supply moisture to their hay. Pitted swedes, whether cut or not, should never be given to them until they have been opened and thrown about on the land several days before being used, or until they become shrivelled: they are not then so likely to produce scouring. 7, [Lambing time.] Prepare for the lambing by having a well-bedded fold provided in a sheltered place in a healthy field, or in a straw yard. As the ewes lamb, draft them out, putting them singly into small pens, protected on all sides, with a covered place to run into in bad weather. The ewes should then have good hay, not over heated, with a few swedes or turnips, or water, if the latter are not given, and a little bran or ground oats and beans would be advantageous. If the weather is mild and dry, they may be turned out in a pasture field in two or three days, in preference to keeping them in a straw fold. In a few days more, if sufficiently strong, they may go to fold on swedes, or turnips and hay, then to the meadows, if there are any, to be followed by rye and vetches, with clover. Ewes with two lambs, and those that are poor, ought to have a daily allowance of beans and bran or oats, and they will do quite as well then as ewes with only one lamb without such additional keep: it will only cost about 1d. per head per day, or 3s. 6d. for six weeks, and there is a set off against this expense, in the hay it will save. The mothers of ram lambs, after lambing, should be kept extra well; they should have corn and the best hay with their turnips, and the lambs should be allowed to run forward to their own allowances. There is nothing better for both ewes and lambs than the first year's sainfoin hay, in conjunction with a little corn. Peas are sometimes given, but they require to be used with the greatest caution; malt-dust or bran and oats and hay chaff is better. 8, [Weaning lambs.] The lambs should be weaned not later than the first week of June, and the ewes shorn in ten or fourteen days afterwards. The lambs, after weaning, should be put on vetches and clover, &c., avoiding crops affected by blight or insects, and such as are too growing or succulent, all of which are apt to produce fatal consequences. The lambs' tails should be cut when about three weeks old: those lambs intended to be castrated for wethers should be operated on when a fortnight old, if this operation be done by drawing; but if by searing, the 1st of May is not too late. They are made to look stronger in their constitutions by the latter process. Late lambs should be kept separately from the others until they become strong, and if they have straw to be on, it will lessen the risk of 'joint evil.' 9, [Diseases of ewes and lambs.] Both ewes and lambs are subject to many diseases at lambing time. The most common in ewes is heaving or straining. I generally bleed for this, until the ewe becomes faint, and give from two to four table-spoons full of castor or linseed oil, and a little spirits of turpentine; if this fail give about a table-spoonful of laudanum. For bad udders, bleed in the belly or udder vein, and keep the ewes in a house—bathing the parts affected, and giving a dose of salts if necessary. 10, [Scouring.] Scouring in young lambs is a frequent complaint, and if many of them are affected, all the ewes should be milked out clean as they lamb, it being then evident that the mother's milk is too flush, or has become too old in the udder. The lambs may have a teaspoonful of castor oil with safety; and should after-scouring affect them, give a teaspoonful of gin with a little lard. Should navel-ill occur, which I believe to be infectious, as well as scour, remove the unlambed ewes, in both cases, to a fresh fold; and the same should be done in cases of heaving or straining among the ewes, should more than one case occur. To cure navel-ill, cut round the navel with a lancet, near the belly, and apply a drop or two of oil of tar to the wound; but to prevent the disease, dust a little powdered blue-stone on the part, as the lambs are dropped, for which purpose the shepherd should carry a small boxful in his pocket. When lambs begin to feed, put them into a fold at night with hay and corn, to prevent them eating turnip-tops, &c., when the frost is on them, which frequently brings on the fatal disease called black scour. 11, [After weaning.] After weaning, separate the ewe from the wether and ram lambs, and put them on vetches, turning them out during the day into pasture, or on seeds. They should never have vetches until they are weaned, unless the lambs are strong and healthy; but after weaning they may be kept on rape and vetches until July, then on the second crop of clover, and sainfoin. Rape and spring vetches come in usefully after the second crop of clover in July. 12, [Sale ewes and wether lambs.] Sale ewes and the best wether lambs should always, after shearing time, have the first and best runs, to make them ready for sale in September. This will also apply to ram lambs, which should be kept between the hurdles, on sound land, all winter, having thatched hurdles for shelter. They settle and do much better in this way, than if allowed to run out on pasture. 13, [Stock ewes.] Stock ewes should first "run the stubbles," before going to turnips, &c., the same as already described. I have only to add that all stock sheep should be carefully washed seven days before shearing, and shorn from the 10th to the 20th of June. The lambs ought to be dipped in July, as it not only frees them from ticks, but keeps off flies and maggots. This operation may again be beneficially

gone through in October, if thought necessary. If the ewes are dipped, it should be done either before September, or not until they have been put to the ram and are again out of season. I have said little about the management of a "dry flock," hoping it will be taken up by another of our members.

Mr. D. TAYLER (Yatton) suggested that a two-tooth ewe should never be allowed to rear two lambs, which was generally assented to.

Mr. JAMES GOUGH (Sevington) adduced a case where a male animal had caused abortion in cows, and stated his belief that a similar influence would produce a like result amongst a flock of ewes. Mr. Gough gave strong corroborative evidence in support of this conviction, and stated that he had known several other cases, in which the cause could not be doubted. The meeting, however, seemed to consider the cause of abortion in ewes as yet undiscovered, but generally agreed that the disease was infectious.

Mr. SCOTT (Grittleton) said the management of sheep was a subject in which he took much interest and pleasure. Of all our domestic animals, sheep are peculiarly dependent on the care of man. They have been in his keeping for several thousand years, but still we are daily improving our knowledge of them, as to the merits of different breeds, and their respective adaptation to different localities. Sheep are certainly of immense public importance and private advantage. The Spanish proverb says, "The print of a sheep's foot turns the soil into gold," and no class of men can have more reason to subscribe to that saying than the flockmasters of this county, where sheep are indispensable agents in the production of crops and the improvement of the soil. Folding is probably more extensively practised in this county than in any other in England; and though many parties at a distance, who have not seen its working for a series of years, have condemned the practice, yet we know that without it farmers could not annually show the luxuriant fields of corn on their thin cold brash and down lands which they now do. We are, therefore, peculiarly interested in improving our stock of sheep, both in wool and carcass, and aptitude to fatten at an early age. I have heard of such things as "Sheep Clubs" being formed for the hire or purchase of superior animals for the use of the members, when such animals were beyond the reach of single individuals; and certainly great good might be done to the members of this club, and to the neighbourhood, by our acting on this suggestion. I have likewise another suggestion to make, namely, the advantage of having portraits of superior specimens of our different kinds of domestic animals as standards of excellence to refer to. This is perhaps beyond the ability of our club, and must, therefore, be left to more important bodies of agriculturists. I shall now only name a few points which I have noted down as apparent omissions in Mr. Blake's very clear and business-like paper: namely, not to breed from animals too nearly allied, but import fresh blood occasionally into the flock: to add annually some young ewes to the flock, and draft out old ones: to see that the shepherd is constantly in attendance, and vigilant in attention during lambing time: only to castrate when the weather is mild and dry, and to have rock salt constantly beside the sheep, as a condiment. Foot-rot is, fortunately, nearly unknown here; and it is therefore almost unnecessary for me to state that I have found hot lime sprinkled on a barn floor for the sheep to stand several hours on, after having had their feet pared, the best cure. Last year I tried 150 Hampshire Down ewes against a similar number of Wiltshire Downs, and found the former could not compete with the latter in standing the tear and wear of the folding system.

At the request of the meeting, Mr. Sainsbury, of West Lavington, who had been introduced by a member of the club, made a few able remarks, as did the chairman and secretary, and several others; at the conclusion of which a resolution was unanimously come to, "That different breeds of sheep are respectively adapted for different localities, and that the Wiltshire or Sussex Down is best adapted for this district."—Devizes Gazette.

AGRICULTURAL GEOLOGY.

There was an almost universal opinion prevalent some ten years ago, that the character of a soil would depend upon the nature of the formation on which it rested. Hence there was once a feeling that no proprietor would do well until he carried out his improvements by having a geologist to map out his estate, and lay down to a scale the outlines of the different sub-formations on which it rested, as a basis for his subsequent operations. If we rightly remember, Sir John Johnstone had Mr Smith, the geologist, over his estate; and he indicated by geological data the productiveness and sterility of certain fields, which practice showed was correct; and he also marked out the locality where the erratic tertiaries threw out springs of water, and so indicated the facility of obtaining

wells in its locality, while they might search for them in vain ten yards from the outskirts of the stratum.

Great doubts, however, are beginning to be thrown upon this hypothesis. Mr. Joshua Trimmer, in the last number* of the *Journal of the Royal Agricultural Society*—a very valuable and practical number—brings a very great mass of facts to bear upon the point, that generally it is drifts which affect the character of the soil, and not the rock upon which it rests; and a great number of instances to prove the correctness of his opinions from the reports of the Board of Agriculture, and also from the more recent essays on the agriculture of the counties. At the same time some investigations are being made by Professor Hodges for the Chemico-Agricultural Society of Ulster, and have led to the same conclusions; so that it is clearly a point deserving of investigation. The following is from the recent report of the Society, kindly furnished to us by the Professor: it is entitled—

REMARKS ON THE COMPOSITION OF THE ROCKS AND SOILS OF DOWN AND ANTRIM.

Professor Hodges brought before the meeting the first of a series of communications, in which he purposes reporting the results of numerous analytical investigations, which have been made in his laboratory, of the chief rock formations and soils of Antrim and Down. The first paper referred chiefly to the amount of lime contained in the arable soils of these counties, and the analyses which were given of soils from a great many different localities, demonstrated the curious circumstance that not merely in Down, where the slate and granite rocks contain but a minute per centage of lime, are the soils different in calcareous matter, but that even in Antrim the soils of many districts, not far removed from immense beds of limestone, afford but a trifling and insufficient amount of that indispensable constituent of the food of plants. The basalt and other so-called volcanic rocks, Dr. Hodges remarked, which occur in Antrim, were generally rich both in lime and alkalies, but lime was not always present in any considerable quantity; and besides, he said, in a great many instances the soil cultivated by the farmer had not been produced by the decay or breaking up of the rock upon which it rested, but had been transported, by various agencies, from other districts, so that a knowledge of the composition of the under-lying rocks of a particular locality was not enough for the scientific agriculturist. An analysis had also shown that the same thing occurred in Antrim, as had been remarked with respect to the soils of the great central plain of Ireland, by Sir Robert Kane, that, though in many cases supported by a foundation of limestone, they were strikingly deficient in lime. Dr. Hodges' interesting communication will appear in full in the Journal of the Society.

Dr. Hodges also directed the attention of the Council to some analyses of rocks, &c, from Antrim, which were valuable for technical purposes. One of the samples of which the analysis had been given was forwarded by a member of the Council—James Walker, Esq., of Larne—who had for some time been successfully engaged in the conversion of the clays in the neighbourhood of Larne into various articles of pottery, some of which were equal to any sent into the market. The specimen of clay examined contained too large an amount of lime to be useful to the potter; its composition rendered it incapable of resisting the intense heat of the kiln.

COMPOSITION OF CLAY.—FROM MR. WALKER, LARNE.

Organic matter & water of combination	7·43	Soluble in Acids, 49·81
Alumina	7·94	
Oxides of iron	5·15	
Lime, carbonate of	22·18	
Magnesia, carbonate of	5·45	
Potash and soda	1·66	
Alumina, in state of silicate	18·62	Insoluble in Acids, 50·19
Lime, in state of silicate	0·84	
Magnesia, in state of silicate	0·53	
Potash and soda, in state of silicate	5·14	
Silica	25·09	
	100·03	
Water in specimen analyzed	4·57	

So far the Professor. The most important evidence adduced by Mr. Trimmer is the fact of the chalk rocks having soils different; and Mr. Legard's evidence in his report on the East Riding of Yorkshire is very striking. Citing from the Transactions of the Yorkshire Agricultural Society, he shows that the super soil on a calcareous stratum, the chalk, often contains only five per cent., and sometimes as little as two per cent. only of calcareous matter.

Now, while we admit this looks like presumptive evidence of the fact of the super-soil being different from the substratum, and Mr. Trimmer accounts for this very ingeniously by supposing it may be brought up by the plough on thin soils, yet he should also make allowance for the great tendency of all calcareous matter to wash down by the action of rain; so that a superficial stratum of soil may be so far denuded of its chalk as to be different from the subsoil. Hence the deepest chalks are most rich, because more compact and less pervious.

We know some striking instances of this. On the pervious red sandstone a deep well will find the purest and most crystal-like water; but this, on being put into a steam-engine boiler, will thicken like cream, and make an incrustation so great as to render it unfit for the use of the enginemen; and yet there is not the slightest appearance of calcareous matter in the soil, nor any calcareous rock below for a very great depth; and so the washing down of calcareous matter has made this surcharged spring unfit for engine-boilers.

* The *Journal of the Royal Agricultural Society of England*, Vol. xx., Part 2, No. 28. London, Murray.

Mr. Trimmer admits that on the oolites and lias there may be some connection with the substratum of rock. He says: "In tracing the oolites from Yorkshire to the south, we find in many instances a close coincidence between established agricultural districts and geological areas" (p. 491). And again: "In Yorkshire we can readily identify the eastern moorlands, the tabular hills, the vales of Pickering and Cleveland, with the lower oolites, the coralline oolite, the Kimmeridge clay, and the lias" (p. 492). And then he quotes Mr. Milburn and Mr. Bravender, to show instances in the vales of Cleveland and Gloucester, in proof of his position.

He cites, however, the various reports to show that on the new red sandstone the soil is various, in proof of the drift theory; but in this he is mistaken. The soils of the new red sandstone are various indeed, but their variations are within certain uniform and well-defined limits. Every experienced land-agent will tell him that while the tops of the undulations in the new red sandstone are almost always poor blowing sands, the sides of the hills are rich light loams, and the slacks or valleys are all, more or less, cold wet clay. And yet these are, for the most part, neither drifts nor erratic deposits. The tenacity of soil depends upon its fineness of comminution as much, perhaps, as the presence of aluminous matter. From the hill-tops the whole of the highly-comminuted matter washes, in the lapse of ages; from the sides a part only; while it accumulates in the valleys, and so makes a variety of soil on the same formation. We think this washing is not properly taken account of by Mr. Trimmer.—Gardeners' and Farmers' Journal.

OXFORD FARMERS' CLUB.

LECTURE ON THE VARIETIES OF VEGETABLE FOOD, AND THE REARING AND FATTENING OF STOCK.

BY J. C. NESBIT, F.G.S., F.C.S, ETC., PRINCIPAL OF THE AGRICULTURAL AND SCIENTIFIC SCHOOL, KENNINGTON, LONDON.

A lecture was delivered before the Oxford Farmers' Club, by Mr. J. C. Nesbit, on Wednesday, the 14th Dec., in the Town Hall, Oxford: Subject—"The varieties of vegetable food, and the rearing and fattening of stock." The chair was occupied by Mr. Thompson, the president of the Oxford Farmers' Club.

The CHAIRMAN said he had great pleasure in introducing Mr. Nesbit to give them a lecture on the rearing and fattening of cattle. He trusted that the time would not be lost, but that some of them at least would derive great advantage from it.

Mr. NESBIT said—Mr. Chairman and gentlemen: I have very great pleasure in appearing before you to attempt to give you a few scientific explanations of the best methods of feeding cattle, and to hint to you a few things which may be of material service to you in your practice as farmers. I should be the last person in the world to seek to overthrow the practice of the farmer. I regard that practice as the foundation on which the chemist and the scientific man ought to build; and I believe it is by taking practice as the basis, and not by overthrowing it, that you will arrive at anything like a useful result. In the observations which I have to make this afternoon I shall endeavour to be as lucid and as brief as possible, and though I take it for granted that most of you know many of the facts which I shall bring before you, yet you must allow me to treat you as if you were perfectly ignorant of the subject, as it is only in that way that I shall be able to elucidate what I have to present to you. Now, gentlemen, vegetables are the food of animals; vegetables themselves exist on the inorganic or mineral matter found in the soil, and also on the substances which by means of their leaves they draw from the air. When the light of the sun shines on the leaves of plants, they absorb carbon and nitrogen from the air; and these bodies, together with the mineral matter taken by the roots from the soil, are elaborated into vegetable matter. Perhaps many of you are aware that considerably more than three-fourths of the solid matter of plants in general is obtained from the air and not from the soil. Well, now, without entering further into the question of the growth of vegetables and the nature of manures, let us refer at once to the composition of vegetable matter. The different varieties of catable substances which the art of the chemist can separate from ordinary vegetables may all be divided into two distinct classes—those which contain the body called nitrogen, and those in which that substance is wanting. The general components of vegetable matter, in addition to the mineral matter obtained by them from the soil, are charcoal or carbon; hydrogen, which is found in all common coal gases; oxygen, which is one of the main constituents of the air; and nitrogen, which is also found in the air, and in the form of ammonia is used by ladies in their smelling-bottles. This nitrogen is a main constituent of the muscles of animals. The muscle of animals contains carbon, oxygen, hydrogen, and nitrogen; whereas the fatty matter only contains carbon, oxygen, and hydrogen. Vegetables, as I previously

mentioned, contain two distinct varieties of food—the nitrogenous and the non-nitrogenous; and these have very different offices to perform in the animal economy. The non-nitrogenous materials may be termed the elements of respiration. The following is a list of the elements of respiration and producers of fat: *fat* or *oil*, *starch*, *gum*, *mucilage*, and *sugar*. Let us consider the action of the animal economy on these kinds of food. When food is taken into the stomach, that portion which is soluble is there dissolved by the action of the gastric juice; thus dissolved, it is taken up by the absorbent vessels, and is then immediately acted upon by the air taken in by the lungs. This action or consumption of the food is the source of the animal heat. You are all aware that if a cannon ball heated red-hot be exposed to the air, notwithstanding its heat, it soon descends to the temperature of the atmosphere by which it is surrounded. In like manner, there must be in all warm-blooded animals some internal source of heat, otherwise their temperature would be that of the surrounding medium; a portion of the food taken into the animal system is consumed there, just as coal is consumed in a fire through the action of the air. We take food into our system, and by means of our lungs we obtain the air which burns a portion of our food for use. The air which I expire from my lungs differs as much from the air which I inhale, as the pure air entering a body of burning fuel differs from that which has passed through it. When carbon is burnt in any manner, the result is a gas called carbonic acid. Carbonic acid gas is a gas which we find in old wells, brewers' vats, and so on; it is the result of fermentation, or of the burning of charcoal. It is easily recognized by its action on lime water, which it immediately renders white and turbid. The presence of carbonic acid in the air sent out from the lungs is easily shown. If I pour a little lime water into a vessel, and then breathe into it for a few seconds through a tobacco pipe, you will find the lime water, though now perfectly transparent, becoming opaque, and exhibiting a white deposit.—[The lecturer then performed the experiment in the manner described, and with the result stated.]—You see, gentlemen, I have been exhaling from my lungs a gas containing charcoal as one of its constituents; in other words, a portion of the food which I have taken this morning is in the course of consumption at the present moment, and the gas which is the result of the combustion is exhibited in the glass. It would be easy to show you that the burning of any body containing carbon would, in like manner, produce carbonic acid gas. I shall now hold a glass over this lighted candle to allow a portion of the carbonic acid to get into the glass from the combustion of the tallow. On adding lime water we shall have a white deposit.—[Experiment performed].—I shall refer again to these experiments, when I come to speak of ventilation. I have introduced them thus far now in order that you might be aware of the fact that a portion of the food taken into our system is in reality used in the production of heat. If an excess of food be taken in, more than the air received by the lungs can well act upon, there is a beautiful disposition of nature by which a portion of that food is laid upon the muscles in the form of fat, so as to provide for a time when food of that kind is not easily obtained. If a person takes an excess of starchy matter, oil, or gum, after all that is necessary for the production of heat has been provided, the rest is laid up in the animal system in the form of fat, as a provision against the future. Now we know that the surrounding temperature has a great deal to do with the amount of food which is requisite to be burnt in the body to keep up the heat. The colder the temperature is, the more food must be taken into the system; as there is a proportionably greater loss of heat when the atmosphere is cold, so a larger amount of heat must be produced. On the other hand, if we be subject to great warmth, if we have to live in tropical climates, we must vary our food, and diminish all those articles of food which would be necessary under other circumstances to give us the greatest amount of heat. Look at the difference between the food of the Esquimaux, who lives in the most northerly regions, and that of the Hindoo, who lives in the torrid zone. You will find that the Esquimaux delights in whales' blubber, in large draughts of oil, and in fat of every description. When he is visited by one of our trading vessels, the most acceptable present which can be made to him is a few pounds of tallow candles, which he soon devours. For him this kind of food is absolutely necessary to keep up the animal heat; and the inhabitants of these regions, by eating large quantities of oleaginous food, and burning it, as it were, in the system, are enabled to stand the utmost severity of that rigorous climate. On the contrary, if you visit the inhabitants of tropical climates, you will find that, the temperature being very high, they are obliged to live on materials which contain the least possible amount of fat. The Hindoos live on rice and milk; they eat no animal food; their food is of a much lighter quality than that which is consumed by ourselves, who live in more northerly regions. Now all this is the mere effect of difference of temperature. When our sailors go to the northern regions, the extra clothing which they put on is merely an equivalent for a certain amount of food which they would have to eat, and to digest, and to consume, if they did not so clothe themselves. Well, now, gentlemen, I think we may apply these facts to the working of our farms and the fatting of our stock. The more your animals are exposed to cold, the greater will be the consumption of food required to keep up that temperature which is necessary for their existence, before they can lay up the smallest portion of food on their bodies in the form of fat. Two farmers might consume the same amount of food on their farms, one having regard to the temperature, and the other not paying any attention to it. In such a case the former would be able to keep a larger amount of animals than the latter, because one effect of keeping them warm would be that a smaller amount of food would be required. I know a case in which this was exemplified during the last autumn. A certain number of sheep

in Dorsetshire were kept under cover, and properly warm; whilst the same number, fed with exactly the same weight of food, were folded in the open field. Those which had the requisite degree of warmth gained, I think, on the average 3lbs. in weight per week, and the others gained 1lb. only. Such was the difference between two lots of sheep owing to the cause which I have stated. Now at the present time this matter is of considerable importance to you. By attention to it you may evidently get from the same amount of food from 1s. 3d. to 1s. 6d., instead of from 5d. to 6d.; and none of you will deny that that is an advantage worthy of your consideration. I would now refer again to the use of fat. There are plenty of instances which would serve to illustrate what I have to bring before you on that subject. In the hybernating animals nature has provided a disposition of body by which much of the food which is consumed is laid by as a reserve in the form of fat. The bear comes out of its den in the spring: during the summer and the autumn it lines its body well with fat, and when the winter arrives it retires to some den or shelter, where it covers itself up and lies cosily during the cold season, without making any more motion than is absolutely unavoidable. Air is continually taken in by the lungs, and acts on the fatty matter, which is re-absorbed, and by absorbents taken into the lungs; and there the process goes on during the whole winter, and the animal in its winter residence is supplied with fuel which it prepared during the summer months to enable it to live during the winter. There are many other animals which provide large quantities of fat in favourable circumstances, and the materials thus obtained are burnt up and consumed when the animal could not otherwise obtain an adequate supply of food. A case of this kind was met with, some time since. A fat pig was overwhelmed in a slip of earth, and lived 160 days without food, and lost in that time 120 lbs. in weight, which it had consumed during the time it was buried. And you are well aware of the fact that stout, portly gentlemen can fast much longer without experiencing injury than thin, lean persons who have not had the same opportunity, or the same power of laying up provision for a rainy day. Now, gentlemen, with regard to *nitrogenous food*, I must tell you that the use of it is totally distinct from that of non-nitrogenous or carbonaceous food. If we examine the composition of human flesh, we shall find that it contains a certain amount of nitrogen; and it is very singular that when we compare our own flesh with the flesh of sheep or oxen, the amount of nitrogen is discovered to be identical. But our wonder is very much increased when we examine the composition of vegetable products, and find some of them are also substantially identical with our own flesh. If I take a certain quantity of flour, and wash it with water, I wash away the starchy matter contained in it—that matter which is one of the elements of respiration and one of the producers of fat; and I shall have left in my hands a glutinous mass, of the consistence of bird-lime. This material is called gluten; and when sufficiently washed, it represents the nitrogenous material of the wheaten flour. Now, gentlemen, when that is analyzed by the art of the chemist, strange to say, it is found to be identical in composition with the flesh of man, of oxen, and of sheep. Again, if I take the pure curdy matter of a cheese, and wash away all the oily and other materials, I find that also substantially identical with the gluten of wheat and the fibrine of flesh. If I take the fibrine of blood, and examine that, the result is the same. Both in vegetables and animals, we have the gluten or nitrogenous matter existing in three forms, under three names, though of almost identical chemical composition. When insoluble in water, it is called gluten or fibrine. When soluble in water, but coagulable by the heat of boiling water, it is called albumen, as, for instance, the white of an egg. When soluble in water, not coagulated by heat, but separable on the addition of an acid, it is called casein; as, for example, the cheesy matter of milk, separable as curds on the addition of rennet. These several varieties exist in many vegetables. If turnips or mangold-wurtzel be subject to pressure, the albumen and casein will be found in the juice, and the fibrine or gluten will remain in the solid mass along with the more nitrogenous portions of the turnip. If the strained juice be boiled, the albumen will coagulate and float on the top. On removing the albumen, the casein will be liberated on the addition of any acid. The following table will show how nearly these substances agree in composition. The first (the gluten) shows less nitrogen than the others; but it is always difficult to wash away the whole of the starch; and no doubt the sample was not pure:

	Gluten from Flour. Boussingault.	Casein from Peas. Scherer.	Albumen from Eggs. Jones.	Ox-blood. Playfair.	Ox-flesh. Playfair.
Carbon ..	54.2	54.138	55.000	54.35	54.12
Hydrogen .	7.5	7.156	7.073	7.50	7.89
Nitrogen..	13.9	15.672	15.920	15.76	15.67
Oxygen ..	24.4	23.034	22.007	22.39	22.32
	100.0	100.000	100.000	100.00	100.00

The variations in the decimals are not greater than those which we always find in analyzing the same substance half-a-dozen times. Now, gentlemen, we have got hold of a very wonderful fact, namely, that the flesh of animals is prepared by vegetables; that instead of animals preparing flesh for themselves, flesh is absolutely prepared for them. This portion of vegetable food is taken into the system; it is there dissolved; the body merely changes its mechanical form and condition, its chemical composition remaining the same. It is wonderful to think that it should be thus operated upon by the principle of vitality; that it should be resolved by the action of the vital principle into the various forms of nails, hair, flesh, skin, and so on. But, gentlemen, if you examine this question

carefully, you will find that such is absolutely the fact in another case, which is very familiar to you all. Let us take a common egg. In this you have a little oily matter, and the rest is made up chiefly of albumen. You subject the albuminous matter to a certain temperature for about three weeks, and what then becomes of it? What is the result of the lapse of that period under such a temperature? You have produced out of that matter bones, sinews, nerves, heart, liver, lungs, feathers, brains, and claws. The whole of these are produced from the egg, and yet the egg itself is nothing more nor less than albumen. After this, gentlemen, you need not wonder that under the operation of the vital power nitrogenous matter should assume such great varieties of forms as we see it assume, not only in different kinds of animals, but even in the same animal. Now, gentlemen, a question arises as to how the animal heat could be provided for an animal fed only on nitrogenous food, and provided with none of the elements of respiration; suppose a man to be compelled to eat nothing but mutton or beef? Gentlemen, we have this question answered by the case of carnivorous animals—animals which live entirely by eating other animals. How do these animals obtain the heat which is necessary to their existence? You will observe that they take an immense deal of exercise. In the pursuit of their prey they are obliged to exercise the various muscles of their body; and it is this motion of the muscles of the body which causes a consumption of those muscles by the air taken in the lungs, and thus keeps up the animal heat. In the case of the electric telegraph, you are perhaps aware that there is a zinc and copper plate, immersed in acid and water; and as soon as ever a communication has been made by wire between the two, an electric current passes along the wires, and at the selfsame instant the acid acts upon the zinc, and dissolves a quantity of it proportioned exactly to the strength and continuance of the electric current. In the very same way, gentlemen, when I stretch out my arm, the muscle which produced that motion, that exercise of force, is acted upon by the air circulated through the arteries, and it is the oxidation or combustion of that muscle by the air that gives me the power necessary to move my arm. As soon as my will is exercised, and I attempt to put forth my arm, an electric communication is made, a portion of the muscle is insensibly consumed, and the proper amount of force is instantly produced. Now, we all know that the more a limb is exercised the more it wastes for the day. The muscles will be smaller at night than in the morning; for the period of sleep is that appointed for the increase of the muscles. It is well known that when parties have been taking a large amount of exercise, the muscles of their bodies are comparatively wasted. Now this waste is caused by the consumption of the muscles by the air which circulates through the arteries, and it is this consumption which provides animal heat when the animal can obtain none of the ordinary elements of respiration. You will observe how wonderful it is that animals which subsist on flesh are obliged by the very nature of their food to take a large amount of exercise; otherwise their food would not be suitable to them. It is wonderful how soon animal food is digested by creatures who live almost entirely upon it. Sir William Alexander, in his "Travels in Kaffirland," mentions the case of a Kaffir who came into the kraal one evening, nearly famished. He had been seven or eight days without food, having walked for a long distance in search of something to subsist upon. Sir William had often heard that the natives, under such circumstances, would think nothing of eating a sheep—not a Leicester, however, gentlemen, but one of the colonial sheep; and, though rather frightened at the experiment, which was contrary to all his previous notions, he provided a sheep for this hungry native. The man commenced eating; he did not leave off until he had eaten three-quarters of the animal, and the next day it was discovered that the consumer, instead of suffering any injury, had recovered, and was swelled out to his proper proportions. Instead of appearing a skeleton he now appeared a healthy man, with muscles ready for another week's exercise. Such is the effect produced by the operation of that law which I have been describing to you. When parties who have gone for such a length of time without food obtain the command of what is necessary for them, it is taken into the animal system, and is employed in replenishing those muscles which were previously exhausted. And let me tell you that any man in this country who is compelled to labour hard must live to a great extent upon animal food, or upon food that contains the flesh-making principle; because all waste requires to be replaced from that source. In like manner, a person who eats a large amount of animal food must take a large amount of exercise; otherwise he will be thrown into a fever, which is the only other way of correcting the consumption of too great a supply of animal food. Now a great deal may be deduced from what I have stated. In the first place, it proves that unless you have a proper amount of the flesh-making principle in food, what you give them will not answer the end for which it is given. If a mother gave her child nothing but arrowroot, which contains no nitrogen at all, and no bone earth, that child could not increase in size; or if it did, one portion of its body must grow by absorbing the other. If the amount of nitrogenous food were too small, the child would grow up a little Tom Thumb; it is impossible that it should grow up well, not having that which is necessary to produce muscles and bones in due proportion. Allow me to say, gentlemen, that vegetable food varies very greatly indeed as respects the relative amount of the flesh-producing principle. The life of a vegetable has for its object, as it were, the reproduction of its species, in other words, the production of seeds; and you will find that seeds contain, under all circumstances, a larger amount of nitrogenous substances than any other form of vegetables. Now, 100lbs. of beef contains 25lbs. of gluten. The following table will show the amount of nitrogenous matter contained in different varieties of food:—

TABLE OF FLESH-PRODUCING PRINCIPLES IN DIFFERENT VARIETIES OF FOOD.

100lbs.	Gluten, Fibrine, or Albumen. lbs.	Unazotized matter. lbs.
Flesh	25	0
Blood	20	0
Beans	31	51½
Peas	29	51¼
Lentils	33	48
Potatoes	2	25
Oats	11	68
Barleymeal	14	68½
Hay	8	68½
Turnips	1	9
Carrot	2	10
Red-beet	1½	8½

When you refer to beans and peas, you find that they are a stronger food than flesh itself. The seeds of all leguminous plants contain a large proportion of the flesh-producing principle. Peas and lentils generally are a stronger food than even beef; and a man who was fed upon them would, other circumstances being the same, do a larger amount of work than one who was fed upon an equal weight of animal flesh. When you come to analyze the potato, you soon discover why an Irishman, in order to get through the same amount of work as an Englishman, is obliged to eat a much larger quantity of food. He has to eat such a large amount of food, because the potato contains only a small amount of the flesh-producing principle. The amount of nitrogenous matter will vary in different samples of the same vegetable, grown under different conditions; but the figures which I have given will, in the main, be found correct. Another lesson which may be learnt from what I have advanced is the necessity of mixing different kinds of food together. If the Irishman were to mix some other kinds of food with his potato, he would obtain the same amount of nourishment much more cheaply than by swallowing such enormous quantities of that one species of vegetable. A man who uses with his bread a portion of cheese, which contains from 30 to 32 per cent. of nitrogenous principles, will be able to do a larger amount of work than if he confines himself to the bread. I am persuaded that there is not a dearer food to be found than potatoes, if used alone. It is well known that in the case of parties who feed on potatoes alone, a large proportion of the starchy granules passes through the system untouched. So far as subsistence is concerned these granules are lost, and form part of the excrements. You see, therefore, that in mixing food, it is a point of great importance to take care not to give too much of one kind of food or too much of another. In like manner too large an amount of the flesh-producing principle will be too expensive: on the one hand it will not be the best for the animal; on the other hand, it will be extravagant. I don't know what amount of oil-cake is given by gentlemen in this part of the country, but I am persuaded that in many cases the amount given to animals is far beyond their requirements, and that a considerable portion of it passes through the animal unacted upon, a portion only having been made use of for the purposes of animal economy, and the rest having been applied to the mere purpose of manuring. It is a most expensive article thus to make use of. I have analyzed varieties of oil-cake from London, Liverpool, and Marseilles, and, having discovered what amount of nitrogen and bone earth they contained, I have then compared them with Peruvian guano. Estimating that Peruvian guano contains 16 per cent. of ammonia, I found that one ton of it will give 2½ times as much ammonia, and 6 times as much bone earth as one ton of oil or rape-cake. No one who knows the relative price of these things in the market will spend his money on oil-cake for the mere purpose of manuring, but will take care that in its use he sees some profit attached to the animals consuming it. Gentlemen, it is perfectly impossible for me, in the time which I have before me, to enter so deeply as I could wish into many other important subjects. I must curtail my remarks as much as possible. In reference to the cooking of food, however, I want to point out one or two facts which I think it of great importance that you should know. The cooking of food can under no possible condition add anything to food. Those who expect that by cooking food they will add to it anything at all in the shape of nutrition are greatly mistaken. All we can do by cooking food, or by any preparation of food for animals, is to assist the animal in applying it to its own use. We know that the animal is provided with instruments for grinding its food. It has glands which give saliva or moisture for the purpose of its being well-mixed together; and food is cooked or bruised, it is operated upon either by a mechanical or a chemical action, merely to render it more easily available for the animal. It is clear that by cooking oats you render them more digestible, and that they are more likely to prove beneficial. But here let me say that it is possible, in my opinion, to carry this cooking too far. We have been told by learned men—or rather by men who profess to be learned, and who have been attempting to teach you—we have been told that animals having nothing to do but lie down will get fat much sooner than animals which are differently situated. Gentlemen, that is all very well as far as it goes, but we must look to the whole of the animal system. A certain quantity of saliva must be passed daily into the stomach in order that digestion may be effectual; and if the chewing of the food be too quickly performed, it is more than probable that saliva will not pass into the stomach to the extent required. There is another point connected with this part of the subject which I must dwell upon for a moment. With respect to animals which chew the cud, it is necessary that there should be a proper amount of solid matter. I have known parties neglect this, and the effect of doing so must be injurious. Unless there is a sufficient amount of chopped straw or some similar material eaten by cattle fed with such succulent food as turnips or mangold-wurtzel, it is impossible for the working of the animal economy to be properly carried out. Now, recurring to the elements of nutrition, gentlemen, you will observe that motion is equivalent to consumption. The more motion an animal has, the more food it will require in order to meet the waste of the flesh-producing principle

in the muscles. We all know that long-legged pigs, requiring a large amount of exercise, never get so fat as short-legged pigs, which seem disposed to take things quietly. Animals which are very much teased by flies while running about, or while at rest, are kept back by that cause; and, speaking generally, animals which have a large amount of motion are not so capable of thriving, and cannot live on so small an amount of food, as animals which are generally quiet. To keep fattening animals at a proper temperature, and to prevent them from having much motion, are the best means of getting them fat on the smallest amount of food. With respect to young stock, gentlemen, the case is different. Here you want a large amount of muscle, particularly as respects breeding stock; and I would never advise you to apply, as some parties do, the very same system for growing stock as you do for fattening stock. Depend upon it that unless the muscles have sufficient action the animal can never be properly developed. In the case of breeding stock, for example, you must take care that in the first two or three years of life there is a sufficient amount of exercise to cause a healthy development of the system. There is another point which I must mention in connection with this part of the subject, namely, the different varieties of stock. You are all aware that there are great differences between different animals, and that different animals will not fatten equally on the same amount of food. You may take it, however, as a fact pretty well ascertained, that all the best animals—those which are most sought after by practical men—are animals whose lungs, liver, and intestines generally are not so largely developed as those of the straggling long-legged creatures that we sometimes meet with. The lungs and offal of a good animal are smaller than those of animals of the last description; and practically this kind of stock is found to answer best. When the lungs are small, less air is taken in and less food is consumed. When the liver is small, less bile is produced and more fat is made. In training horses you should proceed on a plan diametrically opposite to that which you pursue in the case of oxen. In the case of horses you want a good development of lungs; you require a deep chest for wind, so that the animal may be able to endure the greatest speed; and unless a large and constant supply of air be taken in, the muscles cannot produce the requisite force. There is one other point which I desire to introduce, namely, ventilation. A certain amount of food is consumed every day by men and animals generally, for the purpose of keeping up heat. On referring to this table [turning to a diagram] I find that the amount of carbon consumed every day by man is 14 oz., by a horse 97 oz., by a cow 70 oz. This is actually burnt and consumed every day in keeping up the heat. To consume this amount of carbon man takes in each day 27 cubic feet of oxygen from the air, and expires the same amount of carbonic acid gas. The cow takes in 137, and the horse 190 cubic feet of oxygen, and expire an equal volume of carbonic acid gas. Well, now, gentlemen, experiments have proved that the presence of 5 per cent. of carbonic acid gas makes the atmosphere a deadly poison; and if a horse gives out 200 cubic feet, twenty times that amount, or 4,000 cubic feet, will be the quantity of air vitiated in a day by a horse: you will have the air to the extent of 2,000 cubic feet rendered absolutely poisonous. How can we be surprised that in stables which are so constructed as many are, horses and other animals are found with diseased lungs? I have here said nothing of the action of ammonia from the dung on the lungs of animals, and upon their eyes. It is my belief that pulmonary complaints amongst horses arise in great measure from bad ventilation. I can easily convince you of the poisonous nature of carbonic acid gas, by showing you how soon it will extinguish a light; and remember, that what will extinguish light will extinguish life. I have here some common chalk: on adding an acid carbonic acid is evolved. On immersing a lighted candle into this gas, the light will be immediately extinguished (Experiment performed). Now this gas, gentlemen, is entirely identical with that which arises from the burning of charcoal. It is found to accumulate in brewers' vats, at the bottom of wells, and in mines; and in the case of mine explosions, the subsequent effect of this gas, as *choke damp*, on those who breathe it, is far more destructive than the explosion itself. While three or four may have been killed by the explosion, scores have often been destroyed by the operation of this gas. What I have to reiterate with respect to ventilation, so far as you are concerned with the matter, is that it is absolutely necessary for you to take some practical means of releasing your animals from the influence of this carbonic acid gas; for unless you do so, you may rely upon it that you will lose a certain amount of your stock. As regards ourselves, we are very often found in crowded rooms, breathing this vitiated air, without ever appearing to imagine that we are thereby injuring our own health; but though the action of it may be slow, it is not the less sure; exposure to a vitiated atmosphere is sure to diminish the period of life. Gentlemen, I am sorry that I have intruded so long on your time; I trust that some of the remarks which I have made will appear to you of a practical character; and if any information can be derived by you from the observations which I have made, I shall feel both satisfied and gratified with the result" (cheers).

It was here agreed that no questions should be put to Mr. Nesbit at that moment, but that after dinner —which was about to take place in an adjoining room —any gentleman might interrogate him on any point on which he desired information, Mr. Nesbit promising on his part to reply.

Mr. Nesbit then exhibited his methods of detecting adulterations of guano, the details of which have already appeared in this magazine.

IMPORTANCE OF ARTIFICIAL MANURES.

The importance of artificial manures, and questions involved in the application of these to certain crops, which are most efficacious, and, above all, which are the cheapest means of attaining the desired end, are of a character which are always deserving the best attention and closest investigation of the agricultural chemist. Up to the present time our knowledge seems to have acquired at least this degree of perfection—that azotised manures are desirable for wheat, and phosphates for turnips, and that carbonaceous manure is also necessary to the fullest development of the one or the other.

But unfortunately all these materials are to a certain extent costly, simply because either they are obtainable at a great expenditure of labour, or are to be brought from a great distance, or, what is equally an obstacle to their use, they are so useful in certain processes of manufacture or of art, that they can afford to pay a better price for them than the farmer can in the production of corn. Ammonia is useful to the bleacher, the dyer, and to several branches of manufacture. For these, those classes can pay a greater amount than the farmer, who has a slower and more uncertain substance to produce. Phosphoric acid is again, in one shape or other, used, but costs so much producing, that it can only be used by the farmer in a very combined, or rather in a very mixed state with materials of no use to him—for he can only have it in this condition.

Guano is not only the best of all manures whenever soil has a plentiful supply of carbon in its composition; but it is absolutely the cheapest we can purchase after all our chemical discoveries, because, though it is brought from a great distance, and is thus of considerable cost in its being obtained, still it has no competitor in its purchase by the manufacturer, who does not require it; and therefore it is the cheapest of all manures—when the ammonia, the phosphoric acid, and the other organic matter it contains are estimated at their market price.

Still there are many substances which we ought not to lose sight of, and which are within our very sight every day of our lives. We remember being once taken into a very secluded plantation, belonging to a gentleman well skilled in the mystery of farming, when he showed us the secrets of his trade in the manufacture of manure. He did no more than hint that the great source of his success in the manufacture of manure, the basis of his operations, was *dried* blood he obtained in casks from the slaughter-houses of a large manufacturing town at some fifteen miles' distance.

Now it is quite true that wherever a field is occupied by a butcher, the grass, corn, or turnips are always superior to those of his neighbours.

The recent researches of Professor Way on dried blood throw much light on this question, and the results he has obtained will place that very common and much-wasted substance in a position of more favour with the agriculturist than it has hitherto obtained. It is now some time since the celebrated Mr. Huxtable, of whose farming we have heard less of late than we did some time ago, suggested the submersion of dead animals in sulphuric acid as a manure; such solution we apprehended was made, however, more to deodorize than to render soluble, as the ultimate elements are speedily given off both in blood and flesh. We have ourselves used animal matter dissolved in sulphuric acid with no very great advantage, and which we find very inferior to dissolved bones. But from the Professor's investigations it would seem that the blood is really, when dried, more productive of ammonia and nitrogenized matter than even the flesh. The analyses of the two are thus given :—

	Blood.	Flesh.
Carbon	54·35	54·12
Hydrogen	7·50	7·89
Nitrogen	15·76	15·67
Oxygen	22·39	22·32

In several other specimens he found that they contained as much as 13 to 14 per cent. of nitrogen, and therefore equivalent to nearly 17 per cent. of ammonia—a quantity nearly as great as in an average set of specimens of guano.

It must, however, be borne in mind that the blood in this case is taken dry, and that if not perfectly dry it will not only be much less valuable, but more offensive, and less manageable as a manure; for one of the most certain preservatives of decay is the absence of water.

Of the value of dried blood, the Professor estimates it to be worth £8 to £9 per ton if highly dried, calculating its ammonia at 6d. per lb. It contains less phosphate matter than guano, and is certainly worth a less price. Still it may be made a valuable auxiliary, and so far supply the place, and displace the demand for Peruvian guano—the most valuable of all our purchased fertilizers.

The state of an artificial manure is, after all, of great consequence. Mr. Thompson and Professor Way indeed showed that the clay soils had the power of detaining ammonia both in a state of sulphate, muriate, and phosphate; still we well know that manures may be so chemically or mechanically

locked up as to be extremely difficult to be unlocked and made use of by plants. Professor Anderson goes so far as to hint that the superphosphate becomes subphosphate almost as soon as it mixes with the alkalies of the soil, and therefore that it is more due to comminution, and less to solubility than is generally supposed, that vitriolized bones are so beneficial to the crop. Be that as it may, however, there is no doubt that care should be taken as to the state, as well as that the quantity should be considered, in applying artificial manures.—Gardeners' and Farmers' Journal.

LABOUR AND THE POOR.—THE RURAL DISTRICTS.

NORTHERN COUNTIES—CUMBERLAND AND WESTMORELAND.

Letter XXVII.

(From the Morning Chronicle.)

The western division of the northern district offers fully as many points of contrast as it does of resemblance to its eastern counterpart. The surface of Northumberland and Durham is generally flat, or gently undulating, except towards the west, where the country rises into that vast tract of moorland which reaches from the Cheviots down to Staffordshire, maintaining a nearly equal distance from the two seas that wash our eastern and western coasts. Cumberland and Westmoreland, on the other hand, include within their limits the most mountainous portion of the English soil; in the fastnesses of their hills and lakes the aboriginal population of our island found a refuge from Saxon and Danish invasion. Both compartments are alike rich in mineral products—coal and lead being found in abundance, and iron in smaller quantities; both also are distinguished for activity in commercial pursuits. In agriculture, however, the west must yield the palm to the east; its ruder husbandry shows nothing to match the skilled cultivation of Northumberland and the Scottish border. The ethnological diversities observable even in the present day are strongly marked, and furnish a striking testimony to the truth of ancient narrations. In the east no one can help being struck with the Scandinavian features, character, and customs of a race sprung from the Danish colonists of old Northumbria; in the west the Celtic type is not less strongly impressed on the population, and may be read in their lither forms and darker complexions, as well as in the straight aquiline features and black eyes common on this side of England. This holds true generally, in spite of a large intermixture of the Teutonic or Norse element, as evidenced by the number of names ending in *by*, which signifies, in the northern tongues, a settlement or habitation; such are Appleby, Kirkby, Lazonby, Corby, and Newby, and very many more. But Carlisle (properly *Caer-leol* or *luel*, "the castle for the army by the wall") and Penrith ("the red hill," so termed from the colour of its soil) are old British names; and the very appellation of Cumberland (more properly Cymmerland, as the word is to this day pronounced north of the Tweed) attests the true character of its population. Honour to the old and noble blood of the west! Percys and Tancarvilles—Neville, Greville, and Grenville—Beaumonts and Beauchamps—St. Maurs and St. Clairs—came in with the Conqueror, and led the redoubtable chivalry of Normandy; Forsters and Featherstonehaughs—Hilton, Vane, and Lambton—Radcliffe and Rokeby—deduce their origin from men who fought at Hastings in the fated host of Harold, or waged war with the invader through succeeding years of deadly strife. The Howards are a Danish house (their true name is Havard or Haward), though the head of the British aristocracy—I speak it merely in praise—is of modern and plebeian extraction. The Gordons are Frenchmen of Guienne—Campbells, perhaps Italians of Lombardy, of Piedmont, or Tuscany. But Graham, and Douglas, and Lowther, like Caradoc and Llewelyn, were before the Normans, before the Danes, before the Saxons—nay, before the world-conquering Romans themselves. Gog and Magog, the princes of the Goths, keep watch over the passes of the Caucassus in their enchanted castle with walls of brass and gates of burnished steel: but Arthur's tomb, in the vale of Avalon, is tended by loftier fates and more potent spirits; the dragon line is first and last of English dynasties; and even now his blood asserts its right to rule on the throne once filled by the Cymric champion.

"Westward and northward of Westmoreland," says Camden, "lieth Cumberland, the utmost region this way of the realme of England, as that which on the north side boundeth upon Scotland; on the south side and the west the Irish sea beateth upon it; and eastward, above Westmoreland, it butteth upon Northumberland. It took the name of the inhabitants, who were the true and natural Britons, and called themselves, in their owne language, Kumbri and Kambri. For the histories testifie that the Britons remained here a long time, maugre the English Saxons, howsoever they fretted and stormed thereat: yea, and Marianus himself recordeth as much, who termed this country *Cumbrorum terra*—that is, the land of the Cumbri or Britons, to say nothing of the places that everywhere here beare British names, which most evidently declare the same, and as cleerely prove mine assertion. The country, although it be somewhat with the coldest, as lying farre north, and seemeth as rough, by reason of hilles, yet for the

variety thereof, it smileth upon the beholders, and giveth contentment to as many as travaile it. For, after the rockes bunching out, the mountaines standing thicke together, rich of metal mines, and betweene them greate meeres, stored with all kindes of wild fowle, you come to pretty hilles good for pasturage, and well replenished with flockes of sheepe; beneath which again you meet with goodly plaines spreading out a great way, yeelding corne sufficiently. Besides all this, the ocean driving and dashing upon the shore affordeth plenty of excellent good fish, and upbraideth, as it were, the inhabitants thereabouts with their negligence, for that they practise fishing no more than they doe. The south part of this shire is called Copeland or Coupland, for that it beareth up the head aloft, with sharp-edged and pointed hills, which the Britons term cope."

In the county of Cumberland, 3,640 persons are returned as employed in mines, of whom 825 are under twenty years of age; 3,836 in the cotton manufacture (bleachers, dyers, and printers included), of whom 1,065 are under twenty years of age; and 388 in the flax and linen manufacture, of whom 153 are under 20 years of age. In addition to the above, 2,088 persons are returned simply as weavers. The manufacturing and mining interests of Cumberland are now in a state of high prosperity, which, as I shall explain by-and-by, has had a favourable influence on the condition of the labourers. Carlisle is the seat of flourishing establishments for the spinning and weaving of cotton, and I gladly embraced the opportunities of inspecting them which were afforded to me by the kindness of the proprietors. The Messrs. Dixon alone employ, besides spinners, 3,000 weavers, of whom about 2,000 reside in and near Carlisle. These are chiefly hand-loom weavers, employed in the manufacture of ginghams, a description of goods in the fabrication of which manual labour is employed with advantage. In this town the power-loom has not yet superseded it to any extent. Messrs. Dixon's factory, however, contains 240 power-looms, some of them on the double-shuttle principle, by which checks and other patterns of two or more colours can be woven. In the wages of hand-loom weavers an advance to the extent of not less than 20 per cent. has taken place within the last three months; the ordinary earnings of an adult male are now 12s. a week, and in some cases even more; those of women and children from 5s. to 8s. It is a circumstance which curiously illustrates the working of the enhanced rate of wages, and attests at the same time the existence of rather a low standard of *morale* in this particular class of labourers, that, in consequence, the keeping of Saint Monday is very general amongst them. The weavers who tend the power-looms earn less than the above amounts; the average wages of the men (of whom, however, there are but few) are 8s., of the women and girls 6s. There are also piecers, reelers, and warpers, who are in some cases paid as high as 16s. The wages of the other great class of workmen employed in the cotton manufacture—the spinners—are at present 16s. to 17s., considerably lower than they were a few years back, when 24s. and 25s. were generally earned. A reduction, varying from 5 to 10 per cent., took place in the calamitous year 1847, from which they have not yet recovered; though several employers expressed to me an opinion that the prosperous state of trade—a continuance of which may fairly be calculated upon with present prospects—and the brisk demand for labour consequent upon this, would have the effect of raising them to former rates in the course of the ensuing spring. No definite opinion seems yet to have been formed in this quarter as to the working of the Ten Hours Act; in fact it has hitherto been practically inoperative, as, since it became law, the mills have universally been working short time. The apprehension of a deficient crop of cotton in the United States was mentioned to me as the cause which had prevented a rise of the spinners' wages in the last autumn.

The coal district of Cumberland extends along the western coast, and an active trade in this great staple of the north is carried on in the towns and harbours of Maryport, Workington, and Harrington. But the great seat and centre of this branch of industry in Cumberland is Whitehaven, a place which now contains a population of more than 16,000 souls, and which is in some respects one of the most remarkable of our seaports. The average quantity of coals yearly exported hence (chiefly to Ireland) from 1781 to 1792 was 80,000 chaldrons; for the five years ending 1814, 100,000; in 1826 the amount was 135,000; in 1827, 115,000. In 1846 the quantity entered at the Custom-house for Whitehaven, Harrington, and Workington was 321,835 tons of coal, and 4,832 of culm. Iron ore is also sent in considerable quantities to the Welsh furnaces from the mines of Egremont and Alston, and pig-iron to Liverpool. In the sixteenth century, Whitehaven was a hamlet so obscure and inconsiderable as not to be mentioned by Camden; it is now a flourishing and well-built town, with broad and straight streets, the houses generally constructed of stone, and roofed with slate. The numerous piers raised for the improvement of its harbour have involved an immense expenditure of money. That most recently erected, called the New West Pier, is one of the finest in existence, and surpasses the most ambitious constructions of this kind which were planned by the genius of Napoleon. It was commenced in 1824, and finished in 1839; it is a noble work, of vast strength and magnitude, extending to the length of three hundred yards, and terminating in a circular bulwork or tower, raised high above the waves of the Irish Channel, on which a light-house is placed. The harbour was fast being silted up, and this pier was constructed with the view of preserving it; but I regret to learn that it is considered to have little or no practical effect in obviating the evil. Whitehaven owes its creation and aggrandizement wholly to the noble family of Lowther, whose ancestor obtained from King Charles II. a grant of the adjacent land, then a waste, and commenced the mining enterprises which have since been prosecuted so successfully. Sir John Lowther, we are told, having laid the foundation of the future importance of Whitehaven, lived to see a petty village (which in 1633 consisted of only nine thatched cottages) grown up into a thriving and prosperous town,

The population increased so rapidly that in 1713 it consisted of 800 families, or about 4,000 souls. Sir James Lowther, son of Sir John, prosecuted with great energy the plan of his father, and lived, it is said, to see his coal-works and the rents of his buildings at Whitehaven yield upwards of £16,000 a year, though his grandfather never received above £1,500 per annum from the same source. Under his patronage the population of the town was augmented by numerous strangers from different parts of the three kingdoms—"there being at that time employment and encouragement for every one, genteel and rational entertainment and amusement for gentlemen, commerce for the merchant, and plenty of work for the mechanic and the labourer."

The first *iron* railway in the kingdom was laid from a pit near the town to the harbour. The principal collieries are those of How-gill and Whin-gill, in the immediate neighbourhood of the town; the William and Wellington pits are worked to a depth of 150 fathoms and upwards, and the workings extend for miles under the bottom of the sea. In these mines every practicable provision has been made to ensure the safety of the labourers, and to alleviate the inevitable discomforts attendant on their lot; the solidity of the works and the accuracy of the finishings are worthy of admiration, if compared with the ricketty and insecure aspect of many other places in which the miner pursues his dreary vocation. The Wellington pit has three workable coal seams—the Bannock Band, seven feet thick—the Main Band, eleven feet—and the bottom seam, about six feet. The charitable and educational institutions of this town are upon a footing not inferior to those of any other place with which I am acquainted. Of the latter I may specify a few particulars, in corroboration of this opinion. The National-school affords education to no fewer than 450 boys and girls; the school buildings, which are large, and include all requisite accommodation, were substantially repaired some years back, at the expense of a resident of the town. The Marine-school was founded in 1817 by Mr. Piper, a member of the Society of Friends of this place, who endowed it with £2,000 Five per Cent. Annuities, vested in the hands of fifteen trustees, for the education of sixty poor boys, resident in the town or neighbourhood, in reading, writing, arithmetic, gauging, navigation, and bookkeeping. The school-house was built by the late Earl of Lonsdale, and was opened in 1822. St. Nicholas's Infant and Sunday-school, erected in 1846, and capable of holding 500 children, is attended by 300, who are placed under the charge of a school-mistress and two assistants. Trinity Church-school, in Newtown, is a neat and commodious building, erected in 1847, and capable of containing 800 children. It is attended by 120 boys and 60 girls, who pay a penny each for reading, and three-halfpence for writing, arithmetic, and geography. These and other institutions of lesser extent supply ample means of instruction for the children of the poor, The town possesses a subscription library of more than 10,000 volumes, and a mechanics' institute, established only so recently as 1844, to which a judiciously selected and increasing library is also attached.

The lead mines of Cumberland are extensive and important—producing yearly, on an average, about 7,600 tons of lead, each ton yielding nine or ten ounces of silver. They are situated in Alston parish (anciently Aldenstone), a district about nine miles in length from north to south, and eight in breadth from east to west, forming the eastern angle or nook of Cumberland. It is a region of dreary wastes and narrow dales, pent in on the west by Cross Fell, Hartside Fell, and Thackmoor Fell, and on all other sides by high lands and heaths in the counties of Northumberland, Durham, and Westmoreland. The mines of Alston Moor at one time yielded 30,000 bings of ore yearly (a bing is 8 cwt.); at present the quantity does not exceed 17,000 bings, producing about 4,200 fothers (a fother is 21 cwt.) of lead. The Hudgill Burn Mine, said to be the richest ever opened in the kingdom, has been known to yield in one year 12,000 bings. The entire number in the parish, great and small, is sixty. Copper ore is also found in the same veins with the lead ore—the latter then generally containing a large proportion of silver. Iron ores are also found throughout this district, containing from 30 to 60 per cent. of metal of very superior quality. The lead ores lie in cracks or fissures of the strata; the small fissures, and such as have not altered the level of the corresponding strata on each side, are called by the miners *strings;* those which are so large as to materially to affect the coincidence of the strata, by raising one side or depressing the other, are called *veins;* hard and heavy stone veins, which are sometimes found intersecting the mines, are termed *riders;* the horizontal drifts or galleries, in which the miners work, are styled *greaves* (an old English word, signifying ditch or dyke, the correlative of the German *grabe*). Large caverns are often found in the mines, forming picturesque grottoes, resplendent with crystalline spars of various sorts, dressed in all the colours of the rainbow, which imagination sometimes peoples with the elves and dwarfs to whom ancient mythology assigned the guardianship of subterranean treasures. Among the most remarkable of these are Tutman Hole, in Gildersdale Fell, a vast cavern of unknown length, which has been explored to the distance of more than a mile—and another on Dun Fell, in Westmoreland, with chambers and passages so intricate as to rival the Cretan labyrinth, and the explorers of which have actually found it advisable to revive the contrivance of Dædalus, by taking with them a clue of thread to guide them on returning.

The mines are worked on the principle explained in a former letter, and the condition of the labourers closely resembles that prevailing in the adjacent districts of Durham and Northumberland. In 1841 the parish of Alston contained 6,063 inhabitants, and the town 1,650. "Most of the men," says a local annalist, "are miners, and, by long continuance in the works, they show a simplicity of manners rarely found amongst other labouring people. They are strong in limb, and, when in liquor, a vice too frequent, they are quarrelsome and resolute; but when from home are remarkably tractable, and steadfastly attached to their countrymen and fellow-labourers." Kindness, hospitality,

and courtesy to strangers, are pleasing features in the character of this upland population, to which even a passing visitor may bear testimony. The occupation of mining is generally supposed not to be a healthy one, and to have a tendency both to retard the period of manhood, and to induce premature old age. I turned, therefore, with curiosity and interest to the reports of the Registrar-General, with the view of testing, by correct data, the average rates of mortality, and ascertaining the number of persons living at different ages. But in all the three counties of Cumberland, Durham, and Northumberland, the mining districts are lumped together with others, of which the conditions are entirely different, and no attempt is made to discriminate between the different classes of the population; so that it is utterly impossible to attain satisfactory or reliable results in this respect. Thus it is that the most useful lines of inquiry may be frustrated by the negligence of those whose duty it is to supply materials for them. As the matter stands, big blue books, containing interminable columns of figures from which the utmost ingenuity can extract little or nothing to the purpose, may be pronounced somewhat worse than useless. In this district there are also several large smelting mills, belonging to the London Lead Company and others, with smelting hearths, reducing and refining furnaces, and separating-houses, in which the various processes of purifying and sorting the ores are carried on.

Cumberland possesses one mineral product of which no other example is found in England—the black lead, plumbago, or wad. The mine is situated in Borrowdale, about nine miles south by west from Keswick, on the eastern side of the steep and lofty mountain of Seatollenfell, in full view of the billowy ridges of Glaramara, and surrounded by the most magnificent scenery of the lake districts. It has, however, been utterly barren for the last six years, and the search for the mineral can be carried on only in a very haphazard fashion—the wad not lying in regular veins, but being found in "sops" or "bellies," formed by the intersections of strings or small rake veins, often lying at considerable distances from each other. Nine persons only are employed in the mine. The wad with which the public are now supplied is the surplus stock of previous years on hand, or imported from abroad. The manufactory of black lead pencils in Keswick, under the management of Messrs. Banks and Foster, was unique, until the establishment of the manufacture of late years in London, and it is still said to produce a larger quantity of the article than all the other manufactories in England combined. Some processes of the manufacture, including the cutting of the cedar slips, and the rounding of the case which encircles the black lead, are carried on by machiney, simple in its principle, but of complex and highly ingenious construction, which was contrived by Mr. Jackson, wheelwright, of Keswick. The slips are cut, and the channels in which the lead is to be lodged are hollowed out, by one and the same operation; two circular saws of small dimensions, of which the planes are at right angles to each other, and which can be made to revolve 2,000 times in a minute, working in combination. By this means 1,200 cases ready for the reception of the black lead can be prepared by a single workman in one hour. There are about fifty men, women, and children, employed in the manufactory—the former at wages averaging 20s., the latter at various rates, from 5s. to 15s. The miners are paid 18s.

I now come to the condition of agriculture and of the class dependent on it; and with reference to this subject I find more diversity of circumstances prevailing in Cumberland than in any other case which has yet come under my notice. From my own observation I should be inclined to conclude that a large proportion of the cultivable soil is farmed in a very indifferent manner—judging from the small fields (of shape and demarcation often the most quaint and fantastic), the scraggy and unclean appearance of the fallows, and the wet and untidy look of the fields generally. In the two western wards of Cumberland and Allendale, below Derwent, this aspect of things is very prevalent. But there are other districts in which a condition of things very different is found to prevail, and where, as in Eskdale and Allendale, above Derwent, the example of enlightened and improving landlords has given a stimulus to the backward and slothful. Of the agriculture of these districts, a competent witness says—"Every species of improvement and melioration of the soil that industry, skill, and capital could accomplish, has been brought into action; the excellent system of tile-draining especially has been assiduously attended to; irrigation is often used when the situation is suitable" (this measure has been found of great advantage for producing heavy crops of hay), "and lime, bones, gypsum, and all other kinds of manure are used in fertilising it."

Cumberland boasts some proprietors who yield to none in the kingdom in liberal enterprise and active exertion to benefit those around them; I need only mention Sir James Graham, the improvements effected by whom have entirely changed the appearance of his estate—and Lord Lonsdale, who is said to have invested no less a sum than £60,000 to £70,000 within the last few years in draining operations, under the act passed for that purpose.

Farms in this county are extremely various in size; but the proportion of those of 500 acres or upwards is very small, though in the lake district a farmer may have moorland pasture almost *ad libitum*, to add to his tilled land. There is a class of landowners in this county who, if not absolutely peculiar to it, far exceed in number and relative importance the ordinary proportion; I allude to the small proprietors or yeomanry, who are here known by the appellation of "statesmen," that is, men of estate. Most of these occupy estates worth from ten to fifty pounds a year, either freehold, or held of the lord of the manor by customary tenure. It is said that this class has been decreasing in numbers during the last seventy years; they are still estimated, however, at nearly 7,000. There is also a large class of small farmers, not proprietors, whose holdings are from 40 to 100 acres.

The cattle of Cumberland, being intermixed with

the Galloway breed, are generally small and long-horned, and in the sheep the face is often black and piebald—in both cases with the air of stock bred on the mountains. The quality of the beef and mutton, however, is hardly inferior to the primest Scottish and Welsh.

The value of land in this county ranges between two extremes, which are more widely divided than in most other districts of England. This will be best exemplified by particular instances, specifying the number of acres, and the rateable value in each parish. Stanwix parish, lying on the north side of the river Eden, opposite and close to Carlisle, is about seven miles long from east to west, and from one to two miles in breadth, comprising an area of 5,535 acres, of the rateable value of £12,359, or nearly 45s. an acre, with a population of 2,088 souls, by the census of 1841. This parish, however, includes a large village of the same name, which may be considered as a species of suburb to Carlisle, with handsome terraces and elegant houses, inhabited by the merchants and tradesmen of the adjoining city. Kirk-Bampton, a purely agricultural parish, a few miles to the south-west of Carlisle, contains 3,681 acres, and is rated at £2,868, with a population in 1841 of 536 souls. Dalston parish, also purely agricultural, contains 12,413 acres, of the gross value of £15,129, consisting in general of a dry loam—except near Dalston village, where it is gravelly, and is mostly laid down in grass for pasturage and meadow, though all kinds of grain thrive well—with a population in 1841 of 2,874 souls; the average value per acre being in this case 24s. 8d. Bowness parish, about six miles in length from east to west, and two miles in breadth north to south, occupies a large peninsular headland, stretching westward into the Solway Firth, from the mouth of the Eden and Warnpool rivers. The soil in some parts is very fertile, in others moorish and barren, the broad and flat grounds being heavy and marshy in aspect, and the parts rising gradually presenting a mixture of reddish clay and gravel; it comprises about 11,500 acres, with a tract of waste; its rateable value is £6,570, and its inhabitants in 1851 were nearly 1,500. This parish contains many vestiges of the great Roman wall, and its two extreme stations, Gabro-Teutum and Tunnocelum. Alston parish, abovementioned, containing 40,000 acres of meadow, pasture, and common, the rateable value of which is £9,792, or under 5s. an acre on an average. Hesket-in-the-Forest (so called from having anciently formed part of Inglewood or Englewood, which once covered the greater part of Cumberland, and which is described as "a goodly great forest, full of woods, red deer and fallow, wild swine, and all manner of wild beasts") contains 14,492 acres of the rateable value of £14,474—the average as nearly as possible 20s., and a population of 1,206 persons. The parish of Egremont contains 2,708 acres of the rateable value of £5,055—average nearly 40s., with a population of 1,515. Millom parish, in the same ward, contains 18,600 acres, of the rateable value of £1,060—average little more than 1s. per acre, with a population of 1,497. I need not further multiply instances.

The numerous class of small proprietors and tenants, alluded to above, in some degree restricts the employment of agricultural labourers in this county; the extra labour required on a small farm, beyond that of the occupier and his family, being inconsiderable—at least upon the very imperfect system of culture which universally obtains in such cases, except where the tenant is a man of ample means, who keeps the farm chiefly as an amusement or hobby. Generally, in this county, the labourers are lodged in or near the farm-steading, where they are boarded also, as in a large proportion of instances is the case. Their present wages are from seven to eight guineas for the half-year, which is a reduction on the rates prevailing three or four years back, when they were from nine to ten. The wages of day-labourers are in general 2s. a-day; but it is customary in this county for this description of labourers to receive their daily dinner at the farm-house, and in this case the wages given do not exceed 1s. 3d., and in many cases not higher than 1s. The advantages of this arrangement are very questionable—inasmuch as, though the labourer may thereby obtain a better dinner than he would eat at home, the amount disposable for household expense, when the man is married and has a family, is materially lessened. This arrangement, however, subsists by the consent of both parties; and I am bound to say that I have not heard it complained of by the one principally concerned.

The cottage accommodations on this side of England are, upon the whole, except in unfortunate cases of stinted means on the part of the employer, which occur more or less in all districts, not inferior to those of the north-eastern counties. The different style of building in use, as well as the different physical conformations of the country, cause the aspect of the rural districts to vary materially from those of Northumberland and Durham. The farm-houses and cottages are, for the most part, rough-cast and whitewashed, or else built of that reddish sandstone found in more or less abundance over the whole western district of our island from Cornwall to Clydesdale; in the east, brick, whinstone, or sometimes a superior freestone, are the ordinary materials.

The day-labourers of this county are more exposed to suffer than those of the east, from the competition of Irish immigrants—a source of depression from which the farm-labourers of Northumberland are protected by the bondage system. During the last year numbers of "navvies," discharged from the railroads, have sought employment in farm-work in Cumberland, and in the neighbourhood of the larger towns, often with success. These men have executed the drainage of some tracts of land at a rate of remuneration not exceeding in the whole 1s. a day.

I have alluded in former letters to the comparatively high standard of education prevailing in the northern district, as evinced by the relative numbers of persons signing the marriage registers with marks, or with their names in full—which, in spite of any cavils that have been raised in depreciation of this test, I must regard as one of the most decisive that could be selected for determining the comparative amounts of ignorance and knowledge existing in a given district. I cannot conceive any motive which

could induce one person in 1,000, out of those who marry in a state of sanity, to sign with a mark if he could muster up sufficient acquaintance with the art of writing to subscribe his name, as other people now-a-days do. I find that in this respect, of all the northern counties, Cumberland is the most favourably situated. During the years 1839-45, the mean proportion per cent. signing with marks was, in the county of Duaham—of men 25, of women 48; in Northumberland—of men 19, of women 37; in Westmoreland—of men 20, of women 35; in Cumberland—of men only 16, of women 36.

No county in England, I believe, contains a larger proportion of free endowed schools than Cumberland. The number of parishes in the county is 108; of free or endowed schools, 60. Of these a few examples, illustrative of their nature and operation, may be specified. The Grammar School of St. Bees was founded, in 1583, by Grindal, Archbishop of Canterbury (who was born in the village of Hensingham, near Whitehaven), under a charter from Queen Elizabeth. The founder's will stipulated that there should be seven governors, including the Provost of Queen's College, Oxford, and the Rector of Egremont, in the former of whom the nomination of the master was to be vested. The founder's donation was £50 a-year—viz., £20 to the master, five marks to the usher, £20 to the master of Pembroke Hall, Cambridge, five marks to an exhibitioner at Queen's and Pembroke alternately, the residue to be appropriated in repairs and other charges; the head master to be a native of Cumberland, Westmoreland, or Yorkshire, and the scholars to be educated gratuitously, excepting 2s. 6d. entrance. In 1604, King James I. granted, in augmentation of the endowment, a number of messuages and tenements in the adjoining parishes, value £28 8s. yearly. Sir John Lowther, who died in 1705, gave a valuable library to this school, which has since been augmented by other donors. The site of the school and the master's house was given by Mr. Challoner; the late Earl of Lonsdale expended a large sum in repairing and enlarging it, and in its present state it is a building with some pretensions to magnificence. The intentions of the founder have been departed from in the lapse of ages, and it is no longer a free grammar school, though offering many valuable privileges to those who are educated in its precincts. There are twelve exhibitions to colleges at Oxford, and the amount of its resources, accruing from rents and dividends in the funds, is returned to the income-tax at £1,580. The number of boys in the school is 150, of whom 35 are on the foundation, and they pay an amount of about £700 yearly. At Parton (a considerable fishing village and bathing place of ancient standing), there is a school, endowed so recently as 1818 with freehold property of the value of £45 a year, besides a free house for the residence of the master—who is to teach sixty free scholars under the superintendence of eight resident trustees, who hold an anniversary meeting in July to scrutinize the master's conduct and the proficiency of the pupils. In this instance the intentions of the founder are carried out with exactitude, the master being allowed to take twenty scholars for his own benefit. There are a great variety of minor endowments in aid of schools existing beforehand.

The remains of antiquity (in an endeavour to ascertain the circumstances and relative condition of the mass of the people, some allusion to their state in ancient times cannot be thought misplaced) existing on the soil of Cumberland, attest its former importance as one of the bulwarks of England on the northern frontier. Such are the castles of Naworth (so lamentably reduced to ruin only a few years back by a fatal conflagration), Cockermouth, Millom, and Dacre—the last of which, like some others of minor importance in the northern counties, is now converted into a farm-house.

Cumberland also contains the relics of one of the most curious monuments of past times to be found in our island—the Roman wall, still distinctly traceable at many parts of its course. "Verily I have seen the tract of it" (says Camden) "over the high pitches and steep descents of hills, wonderfully rising and falling; and where the fields lie more plain and open, a broad and deep ditch without, just before it, which now in many places is grounded up; and within, a bank or military highway, but in most places interrupted. It had many towers or fortresses about a mile distant from one another, which they call castle-steads; and more within, little fenced towns, termed in these days *Chesters*, the plot or ground-works whereof are to be seen in some places four square. But that I may follow the track of this wall more directly in particular, it beginneth at the Irish sea, hard by Blatum Bulgium, or Bulnesse (the present Bowness), and goeth on along the side of Solway Frith, and so by Burgh-upon-Sands unto Luguvallum, or Carlisle, where it passeth over Eden. From thence it runneth forth, and hath the river Irthing beneath it, crossing over Carnberk, a little brook running crooked, with many windings in and out, where are great tokens to be seen of a fortification. After this, having cut over the rivers Irthing and Poltross, it entereth into Northumberland, and, among the mountains huddled together, goeth along by the side of the river which they call South Tyne, without any interruption (save only that it is divided by North Tyne, where, in ancient times, there was a bridge over it), as far as to the German Ocean. Yet this admirable work could not arrest and keep out the tempestuous storms of foreign enemies; but when the Roman armies were retired out of Britain, the Picts and Scots, assaulting the wall upon the sudden with their engines and hooked weapons, plucked and pulled down the garrison soldiers, brake through the fence, and overran Britain far and near, being then disarmed and shaken with civil broils, and most miserably afflicted with extreme famine. But the most awful and lamentable misery of those heavy times, Gildas, a Briton, who lived not long after, pencilleth out lively in these words:—'As the Romans were returning homeward, there appear striving who could come first out of their barges—in which they had crossed over the Scottish seas, like unto dingy swarms of worms coming forth out of their little caves, by narrow holes, at noonday in summer when the heat of the sun is at the highest—a rabble of Scots and Picts, in manners partly differing, but united in one and the same greedy

desire of bloodshed. And having knowledge once that our allies and protectors were retired home, and had denied ever to return again, they with greater confidence and boldness than before time, attempt to wrest all the north side and uttermost part of the land from out of the inhabitants' hands, as far as to the very wall. Against these invasions, there stands, placed on high, in a keep, a lazy crew, unable to fight, unfit (God knoweth) for service, trembling and quaking at heart, which, night and day, sat still, as benumbed, and stirred not abroad. Meanwhile, their naked and bare-shanked enemies cease not with their hooked engines, wherewith the miserable defenders are plucked from the walls, and dashed to the ground. This good yet did such untimely death unto those that thus lost their lives, that by so quick a despatch and end they were freed from the view of the piteous pains and imminent afflictions of their brethren and children. What should I say more? When they had left the cities and high wall, they were again driven to fly and hide themselves; and being thus dispersed, in more desperate case they were than they had been before. And even as lambs are torn to pieces by butchers, so are these lamentable inhabitants by the enemies; insomuch that their abode and continuance together might be well compared to wild beasts.'"

I may now pass to Westmoreland, respecting which, however, I have little to add—inasmuch as, though its agricultural conditions differ from those of Cumberland, and large farms are more common, the lot of the labourer is as nearly as possible the same in both. "The more southerly part of this shire," says Camden, "contained in narrow spaces between the river Lone and Winandermere, is reported fruitful enough in the vallies, though it can show many fells with rough and stoney rocks, lying ever bare, without grass, and is all termed by one name, the Baronny of Kendale, or Candale, that is, the dale of Ken; for it took the name of the river Ken, which, running rough upon stones, cutteth through it. On this west bank hereof standeth Kendal or Kandal, called also Kirkby Kendale, a town of very great trade and resort, with two broad and long streets crossing the one over the other, and a place for excellent clothing, and for industry so surpassing, that in regard thereof it carrieth a great name; for the inhabitants have great traffic and want of their woollen cloths through all parts of England." Kendal is at this day one of the neatest and most beautifully built of our smaller towns. Indeed, throughout nearly all the Lake district the smallest villages have an air of elegance which is really charming, and which no doubt is attributable to the multitude of strangers resorting to them in the fine season to enjoy the pleasure of contemplating some of the grandest scenery of our island. But here I feel that I am approaching dangerous ground—for, with a vivid recollection of the poetry of Wordsworth and the prose of Wilson, who would venture to dilate on the beauties of the lakes and mountains of Cumberland and Westmoreland? I question, however, if, when viewed beneath the effulgence of a sun of August or July, they are more grand and imposing in their aspect than on a clear frosty day of winter, with their noble heads crowned with a snowy diadem, and their enormous sides clad in robes of virgin white. Skiddaw, Blencathra, and the mighty Helvellyn, mirrored in the pure waters that sleep at their feet, wear now an aspect of Alpine grandeur, and may well tempt the admirer of nature to quit the noisome smoke and dirt of our great cities for a day or two, and exchange them for the delicious quiet and clear bracing atmosphere of Keswick, Rydal, or Ambleside.

AGRICULTURAL ECONOMICS.

There are two distinct and very opposite principles in operation in agricultural economics at the present day. The one is calculated to decrease the appliance of manual labour and to substitute horse or steam power, and substitute machinery as much as possible for the manual processes: the other is to increase by very much the amount of manual labour, and so to make the amount of produce repay the outlay.

Now it so happens that while the whole of the agricultural body, as a mass, is decreasing as much as possible the outlay, laying down land to grass, economising the amount spent in labour on their farms, so as to meet their diminished receipts for agricultural produce, the great sums of money expended in draining, by the facilities of borrowing afforded by Government, has had a very favourable influence on the labour market; and there is a degree of prosperity amongst agricultural labourers seldom perhaps known at any previous period.

But when this is over it is difficult to see what must be done with the surplus so thrown upon the labour market; and which, we think, includes a considerable number of "*navigators*" thrown into this kind of work by the cessation of railway construction.

Now when all these influences serve to act upon the labour market, there must either be some safety-valve of escape, or there must be some new mode of employment devised, or the consequences will be of a very fearful and distressing kind.

In times when labour is plentiful, the employers begin to select. They take the ablest and best labourers of course, irrespective of their wants and families; and a great number of those borne down with large families are thrown out of work, or have only partial and scanty subsistence from a fluctuating employment. This will press upon the poor-rates, and increase crime and incendiarism, not to mention the incentives to poaching and idleness.

A retired farmer gives us his notions of this state of things, in a forcible letter, which though it applies less perhaps this winter than we fear it will do next, is well worthy of an attentive perusal. He says

"EMPLOYMENT OF LABOURERS.

"TO THE EDITOR OF THE FARMERS' JOURNAL.

"SIR,—At this time of the year many labourers and their families have suffered much privation from want of employment even in more prosperous times. Though plenty of profitable work might have been found, which they were both able and willing to do, they have been driven into pauperism, and compelled to while away their time in the union house. Or after starving at home, they have perhaps glided into indolence, drunkenness, and recklessness; and by frequenting that nursery of vice and crime, the beer-shop, they have been caught in the snare of the poacher, or enticed into the employment of the thief. Such cases are not imaginary: there have been abundant proofs of their sad reality.

"If such has been the case when farmers had more money to spend in labour, it is to be feared that it may be more particularly so now, since the farmers' produce realizes so little. But it need not be so, if both landlords and tenants will do their duty. Let them consider that they have the labourers to maintain either in work or in idleness, in the union house or the prison; and it is far better to employ them in labour which will ultimately be profitable, in part at least, if not entirely, than to pay for their support in the poor-house or the jail. But since times are now so difficult for the farmers, it more especially behoves the landlords to give good help, by employing labourers freely at task work during slack times. This they may do with great advantage to the labourers, the tenants, and themselves, or at least their families, in stubbing up hedges and trees, and planting others in more proper places, in draining, in trench digging, in making and repairing roads, and many other similar improvements. But if the employment be not actually profitable, the employers will have the satisfaction of reflecting that they have endeavoured to preserve the poor from suffering, vice, and crime.—A. R. F."

Now how can a vast surplus labour be absorbed? What kind of employment ought to be adopted? Too much severity cannot be used in characterizing the methods once adopted in employing burdensome paupers. They were made to wheel stones from one place to another and back again; or to dig holes and fill them up, rather than have their wages paid for idleness. Now though this cannot be done again, it is well worth considering whether something may not be done in some districts with the fork and the spade. We mean not that the plough should be displaced; it is a valuable implement, and one for which, so far, no substitute has been discovered. But it is a highly objectionable mechanical appliance. The most perfect plough is a *double wedge*. On clay soils it plasters the sole, year after year; in lighter it consolidates into a pan by its uniform pressing and driving over the same subsoil, until the subsoils become hard or impervious. The roots of plants cannot penetrate through this solid concrete. It holds the water and excludes the air, and thus sterility, coldness, and vegetable poison are the invariable results, preventing the grain from yielding, and inducing lodging of crops, "segging," as well as encouraging weeds in abundance.

The operations of the plough are all *horizontal*. It will turn a surface above it with the greatest precision, regularity, and accuracy. But it does no more. Hence digging, or a *perpendicular* motion is necessary to break down the solid sole made by the plough; and though this may to a certain extent be effected by the subsoil plough, it is only a makeshift. The real instrument for thoroughly effecting this is the fork or the spade, or some similar machine to give a perpendicular pulverization; and to go much deeper than the plough is ever permitted to do, in almost any soil whatever.

The reason why in garden allotments the produce—the yield is so much more per acre, is simply this: the soil is deeper. An alluvial soil will produce forty bushels of wheat from a crop to all appearance no more bulky than one on a thin chalk or gravel, which will only produce twenty. A crop of five quarters of barley on a thin soil will be lodged and almost worthless; while on a deep one, seven will be carried without any difficulty. You may manure as you please one of these thin soils, and you can only obtain crops of a certain maximum weight, and these by no means large ones. The subsoil wants aëration, and the roots of plants want to make progress downward to hold fast on the soil, which a tenacious, a wet, or an excessively mineral subsoil will prevent.

Now there are few farms which have not some of this stubborn subsoil, especially on the grey sands and peaty gravels. Could labourers be better employed than by trenching soil of this description? Be the cost £2 10s., £3, or even as far as £3 10s. per acre, it would soon repay the outlay. In the first year possibly no advantage would follow. It is money lent to the land. But when a vast mass of unproductive labour is pressing upon us, it is far better to employ them in something calculated ultimately to increase the produce, than to allow men like ourselves to pine in idleness and want.

Let it be remembered that all the money judiciously spent in improving the soil, will increase production. It will thus react in employing more labourers, and increase the comfort and riches of the community; and though we can never hope either by improved machinery or by the use of hand

labour, to displace the horse as an agricultural vital machine, we may reduce the number of those very heavy taxes upon the nation's resources—those great impoverishers of most farmers' soils.

These are questions which will have to be entertained when the present artificial demand for rural labour ceases, as soon it must.—Gardeners' and Farmers' Journal.

THE SEED TRADE.

That there is something rotten in the seed trade can no longer be denied. The increasing complaints of our correspondents, who declare that they are supplied worse and worse every year, furnish so lamentable a proof of the deterioration of English seeds, that our duty as public journalists compels us to advert to the subject; and the more so, because the remedy lies with the public itself, and can be readily applied by the public, although by no other party.

Among our agricultural letters of this week will be found a communication signed "A. L.," in which the writer exposes, with an evident knowledge of the arcana of seed dealing, some of the evils of our present system. He says that the farmer sows twice as much clover seed as is necessary, because he buys bad seed; he asserts that this is equally the case with turnip seed; and he adds, that inquiry into the trade in garden seed would reveal some equally startling facts. "There are persons who could tell of buying at prices two or three times greater than the article is sold for. I have known 23s. a bushel given for seed by parties whose own lists quoted it at 18s. the same season, both before and after the purchase. Others could tell of seeds being grown without any intention on the part of the raisers to sell them by their proper names, but to be killed and mixed with other seeds of like appearance. The men must be mad who do these things! Not at all: competition is so great, and the public so determined to have a cheap article, that they can do no other than do as others do, or give up the trade. Now is not this a serious subject to all the parties concerned? It must be to the purchaser, who not only gets an inferior kind, but has to sow so much thicker, that he saves nothing even in the first cost of seeds. It must be to the retail dealer, who, without any fault of his own, loses the respect of his customers by selling a bad article, though the best he can procure (it is impossible any man, whatever the extent of his occupation, can grow every description of seeds), and often suffers the loss of his best customers in consequence, besides paying heavy damages in some cases. It is equally certain to injure, in the long run, the wholesale business, as every retail dealer will do his best to render himself independent of the trade by purchasing directly of the grower what he cannot produce himself."

These assertions we know to be true; and no man, aware of the facts, dares contradict them publicly. It is true that worthless seeds are killed—expressly for mixing; it is true that old seed unable to vegetate are sold for the same purpose; it is undeniable, moreover, that the greatest rubbish, although still alive, goes enormously into the market, either by itself, or mixed off with seeds of better quality; and, finally, as we have long ago shown to be the case, half-a-dozen different names are often sold at half-a-dozen different prices, pretending to be half-a-dozen different kinds, although they all come out of the same bag. And this is so true that no honest man can be found to deny it, unless he is a simpleton utterly ignorant of the devices of dealers.

But what is the remedy for such a state of things?

It is suggested that we should follow the example of the *Lancet*, and buy up samples of peas, and other seeds, as that paper bought up samples of tea and sugar, &c., and publish the results, thus exposing the fraudulent, and establishing the character of the fair dealers. And if it were possible to tell, by simple inspection, whether a sample of seed is adulterated, as is the case with articles of food, we would readily undertake the office. But the nature of the objects to be examined renders the trial of seeds for any useful purpose a very difficult operation; they must be sown, grown, carried up to the state in which they are fit for use, and then, and not earlier, reported upon—a very different process from studying a sample under a microscope. Give a man of science a pinch of ground pepper, and in an hour he will tell you that it is made up of Capsicum husks, brown mustard skins, flour of mustard, sago flour, rice flour, potato flour, ginger dust, and so on. But a pinch of cabbage seed cannot be so examined; it may consist of turnip seed, rape seed, red cabbage, bastard broccoli, runaway savoys, or any such rubbish; but this can be ascertained only after many weeks or months. In the case of grass seeds, fraud would be difficult to prove legally by any process whatever; for if it appears that the worthless annual poa comes up

instead of, or among, the perennial poa seed, although there may be a moral conviction that fraud has been practised, nevertheless there is so much possibility of error from natural accidents, that it would be next to impossible to make out a clear case of dishonest dealing. Yet we entertain no doubt that this very kind of falsification, that is to say, selling worthless annual for valuable perennial grasses, is of common occurrence.

Then it has been suggested that everybody should be his own seed grower. To us it seems as reasonable to advise that everybody should be his own sugar broker, or his own tea broker, or that every one should weave his own linen, so that he may be sure that linen is linen, and not cotton in disguise. In the actual state of society, such propositions cannot be seriously entertained: we will even add that in no state of society can a man be advantageously his own seed-grower, except on the most confined scale. A gardener may have a very fine sort of cabbage, and if he allows no other cabbage or cabbage-like plant to flower near him, he may perhaps succeed in obtaining some genuine seed; but if any other kind of cabbage flowers in his own or his neighbour's garden, he will only reap a crop of mules and monsters. And so of other things. Seed saving must therefore be a special occupation, conducted under special circumstances. Crops must be so cut off from all other crops of the same or a similar kind, as to render mixture by muling impossible; and private individuals are not in a possition to undertake any such a task.

The public, therefore, must seek another remedy, and that remedy is to pay tradesmen a fair price for what they sell. If a man cannot live by his trade and be honest, he will abandon it; we need not state the converse of the proposition. If the public will persevere in the present ruinous race after impossible cheapness, the public must be content to suffer; and the public richly deserves it. The public deserves more; for it renders itself an accomplice in fraud, and is the great tempter who leads weak and low-principled men to the commission of offences they would not have thought of. If a baker loses a loaf of bread, and it is shown that he so placed it in his window as to tempt the poor wretch who stole it, that baker loses his remedy; if a mercer, suspecting a customer of shop lifting, can be shown to have intentionally placed goods in the way of the person suspected, so as to tempt him to the commission of the offence, that tradesman finds it difficult to obtain a conviction, and in the opinion of all right-minded men, ought to be placed in the dock, by the side of the criminal himself.

But what is the difference between the baker and the mercer on the one hand, and the public on the other? Both are alike tempters to fraud; the first put their goods in the way of people whose necessity overcomes their sense of right; the second insists upon having goods at a price at which they cannot be sold without fraud. In the one case the dealer tempts his customers to dishonesty, in the other case the customers tempts the dealer.

Does any one believe that the poor grocer who incurs the risk of an excise prosecution, and of a fine of £100, by selling a half-penny worth of adulterated pepper, would do so if he could live otherwise? But this man is required by his customers to sell for 0½d. what would cost him 0¾d. if it were genuine; to avoid ruin, he commits a fraud by which he gains 0¼d. in-stead of losing one.

The world does not see the analogy between all these cases; it is the more fitting that it should be pointed out. The curse of our age is the eagerness with which every body attempts to knock down prices beyond that they can bear, if commerce is to remain honest. The economist's maxim, "to buy in the cheapest market," is wretchedly misapplied, and Great Britain is the victim. Low prices must end in low position. Of this at least we may be sure, that so long as men pray not to be led into temptation themselves, and at the same time fix their whole thoughts upon leading others into temptation, fraud will be triumphant, and gardeners must suffer like other people.

The following is the letter referred to above:—

"SEEDS.—Some time ago, the editor of the *Lancet* sent agents to the dealers in coffee, tea &c., to purchase samples to be tested, and afterwards published the names of the parties whose goods were not adulterated; I have been thinking that if the editors of the *Gardeners' Chronicle* were to adopt the same course with regard to seeds—how many of our wholesale seedsmen would figure as dealers in genuine articles of first-rate quality? My own conviction is, that no firm could sell really good seeds at the price usually asked, without being utterly ruined. That this, in the end, must destroy in a great measure the trade in seeds, is beyond a doubt; we can hardly suppose farmers to be so stupid as to continue to pay for samples not only second-rate in quality, but of which twenty-five or thirty per cent. are never intended to grow. Take clover seed, for instance—can it really be necessary to sow the large quantity per acre usually sown, if the seed were good? ought we not to expect half the amount to produce a crop? Then, with regard to turnip seed, perhaps the most important article purchased by farmers, it is impossible to keep a first-rate stock up to the mark, without transplanting every year; this makes it a two-years' crop. The turnips are sacrificed, and also the barley crop afterwards. The expense of pulling and replanting the turnips is very great? No seed is more expensive, preserving from the attack of birds; the straw is of no value as manure. Now what price can this seed be grown for? As a large grower, I can speak with confidence, that it cannot

be grown for less than 20s. per bushel; if the crop is a bad one, it often costs 25s. or even 30s. Swede turnip seed has been offered to me by some of the largest houses in the trade at 15s., 12s., and 8s. per bushel; now how is this done without serious loss to the seller? I can show how it may be brought about. In the first place, turnip seed may be sown as a stubble crop, so as to be large enough to stand the winter, though not sufficiently large to transplant; for transplanting is of no use if the turnips are not of sufficient size to judge of their quality; this reduces it to a one year's crop. Then seed may be purchased in any quantity, warranted not to grow, which may of course be mixed to any extent. Perhaps some persons may not believe that this is generally the case; let them prove if it is or not, for themselves. Every seed in a genuine sample of turnip, cabbage, or similar round seed, will grow; nay, more—a great part of the small seed which flies before the blast of the winnowing machine will vegetate. If, therefore, a given quantity, say twenty-five or thirty seeds, be sown in a pot, and preserved by any means from the attack of birds, the fly, &c., every seed which does not grow may be put down as either too old or as previously killed. Now, how is the farmer affected by this state of things? It requires one and a half to three pounds of seed to produce an acre of turnips; this might be sold, one year with another, by a person who made it his whole business to produce the best samples, which could be grown at 9d. per lb; and it is difficult to see how he could pay the necessary expenses of sale, give the usual credit, and live by his business, at a less price The cost therefore to the farmer is 1s. 1½d. to 2s. 3d. per acre for seed—a most inconsiderable sum when we take into account how much depends upon it in the value of the crop produced. He had better pay 20s. per lb. for good seed than have bad for nothing; and yet there are men who will risk a crop of turnips to save 3d or 6d. an acre in the price of the seed. Many persons will say, why not grow our own seed? A very natural question; but is it advisable that the division of labour in this case should be done away with? Is it advisable that each farmer should breed his own rams, or that all should be breeders of first-rate bulls? Is it not better that a class should devote their time and attention exclusively to one object for the benefit of others? And will they do so unless by it their own interest is served? If the supply were dependent on farmers alone, would it not be very irregular? When keep for sheep and other stock was scarce, there is reason to believe few would be planted for seed, as it cannot be judged, as in the case of corn, by the eye; the farmer's customers would be his neighbours, and if he produced more than they required, would not the old seed remain on his hands, and in time reach them in place of new? Is it to be supposed that a small grower would generally take the same trouble with a crop of this description, as a man who made it his sole object? or that he would take pains to produce a new variety during 7 or 10 years, as a man in a large business will do? It cannot be expected; and no farmer will deny that a man like Mr. Skirving, of Liverpool, has done good in raising a superior turnip. In addition to losing the advantage of change of seed, it is very doubtful if it is not more expensive to grow than to purchase a small quantity.—A. L."—Gardeners' Chronicle.

AGRICULTURE AND THE RURAL POPULATION ABROAD.

FRANCE.—No. XXI.

THE PLAIN OF THE CRAUE.

[FROM THE SPECIAL CORRESPONDENT OF THE MORNING CHRONICLE.]

A glance at the map of France will show that the great plain through which the Rhone pours its waters as it approaches the sea is terminated, on the northern and eastern sides, by a winding range of stony barren hills, bending round from the Cevennes ridge and approaching the Mediterranean by Aix and Marseilles. The plain in question may be divided into two very different portions—the first forming the delta of the Rhone, muddy, marshy, and intersected with a lake-like labyrinth of salt or brackish ponds, ditches, and lagoons; the second divided from the first by a belt of good dry land, which in turn fades away into arid sterility, becoming, in almost every particular save the common feature of extreme flatness, the very reverse of the western portion of the expanse. The former is the tract known as the Camargue—the latter, that called the Craue. A more curious anomaly in the conditions of different parts of the same expanse of level land is perhaps to be found nowhere in Europe. Both districts were at no very distant date absolute wastes—the Camargue a mud swamp, the Craue a stony desert. They are now being rapidly brought into cultivation by opposite methods—the Camargue by drainage, the Craue by irrigation. The Camargue farmers can do nothing without rearing dykes to keep out the water; the Craue cultivators are powerless until they have dug canals to let it in. Between the two processes, however, I hope to be able to sketch the main and varying features of a couple of curious agricultural pictures.

The Craue may be divided into two general portions—those cultivated in a greater or less degree, and those still remaining a dismal waste of shingle and round stones, but still not without their uses as pasture ground. The tilled and productive parts form principally the borders of the stone-heaped waste; but here and their run veins of superior land through the wide grey expanse of stone, and now and then the vicinity of a pond or marsh produces a literal oasis in a literal desert. On the

Arles, or western side of the Craue, the cultivation is mostly that of artificial meadows. On the Salon, or eastern frontier, it is mainly corn, olives, and almonds. Both of these districts are included in the *Plaine du Craue;* but the Craue proper is the extraordinary expanse of flat poor land, covered, for dozens of square miles, with a layer, more or less thick, of round stones and shingles, among which grow all manner of furze, heath, thin grasses, and low prickly shrubs. Tracts, floored with shelves of rock, here and there penetrate into the shingle beds, and set at defiance the utmost efforts of the cultivator. The Craue is a very long-standing feature of France, having been more than once alluded to and described by the Greek tragic dramatists. Its mythologic origin is curious, if not, as a scientific theory, satisfactory. It seems, that hereabouts Hercules felt himself bold enough and strong enough to attack a whole tribe of the Ligurians single-handed. Notwithstanding, however, all his muscle, the son of Alcmena was hard put to it—when Jupiter, with a paternal feeling which he did not in all cases exhibit, rained down for his relief a shower of stones, to be used as missiles against the enemy. One would have thought that the expedient was a very ill-judged one, seeing that the obvious plan would have been to shower the pebbles at once on the heads of the strong man's assailants; to say nothing of the chances in favour of the Ligurians turning the tables, appropriating the ammunition, and so pelting instead of being pelted by Hercules. The demi-god, however, is said to have triumphed, and still upon the field of battle there lie, spread over scores of miles, his well hurled broadsides. The more modern opinion, however, disdaining the romantic tale above cited, is that, not Jupiter, but the river Durant bespread the Craue with shingle—the Alpine stream in question, still a wild and fitful torrent, having rolled these masses of debris from the mountains during a period when the physical features of the district were different from those which now characterise it. And that this theory is well founded is, I believe, no longer a matter of doubt.

Arthur Young, in his journey through France, seems to have been greatly struck with the strange phenomenon of the Craue. The plain is, he says, "composed entirely of shingle, being so uniform a mass of round stones, some to the size of a man's head, but of all sizes less, that the newly thrown-up shingle of a sea-shore is hardly less free from soil. Beneath these surface stones, is not so much a sand as a cemented rubble, with a small mixture of loam. Vegetation is rare and miserable—some of the absinthium and lavender so poor as scarcely to be recognized; two or three miserable grasses, with centaurea, calycitropes, and solstitialis, were the principal plants which I could find." That this description, however, only applies to the most barren portions of the Craue must be pretty evident from the fact that upon its uncultivated tracts, in general, thousands of sheep are kept in very good condition through the winter; and hardly a year passes without fresh districts being brought under tillage, and converted, if not into meadows, into fields producing thin but wholesome crops of corn, mulberry, olive, and almond trees. The "cemented rubble, with a small mixture of loam," is found, indeed, to be endowed with more valuable qualities than the shrewd agricultural tourist gave it credit for. An enterprising Marseilles merchant purchased twenty years ago a tract of the Craue for under 20,000 francs. It is said now to be worth from 150,000 francs to 200,000 francs. Another energetic cultivator, an exiled Polish nobleman, is now carrying on extensive works of *défrichement*, and bringing many square miles of land under such tillage as it is suited for.

Let me here, before proceeding further, try to sketch the desolate grandeur of the true pebble-covered Craue, as contrasted with the rich and highly cultivated tracts which form its frontiers. Imagine, then, an apparently boundless expanse of brown-grey and dusky-green, a desert of shingle, stunted herbs, and rock veins and splinters. Look narrowly, and you will perceive that everywhere, except where the Durant has left absolute waves of soilless gravel upon the land, grass and aromatic herbs are struggling manfully up through the stones; and here and there the eye is caught by jungles of a dark green shrub, bearing a species of fruit like the cone of the fir, only the local name of which I was able to ascertain, but which I was informed the sheep ate greedily. Making your way along the waste, you will traverse districts occupied by stones of all manner of sizes—the greater being frequently rolled in beds together as if carried by some particular wave, the weaker successors of which had only been able to drive the smaller pebbles further. Here and there you will come upon a slightly marked but rolled track, winding across the plain, and in patches in its vicinity you will find the larger stones carefully gathered into heaps, and a thin crop of corn shooting up among the smaller pebble. Dreary as the wilderness looks, you perceive that it is not uninhabited. Small bare-looking houses occur at distant intervals; or still ruder hovels with circular roofs—such habitations as Cannie Elshie, the Black Dwarf, might have reared—have been piled up from the abundant materials at hand. These are the abodes of the shepherds, who in winter time tend the vast flocks of sheep pastured upon the Craue. Gaze around, and if it be the right season, you will see the expanse dotted over with the herds—the solitary figures of their guardians, leaning upon their long pastoral staffs, often finely relieved against the horizon. Occasionally, in the vicinity of the hovels, you may observe the low, dusky walls of folds, formed of wicker-work and woven rushes, within which the flocks are nightly collected. These folds are of course easily moveable, and one of the first steps towards reclaiming land in the Craue, is to station one of them nightly upon the soil to be improved.

So much for the pastoral portion of the plain in question. The grand artificial feature of the Craue is, however, the immense system of irrigation which is daily bringing masses of it into greater or less fertility. Verdure follows the track of every watercourse, and adorns the edges of every shallow pond, which trickles or stagnates through the stony waste. The application of the water to the

"cemented rubble" would perhaps be attended with no very special consequences in England, but under the sun of Provence the effect is magical. Let the soil be as sterile as it may in appearance, so long as the drying mistral sweeps only over a surface of scorched shingle and driving dust—a stream has only to be turned through the ground, led hither and thither, through a net-work of furrow-like canals, and the latent powers of the soil exhibit themselves in the production of an immediate crop of natural vegetation, often rich to rankness. This characteristic of the country was early known to its cultivators, and the topographical peculiarities of the district enabled them to avail themselves of it. In 1525, an individual, whose name enjoys great and deserved local celebrity—Adam de Craponne—was born in Salon. This person seems to have been a self-trained engineer of no mean powers; and, casting about for some plan to obtain a good supply of irrigating water for the Crau, he thought of the Durant, the stream of which runs north-westward to join the Rhone at Avignon, skirting the landward extremity of the plain. The level of the former river at some thirty miles from its point of junction was of course considerably higher than that of the latter—some thirty miles below the confluence; and thus Adam de Craponne found no difficulty in carrying a canal, in a winding course—so as to bring it as close as possible to the best tracts of land, right across the Crau. The water is derived from the Durant, at a place called Antheron, and as much of it as is not absorbed in the thirsty soil, falls into the Rhone at Arles. The work was completed at the projector's expense, during the latter half of the sixteenth century, and was the first canal, for purely irrigational purposes, constructed in France. With shrewd powers of adaptation, Craponne managed to avail himself of several portions of a Roman aqueduct, which he so far repaired and restored as to suit his own purposes. These ancient works had originally been built for the supply of Arles with drinking water; but the turbid torrent which now hurries along them is very different from the limpid Alpine stream contemplated by the Roman masons. The Canal de Craponne is about thirty or thirty-two miles in length, and presents the general appearance of a strong-running muddy brook. Branch canals of different sizes, according to the extent of the collateral district which they are to embrace, run from it thickly on either hand, and from these again a vast and complicated system of smaller channels diverge. Considering that the greater portion of these waterways have been constructed by mere rule of thumb, the satisfactory manner in which they work is astonishing. In several districts two distinct water levels are preserved, and one tiny stream is carried across another by means of wooden shoots; or, in the vicinity of Arles, with the help of mutilated stone coffins, found in great plenty near the ruins of a Romanesque chapel there—and which, by the simple process of knocking out the slates at the head and the feet of the sarcophagi, the economic farmers of the Crau discovered they could turn into excellent ready-made aqueducts. The chapel in question, which lies invitingly near the brink of the canal, is in many respects a curious one. The adjoining fields are said to have formed a great necropolis in Pagan, and as great a churchyard in Christian times. Empty stone coffins lie around by the score. Those in any way curious, from their sculptures or effigies, have been removed to the various museums of the district; but quite enough of the plainer sarcophagi have been left to furnish every farmer for miles around, with bridges for his ditches—made, of course, out of the coffin lids—and with viaducts for his canals, and drinking troughs for his cattle, formed from the coffins themselves. Besides the Canal de Craponne, another main water-course, on a somewhat smaller scale, traverses the Crau, deriving its waters from the same source, and flinging them into the same repository. This canal is north of Craponne, and waters another district. It was made by a bishop of Marseilles, and remained the property of his descendants until the Revolution. Both canals are now the property of companies, who derive handsome incomes from them, the works being simple, and requiring very little looking after. Of course subordinate streams are never set in motion except when the actual work of irrigation is to be performed, and the proprietor or farmer of the ground to be watered is generally entrusted with the whole conduct of the operation. The price of the water depends entirely upon the extent of land to be irrigated, without any regard to its quality. The proprietor cuts the necessary canals, and on the payment of a moderate rate, not above six francs per hectare, can water his land as much and as often as he pleases. As to the effects of irrigation upon the Crau, I again quote Arthur Young. His account is rather under than over the mark. "The meadows I viewed," he writes, "are among the most extraordinary spectacles the world can afford, in respect to the amazing contrast between the soil in its natural and in its watered state, covered richly and luxuriantly with clover, chicory, rich grass, and avena elatior."

I am not aware of the season at which Young saw the meadows of the Crau; but to British eyes one of the most astounding features of the spectacle is the sight they afford in the winter time, when every grass field in England appears a carpet of soppy, brown, spongy, pithless, and spiritless herbage. You see the sight to still greater advantage if you have previously traversed the dreary nooks and dusty fields which for the most part make up Provence, at a period when the gray olive is the only tree in leaf, and when the vineyards are nothing but wastes of dust and shingle—overrun with what appear to be the tips of black burnt-up stakes, supporting plumes of dry sapless switches. It was close upon the end of November that I found myself traversing the artificial meadows in question. They extend nearly up to the walls of Arles; and the road to Marseilles, which crosses the entire plain, is carried for some dozen of miles through this belt of watered, grassed, and wooded land. The contrast with the bare arid country I had so long been traversing was wonderful. I could have fancied myself in England late in May or early in June. All around me stretched hedges, which might have sprung up in Yorkshire, broken by clumps of glorious elm, beech, and oak—the

trees of the gigantic size which one sees in parts of Devonshire. But the grass was the main wonder. The Pyrenean water meadows, beautiful in their way, and rich and fresh in hue, showed little of the coarse rank vigour of the herbage here. The former were trim carpets of soft, smooth, green sward. The grass of the Craue sprouted in jungles and tufts, very coarse and irregular, but excessively thick, strong, and full of sap. Crossing the meadows, the foot sunk deep in the cushion of fast-springing herbage, while the whole field was sprinkled with newly blossoming daisies, buttercups, dandelions, and all manner of grass-flowers. On every side the trickle of running water might be heard, the ditches being usually lined on either side by hedges, among which all manner of weeds—hemlock most notably—sprung up in apparently undisturbed luxuriance. These latter crops are not, however, without their uses. Cut by the hand with hooks, they are carried home by donkeys in panniers, and spread all round the farm wherever they are most exposed, to be trampled upon, to rot and ripen into manure. In one little town which I visited, St. Chamas, I found every street a litter of rank grass and weeds. It was a pouring wet day—the green layers were seething and steaming in the warm thick rain—and altogether the mess was fearful. To return, however, to the meadows. The spring-like feeling with which they inspired one was not diminished by the sight of dozens of lambs running alongside their mothers. At first I could hardly believe my eyes, and then the summer-sounding note of the corn-rail was heard, to add to my bewilderment. I soon found, however, that the sheep which are fed upon the Alps during the summer months, and pastured in the Craue in winter, lamb in the two months from the early part of November to the early part of January. The animals are fed in the water meadows to fatten them for the butcher—and that, in general, only upon the fourth crop of grass. The arrangement usually followed is much the same as in the case of the artificial meadows under the Pyrenees. Three excellent crops of hay are produced, and the cattle are afterwards grazed. The branch canals, and subsidiary canallets—if I may coin the word—are kept in capital order, and the masonry round the sluices of the former is so firm and careful that it might have been applied to a work of far greater extent and importance. Many of the meadows were devoted to other purposes than that of producing hay crops—being orchards, thickly planted with pear, apple, and plum trees, as well. The appearance of the district is thus, as may be conceived, fresh and rich in the extreme. Farm-houses are very thickly scattered over it, embowered in trees, but, what seems strange, seldom or never provided with gardens for either vegetables or flowers. The average product per hectare is, I am informed, about 30 metrical quintals of hay, each quintal being worth from three to four francs. The system of irrigation in use is very similar to that which I have already described *apropos* of the Pyrenean water-meadows; the green sward being sometimes copiously drenched—in fact laid completely under water—at intervals of from eight to fifteen days during the growth of each crop; the water being in other instances only dispersed through the *rigoles* with which the fields are furrowed, and thence left to soak through from one to the other. I cannot find, from the inquiries which I instituted, that the irrigating system makes the district, as it has been represented to be, unhealthy. The water dispersed over the meadows speedily sinks into the ground, and when the latter is saturated the residue is at once drawn off. Were the water to stagnate so as to breed miasma, the very end of the irrigation would be foiled. The cultivators, on the contrary, watch attentively for the first appearance of floating scum—always a sign that the process of putrefaction has commenced beneath—to get rid of the water as speedily as possible.

The metairie, or, as it is hereabouts called, the *mesary* system, prevails partially over the Craue. In the meadow district near Arles, the practice is all but universal, whatever may be the nature of the crop upon the ground. The conditions are, however, in some instances different from the usual terms. The land requiring little or no culture, calling for neither plough nor harrow, but bringing forth its crops in abundance upon the easily accomplished terms of drenching it with water, the proprietor may reasonably demand a somewhat larger share than one-half of the produce. The actual arrangement, however, is, that the metayer finds what animal power may be wanted about the farm, a branch of the service usually supplied by the proprietor. The whole of the expense of cutting and storing the hay is likewise borne by the metayer, sometimes amounting to no inconsiderable sum, as it is of importance to secure the crop as speedily as possible; and from the regularity with which the produce ripens, and the uniformity both of the character of the soil and the tillage, there is a great demand for labour at stated periods of the spring, summer, and autumn, and consequently a high average of wages, running from 35 to 40 and 45 sous per day. I inquired of one jolly-looking fellow, a metayer, whom I found busy among the boughs of a pear-tree, grafting it with fresh shoots, whether his master, the proprietor, looked much after the cultivation of his estate. The man seemed astonished at the question; "Why should *he* look after the farm?" he asked. "It is I, not he, who cultivate it." I inquired whether the proprietor never gave him any advice—never took any interest in the working of the farm—never threw out any hints or notions for the improvement of the ordinary annual routine of operations. But no such relationship subsisted between the two. My metayer, supposing that the drift of the questions I asked was to undervalue his particular system of cultivation, stoutly asserted that he did what his neighbours did, and just as well as they. What would be the use of the *bourgeois* interfering? There was a regular way of doing things in that part of the country; every farmer and metayer followed it, and he among the rest. The only time, he said, that his proprietor and he met, was when the hay was weighed. He was quite sure of seeing the landlord then; and the money settled upon at the meeting in question, as representing one half of the produce my acquaintance paid to the land-

lord's *homme d'affaires*. He had a comfortably-built house, one-half of it being devoted to living rooms, and the rest to store-houses for the hay. Each estate of any size hereabouts is provided with a proprietor's house and a farmer's house. In some cases they are contained beneath the same roof—in others they are separate buildings. In one portion of the Crau I saw a large pile of farm buildings, which I was told contained accommodation for the landlord and three tenants, all surrounded by the same walls. As often, however, as not, the farmer occupies the principal dwelling or *campagne*—the landlord living in the next town, and only paying an occasional visit to his domain when crops are to be weighed and divided, or game killed. In these cases the structure intended for a farm house is often degraded to a receptacle for tools, or a store place for firewood and hay. The half of the whole produce is sometimes paid in money, and sometimes in kind. The metayer can always be turned adrift upon a year's notice; but, except in cases of serious quarrel between master and man, such a separation seems to be seldom thought of. French tenantry, indeed, as a body, whether metayers or farmers, appear to have very little, in this respect at least, to complain of. I continually hear of cases in which farms have remained in the same family for generations. The case of the metayer growing old and becoming incapable of paying the necessary attention to the land, without having sons upon whom the charge would naturally descend, appears to be that which, in the greater number of instances, produces the distressing result of a forced removal.

I have stated that the Crau is, in the winter months, thickly covered with flocks of sheep, driven down thence from the French and Piedmontese Alps. These migrations are managed much in the same style as those in the neighbourhood of the Pyrenees, and have been practised from time immemorial—almost, in fact, since the days in which Jupiter is supposed to have given the land its coating of stones. The average length of time taken by the flocks and their guardians to perform the journey from that portion of the Alps which they chiefly frequent to the Crau, is from eight to twelve days, being at the rate of from twelve to fifteen miles per day. The sheep are shorn before being driven to the hills in May. They return to the plain upon the fall of the first serious snows. In appearance and dress the shepherds of the French and Italian Alps are not unlike their brethren of the central and lower Pyrenees. They invariably wear huge leathern haversacks suspended across their shoulders, and heavy mantles, generally carried in graceful fashion over one arm. Each shepherd is furnished with a long staff, which he uses as a missile with great dexterity, sending it flying through the air, and against the ribs of any unruly member of his flock, with never-failing effect. The herd, both upon the mountains and in the plain, is usually attended by two or three donkeys loaded with the provisions and small store of clothes of the shepherds, carried upon antique pack-saddles. On the mountain they live much in the fashion of their pastoral brethren all the world over—dwelling in cabins or shealings made of turf or stone, principally employing themselves in the manufacture of ewe milk cheeses, and occasionally descending to the nearest village to replenish their exhausted meal bags. On the Crau they have a somewhat better class of dwelling, suited to the different seasons. One-half of these houses often forms a well littered and roofed fold, into which, in severe weather, the lambs and their mothers are received at night. Most of the shepherds are unmarried men, the occupation being hardly suited to the fathers of families. A few, but only a very few, are the proprietors of the flocks they tend. The vast majority are the servants of individuals residing in Marseilles, Aix, Arles, Salon, and the surrounding towns, who perhaps seldom or never see the flocks from which they derive their revenues. From 200 to 300 francs with allowances of corn and sundry other articles of coarse food, form the general range of a shepherd's wages. The Alpine tracts in which the flocks feed, unlike the Pyrenees, are seldom communal property, and a regular price per head is paid for right of pasture. The amount of the summer expenses, including the wages and allowances of the shepherds, are from 40 to 50 sous per head, according to the nature and situation of the pasture. The winter grazing upon the Crau is dearer, ranging from three to five francs per head—the latter price generally comprising pasture for a ewe and a lamb, and including shepherd's allowances. The grazing is, I am assured, good and fattening. The low creeping aromatic plants and shrubs to which I have alluded are eagerly devoured by the sheep; and they speedily acquire the knack, after they have browsed the blades springing up above the shingle, of turning the pebbles over with their noses and getting at the short thick fell of sweet grass beneath. The animals generally fetch the following prices:—Ewes from 12 to 20 francs; wethers from 18 to 26 francs. The latter are generally killed at three years of age. The breed is a thick long-woolled one, of medium size. The bell wethers regularly, and sometimes all the wethers in the flock, are marked, in a curious and not very elegant fashion, by a contrivance causing the wool to grow over circular patches upon their backs, in high round locks or bunches, giving the animal an ugly diseased look. I could ascertain no definite reason for the practice, which, however, is universal. One or two of the shepherds' houses into which I looked upon the Crau, I found to be particularly uncomfortable bachelor establishments, consisting for the most part of a single room, with a fireplace littered with a pot or two, and a few spoons and platters, a rude deal table, a couple of stools, and a coarse straw-stuffed mattress and not over-clean blankets in the corner. The walls consist generally of the bare stone, full of crevices and crannies, which must be especially disagreeable during the prevalence of one of those mistrals which sometimes, it is said, blow with almost unabated violence for a month together.

The greater portion of the Crau is private property. The communes in the vicinity, however, have each a tolerable slice of the uncultivated land—an arrangement one of the effects of which is to keep waste ground always waste ground. To steal

the goose from the common is proverbially a dangerous exploit in England; but to steal the common from the goose is a still more hazardous affair in France. Of no right are the country people more jealous than of their communal privileges; and even in wildernesses like the Landes, the allotment among the inhabitants of the public property of the district, decreed by the government as being likely to improve the condition and add to the wealth and labour-fund of the whole community, gave rise to violent opposition and long-continued heart-burnings. In the Craue, the communal portions of territory are free for the flocks of persons resident within the district, from March to September. In the winter months individuals feeding their sheep upon the communal tracts pay the ordinary grazing prices. The flock thus pastured belong, in general, to the small proprietors and farmers in the villages and suburbs of the towns.

On certain portions of the Craue, newly brought into tillage, I found prevailing, for the first time, a contract of metairie by which the labourer obtained two-thirds and the proprietor only one-third of the produce. The arrangement, of course, arose from the very small amount of the crop produced, upon the half of which the metayer could not live, and the comparatively severe labour requisite to grow that scanty harvest. The ploughing amid the stones is, however, by no means such heavy work as might at first be supposed. Once broken up, the soil beneath the pebbles is light and easily stirred; while the stones being round, and merely lying upon the surface, give way without difficulty before the plough. I saw many of the latter implements—their shares formed of wood, enveloped in sheet-iron.

Upon the eastern or arable portion of the Craue—where, instead of plum, apple, and pear trees growing from meadow land, olives and almond trees rise above corn—there are as many farmers as metayers. Hereabouts are numerous large estates, from which their proprietors draw a fixed income. The farmer has the charge, and reaps the whole produce of the land—corn, vegetables, olives, and almonds. More than one of these farmers, I was told, paid as much as 10,000 francs, more than £400, of rent. Yet even in such cases as this, the individuals in question are mere peasants, dressing and living like their labourers—shrewd, it may be, and not unendowed with mother-wit, but still—beyond, perhaps, a little reading and writing—quite uneducated, imbued with all the prejudices of the district—and, in short, honest, unenlightened, jog-trot men of routine. The agreements upon which farms are frequently let here are mere verbal understandings. Not a syllable of writing is thought of on either side. Occasionally, however, leases for five, eight, or ten years are given. In other cases it is understood that, if the proprietor grants land for a certain number of years certain—say from two to four—he is morally, and by the custom of the country, bound to give his farmer an equally long notice of his intention to remove him. The crop upon the ground is always held to belong to the occupying tenant.

The system of crop rotation pursued in the arable districts of the Craue is a very simple one. It consists in leaving the land in fallow every second year, sowing in the alternate seasons with wheat, oats, or barley. The heavy farm work is almost entirely performed by mules, a fine, strong breed of which is hereabouts raised. These creatures, I was informed, are far stronger, and more workable, in proportion to their price and the food which they consume, than horses. Yet they are by no means cheap. A really good mule costs from 800 to 1,000 francs. The breed of asses is also much used for lighter work, such as carrying vegetable produce to market, and household purchases back from the towns. The creatures are well-fed, well-housed, and seldom or never ill-used, and form a striking contrast to the wretched animals which our costermongers belabour along the streets. Coleridge would have been quite flattered in hailing them as brothers. Their value is low as compared with that of the mules, ranging from 100 to 200 francs.

It is not easy to ascertain with anything like exactitude the average rent of land in a district in which the quality and condition of the soil change every few roods. The upshot of my inquiries in this particular was, that arable and olive-growing land in the Craue is seldom let under 20 francs, and seldom let over 50 francs per hectare. When a cultivator in this district enters upon a large metairie, a regular valuation of the implements and cattle handed over to him is made. When he leaves the holding, the same individuals, if alive, make another estimate of the moveable property, and the metayer pays the amount of deterioration, of course deducting the necessary wear and tear. In the case both of farmers and metayers, all permanent improvements effected upon the land are paid for by the proprietor, upon the verdict of a jury of *experts*, which either side is empowered to summon. I understand, however, that there is seldom much occasion for the assemblage of such tribunals. The most ordinarily effected *ameliorations* of the land are those accomplished in the process of reclaiming it from waste. These works are of course always undertaken by the proprietor, and, the soil once brought into cultivable condition, the farmer jogs on in the routine of the district. In every case, either of farming or metayage, all public burdens are paid by the proprietor of the soil. Let me add to the foregoing sketch of the irrigation of the district, that corn in general, and wheat particularly, is sparingly watered. When the blade begins to spring, a good drenching or two is admissible; but, as the grain ripens, the field is only laid under water in the last extremity of drought. The corn crops in the most fertile portions of the district are injured in no small degree by the numbers of olives, mulberry, and almond trees grown amongst them. The olives are generally poor stunted affairs, no better than shrubs, and hardly paying the expense of their culture, which is always considerable. Many of them are planted in bad clayey land, and look drooping and miserable in consequence. The mulberry, in fact, seems to be gradually ousting both of its older-fashioned brethren from the field.

Of the management of the almond tree I have as yet said nothing; and there is really not very much to be said at all. It is an ugly, shrub-like

tree, bearing a good deal of resemblance to the mulberry—a mop of round-growing branches rising from a short smooth stem. The almond tree is far less difficult in its choice of ground than the olive. In fact it will grow where the latter *will*, and where the latter will *not*. It flourishes upon dry stony slopes and moist loamy bottoms, and will shoot among rocks, provided its roots find crevices down which to thrust their fibres. The almond tree is said to have four advantages over the olive. The first is, that good vigorous shoots, or *sujets*, can be had for from 25 to 30 centimes. The next is, that it requires a hole for setting not deeper than from 50 to 80 centimetres, or $1\frac{3}{4}$ to 2 feet. The third is the comparative rapidity with which the tree can be reared from seed in nursery-gardens (*pepinieres*), or, still better, in the earth in which it is destined to grow—the seed being deposited in a shallow trench wrought by the hand, or in a furrow turned by the plough. And the fourth advantage is, that the tree, being hardier, can, when in its young state, dispense with the stimulating earths and manures, and the repeated waterings and loosening of the soil round its roots, which are indispensable in the culture of the olive. The annual care given to the almond consists of a hoeing or two round its trunk, to root out weeds, and a slight pruning of its more straggling branches. No manure whatever is applied to it. In the quaint phrase of a peasant whom I questioned upon the subject—*l'amandier ne mange rien*. The tree is in several respects a profitable one. It yields a very fine close-grained wood, well suited for the cabinet maker, and not unlike mahogany. Its blossoms are said to furnish the bees of Provence with their very finest and sweetest honey, and the bark is used in the manufacture of soap. The yearly crop of almonds is, however, a very uncertain one. The tree blooms very early in spring, and the blossoms are extremely apt to be nipped and withered by the white frost, or torn away by the merciless mistral. The tree itself is seldom or never injured by these atmospherical influences, but its crop is destroyed for the season. Both the present year and the last have, I understand, been fatal to the almond harvest. In the department of the *Bouches du Rhone*, for example, hardly a tree has yielded a sou since 1848. A large and thriving almond tree, in a good year, will yield 10 or 12 francs worth of fruit.

ON THE IMPORTANCE OF GROWING NON-EXHAUSTING CROPS.

In calling the attention of agriculturists to the importance of growing non-exhausting crops, it is only necessary to show how great is the saving of manure; how important to the land to have a crop grown which does not indispose it to future production; and how valuable to have a range of crops at command, which, while they make money to the farmer, will admit of his land continuing in good condition.

Now while green crops, for the two important reasons of not being allowed to mature their seed, and being consumed on the farm by stock generally feeding, are invariably considered enrichers rather than impoverishers, those which do mature their seeds, and which are not so consumed, are as commonly considered exhausters.

There is but one crop with which we are acquainted which does not quite come within this category—we mean the bean; and though it must be admitted that if it were grown to any great extent, and all the grain sold off the farm, it must deprive it of its nitrogen, and so far impoverish it, still it is not by any means as exhausting as many crops which could be named, and is, in fact, the only grain to which this may be with safety applied.

But notwithstanding that the pea is so nearly allied to the bean, partaking of much of its cultivation, the one is much more exhausting than the other. In their ash we should hardly expect to see much difference. Take a whole crop on an acre of land, the latter may be thus expressed according to Professor Johnston:—

	lbs.
Potash	103·81
Soda	7·02
Lime	36·33
Magnesia	14·53
Oxide of iron	0·79
Alumina and a little oxide of manganese	0·65
Phosphoric acid	27·52
Sulphuric acid	2·25
Chlorine	4·65
Silica	12·45
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Now if we take the phosphoric acid and the potash as the representatives of the manure of which the bean and the pea exhaust the land, and compare them with oats, barley, and wheat, they will stand thus, per cent.—

	Potash.	Phosphoric acid.
Oats	26·18	43·84
Wheat	23·72	49·81
Beans	33·56	37·57
Barley	13·64	38·93
Peas	36·05	33·29

A crop of oats, wheat, and barley, abstract of these however the following, per acre:—

	Potash.	Phosphoric acid.
	lbs.	lbs.
Wheat	29·59 ..	20·56
Oats, with soda	75·66 ..	19·86
Barley	17·53 ..	25·76
Whereas in beans it is as above	103·81 ..	27·52

Chemically, therefore, beans might be expected to be the most exhausting, instead of the least exhausting crop; and yet any tyro knows that a clean bean stubble is the best possible preparation for a crop of wheat.

This appears to be a contradiction between science and practice; but it is scarcely so; for though chemistry alone will not account for it, yet vegetable physiology will to a certain extent accomplish it; and we have but to examine the root of the bean, and see how different it is from that of the cerealia, or even from any other of the leguminosa, and a reason will appear at once for its being less exhausting, or appearing so at least, when succeeded by them, than might otherwise appear to be the case. It feeds in the subsoil, in a range of soil different from those plants which cast out surface rootlets, as the corn crops generally; and leaving the top soil impermeated by its roots, so far allows the soil to retain its nutritive particles, and thus to have more ready food for a subsequent crop, though in reality bulk for bulk it possesses less absolute aliment. The bean, covering only a portion of the ground, is far more subject to horse and hand hoeing; and therefore as new surfaces of soil are constantly presented to the atmosphere, it is more calculated to absorb the fertilizing gases thereof.

Then by far a greater portion of the bean crop is left on the land than any other. The leaves are usually mostly decayed and mixed with the soil, so that some decaying vegetable matter is at any rate left; while the shade of the leaf has the same mysterious influence which appears to be exercised by a "smothering crop" of red clover, or turnips, or of rape; and to this we may attribute the usual success of the bean crop, as a forerunner of wheat. But the complaints we constantly hear of the uncertainty of the crop, are often so great as to deter a cautious farmer from risking a crop; and we often hear great hesitation expressed even at introducing a bean crop instead of the clover on land where the latter is manifestly in every moral certainty a failure. Now we believe that when proper cultivation takes place, no failure of the beans need be expected beyond that which applies to every other cultivated crop.

Let the farmer who dreads the "bean dolphin" sow the winter bean, and he is safe. It is as unusual for it to be injured as it is to lose the oat by wireworm, or the wheat by mildew, or the barley by smut. And let the beans be cultivated as if they were a crop. As they are deep feeders, give them depth of soil artificially, by ridging. And as they are drilled crops, give them manure; and above all let them have *ample room*. The drills must be never less than 25 inches, should perhaps rather be 27 or even 30! This admits of full operation of the horse hoe and the hand hoe. There is more space, and the operation can be performed to a much later period of the year; and if properly managed, they will always cover the space before harvest. But the perfection of bean cultivation is to *plough between the rows*. If these precautions are taken, with a cutting off of the last shoots before the bean has ceased to grow, and as soon as the last flowers are set, we think there need be no apprehension of growing an abundant crop of that valuable grain, the bean.—Gardeners' and Farmers' Journal.

CHRONICLES OF THE WILD CATTLE PRESERVED IN PARKS.

[This interesting article from the pen of Mr. William Hilton Longstaff, of Gateshead, appeared originally in the *Durham Advertiser*, and is by his permission transferred to this Magazine.]

The fossil specimens of oxen are only found in the latest formations in Britain and other countries: Cuvier has distinctly shown the difference between their features and those of the auroch or bison, and it is unnecessary in this place to discuss the question whether the urus of the ancients applied to animals cognate to our wild and domestic oxen, or to the aurochs or bisons. The fossil oxen were one-third at least greater than the largest modern breed, and their horns were much more massive. With the exception of the horns, their anatomical structure was precisely the same as that of the domestic kind. Cuvier therefore concluded that the fossil bones appertained to a wild race, the true stock of our domestic oxen, a race which has been annihilated by civilization, as in the cases of the camel and dromedary. The points of difference between the fossil and wild oxen and the domesticated breeds are briefly these. The size of the fossil specimens is much larger than that of either the wild or tame cattle of the present day, and the horns "show a peculiar rise from their roots upwards, then bend outwards, and then forwards and inwards. No domestic races show this turn; but numerous specimens of inferior sizes, found fossil in the Cornish mines, have this shape, and the wild

bull of Scotland, the only example of this type now known to exist, retains it." The horns are also stated to be placed at the side of the occipitral crest, in the ancient, at the ends of the frontal ridge in the modern breeds (*a*).* The colour is invariably white in the wild cattle. "The wild bull was a perfectly wild, savage, and untameable animal; not only does every account handed down from remote antiquity assure us of this, but it is even verified by the only living example of this form we possess, still preserved in one or two of the northern parks. Although domesticated so far as to live within such precincts without absolute unprovoked violence to its keepers, it retains essentially all the savage characters ascribed to the more powerful species mentioned by the antients. Like that also, it possesses, when at a mature age, a kind of mane, about two inches long, and its throat and breast are covered with coarse hair. These characters, which are never found in the domesticated breeds, were no doubt much more highly developed in the antient urus." "Although the two types come so near in external appearance, nothing can be more different than their moral character—the urus, wild, savage, and untameable, remains with all these propensities unimpaired—the other, tame, harmless, and enduring, has voluntarily submited to the service of man, and seems to have been a companion of the earliest inhabitants of the earth." So Mr. Swainson, in 1835, who considers the wild type specifically distinct from the domestic.

Mr. Bell thinks that there is no modifications of sufficient value to constitute specific distinction, and believes that the fossil bones belonged to the original stock of our domestic ox, and that the wild cattle "approach so near to it as to leave it a matter of doubt, *not* whether they all belong to the same species, but whether this breed be the actual remnant of that original stock, or the descendants of domesticated individuals, which have resumed in a great degree their wild character from having ceased, through many generations, to feel the effects of human domination." (*b*)

On the subject of the colour, which will be found a remarkable characteristic of the wild cattle, we find these remarks in the article, "Oxen," of the *Penny Cyclopædia*:—"The prevailing white colour is not usually found in mammiferous races which have never been domesticated. The white bear is certainly an example to the contrary; but it may be considered as an exception to an almost general rule; the cases of the Alpine hare and ermine are merely instances of winter dress." Mr. Bell, however, admits the probability of the pure creamy white body, the red ears, and the black muzzle, being a true specific character for the whole race: and states that he has been in the habit, ever since he was a boy, of examining every white specimen of cattle that has come within his observation, and he has never seen one that had not some colour about the ears, either red or black, according to the breed. His attention was first attracted to this by having, when a school-boy, seen a beautiful pure white calf, belonging to the parent of one of his schoolfellows, and finding about half of the ears red, it struck him that such might possibly be an invariable character, and so, he says, he has found it. (*c*)

The dun cows of tradition, such as of Durham, in domestication, or Guy of Warwick's grisly beast of Dunsmore heath, in native freedom, give no light. In the many similar legends concerning them, they are generally associated with hills, and therefore, as at Durham, where Dun in Dunholme was confessedly a hill, the name may have no reference to colour, and if it had any, a dun, according to its shade, might designate very differing characteristics.

For the purposes of this paper, the inference will be assumed that whether the two breeds be species or varieties only, the immediate ancestry of the wild cattle of our forests and parks can never, in any probability, have been domesticated, and that, whether they be the origin of our tame oxen or no, they have always, in the post-historic period, been cotemporaneous with, distinct from, and rarer than, the domestic herds. The horns dug out of the Roman apartments at Piersebridge, a year or two ago, differed in no *primâ facie* feature from these of the present short-horns of the same valley of Tees. They were, however, probably the remains of a different race, a primitive wild species, smaller than the large fossil kind, and described by Professor Owen (*d*). It is termed the *Bos longifrons*, and of its domestication in Britain there is abundant proof, at least at the period of the Roman invasion. Soon after this, it appears to have become extinct, and it may be assumed that it was the domesticated ox of the native population prior to the intrusion of the Romans. In 1846, in some railway excavations, near Newstead (E. of Melrose), in Scotland, and nearly on the line of Watling-street, several circular pits were exposed. Two of them were regularly sided with stones, apparently taken from the river, were 2ft. 6in. in diameter, and about 20 feet deep. The others greatly varied in their dimensions, and were filled with black fetid matter mixed with earth, pottery, oyster shells, antlers, and bones of cattle, apparently of the *Bos longifrons*, the skulls being broken on the frontal bone, as if with the blow of a pole-axe, or the sacrificial securis.

* The authorities referred to by italics will be found enumerated at the conclusion of the article.

In one was a skeleton of a man standing erect with a spear beside him, and accompanied with mortaria and undoubtedly Roman pottery. (*e*) The presumed domestication of *Bos longifrons* is strongly confirmed by the discovery of several heads of that species with a bone comb and a human skull, in a marshy spot, near the church of Stanwick, in Richmondshire (*f*)

The custom of burying animals of different kinds with the departed, even to a late date, is familiar. Jewels, arms, and chariots, were supposed to be for use in another world. A chariot and a saddle were for a hero to take his choice between riding or driving to Valhalla. (*g*). Perhaps the animals were imagined to spring anew to accompany their owners. In a tumulus at Elenborough, in Cumberland, the bones of an ox or heifer, and of a colt, were found, in 1742, with some wood ashes near them. The real interment was probably missed (*h*).

There does not appear any proof of the early domestication of the gr fossil species, the *Bos primigenius*, but it certainly existed during the domination of man. Its skull and horns were found in a tumulus on the Wiltshire Downs. It was found in a peat bog in Scania with the great cave bear, under a gravel deposit, and alongside of primitive implements of the chase. "This urus is most remarkable," says R. J. Murchison, "in exhibiting a wound of the apophysis of the second dorsal vertebra, apparently inflicted by a javelin of one of the aborigines, the hole left by which was exactly fitted by Nillson with one of the ancient stone javelins. This instrument fractured the bone, and penetrated to the apophysis of the third dorsal vertebra, which is also injured. The fractured portions are so well cemented, that Nillson thinks the animal probably lived two or three years after. The wound must have been inflicted over the horns, and the javelin must have been hurled with prodigious force" (*e*).

Dr. Fleming describes a skull of this enormous species as measuring 27½ inches in length, and another in the Scottish Antiquarian Museum, measures 28 inches (*e*).

Such is the primeval animal which associates in all but size with our present wild cattle, and in a lesser, but not remote degree, with our domestic herds. Perhaps this is the proper place for the rather vague statement that in digging of peats within the manor of Little Asby in Westmoreland, nigh the east end of Sunbiggin tarn, about 1737, were found the horns of two large bulls, jumped together in the posture of fighting; one of them having probably pushed the other into the mud, where they had both sunk. The rest of the skeletons could not be recovered, by reason of the water coming in. One pair of these horns was carried to Howgill Castle.

It has been a subject of regret that the wild cattle at Chillingham are accompanied by no record or tradition giving any idea of their origin, their history, and the character in which they were kept in former times. At the Newcastle meeting of the British Association in 1838, the Earl of Tankerville, in a letter to Mr. Hindmarsh, of Alnwick, who then read a paper upon them, says: "It is fair to say that I know of no document in which they are mentioned in any past period" (*j*). The same may be asserted of nearly all the later remains of the breed. There are, however, some unpublished records throwing considerable light upon the old method of preserving these noble animals in herds, which are now extinct, but which were clearly viewed in the same spirit as we now view the diminished survivors of all their cotemporary brethren. To these are added the most accessible evidences in print on the subject, in a purely chronological order, so as to show, as far as possible, the changes which have taken place in the features and extent of the race, and the time and mode of its extinction. With regard to Sir Walter Scott's supposition that its members are the descendants of those which inhabited the Great Caledonian Forest, extending from the Tweed to Glasgow, at the two extremities of which, namely, Chillingham and Hamilton, they are found (*j*), it must be in no way supposed that they are or ever were *confined* to such a district; and strange as it may appear, they seem to have been far more widely distributed in the parks of England, than in the less cultivated regions of North Britain.

The bulls that were used in the Druidical sacrifices are described as being white (*k*). We shall find wild cattle at Auckland, the land of oaks. "Weredale," says Leland, "is well wooded, and so be the quarters of Akeland; for by the name it appeareth to have been full of oaks." And of Cadyow Castle, where the ancient British Kings of Strathelyde, and subsequent Kings of Scotland used frequently to reside and hold their courts; it is said that in its immediate vicinity "is a grove of immense oaks, the remains of the Caledonian forest, which anciently extended through the south of Scotland, from the eastern to the Atlantic Ocean. Some of these trees measure 25 feet and upwards in circumference; and the state of decay in which they now appear shows that they may have witnessed the rites of the Druids" (*m*). Some of them are English oaks, and are supposed to have been planted by King David, first Earl of Huntingdon, about 1140 (*l*). The forest is included in the magnificent and extensive park of the Duke of Hamilton, attached to his splendid seat of Hamilton, in

Lanarkshire. There was long preserved in this forest the breed of the Scottish wild cattle, and their present representatives are fondly thought to be a part remaining of the establishment of our ancient British and Scottish kings (*l*). As the Druids delighted in rarities, such as the mistletoe and serpent's egg, it is not unlikely that they might insist on having specimens of the rarer white breed, the capture of which would be no unwelcome task to the active spirits of a non-literary period.

The great Caledonian forest is described by old authors as dividing the Piets from the Scots; and being well furnished with game, especially with fierce white bulls and kine, it was the place of both their huntings, and of their greatest controversies. Some say it took its name from Calder, which signifies a hazel or common nut bush. The Roman historians delight much to talk of the furious white bulls which the forest of Caledonia brought forth. In these early days, they are represented as of large size, and as possessing *jubam densam, ac demissam instar leonis*; or as Hollinshed has it, "crisp and curled manes like feirs leonis" (*u*)

In the 12th century, the immense forest of Middlesex afforded the wild bull (*o*). About the same time, Hugh Baliol grants to the inhabitants of Barnardcastle common pasture for their herds in Marwood Wood, and "quod possint fugare pecora in Hermyre p' voluntate sua." These words are interpreted as a licence for the Baliol lieges to drive *their cattle* in Hermyre at their pleasure (*p*); but it will be observed that the record only mentions *cattle*, and as pasture is already given, a mere supposition, quite open to dismantling, may arise, that a game license to chase is conferred, affecting the wild cattle long afterwards mentioned as attached to the lordship of Barnard.

The park of Chillingham is a very ancient one. By a copy of the endowment of the vicarage, extracted from the records at Durham, and referring to a period certainly as early as the reign of King John, about that time, viz., 1220, the clergyman of Chillingham was, by an agreement with Robert de Muschamp, to be allowed as much timber as he wanted for repairs, of the best oak out of the Great Wood of Chillingham. The more ancient part of the castle also appears to have been built in the next reign, that of Henry III., since which it has been held without interruption by the family of Grey." The park was closely bounded by the domains of the Percies on one side, and of the Hebburnes on the other; and in order to secure their cattle, wild and tame, it is probable an inclosure was made by the Greys at an early period (*j*).

Boetius, in describing the wild white bulls of "The Great Calidon Wood," thus bounds the forest and lightens up his story by a tale:—"In Strivelingshire is the towne of *Striveling*, and above it is the Castell of Striveling, which was sometime called the dolorous mountaine. At this towne also began the Great Calidon Wood, which ran through Menteith and Stratherne, to Atholl and Lochquhaber, as Ptolome writeth in his first table. *

* * * It is said that Robert Bruze, after his coronation, did hunt one of these buls in the foresaid wood, being accompanied but with a small traine, in which voiage he escaped narrowlie with his life. For after the beast felt himselfe sore wounded by the hunters, he rushed upon the King, who having now no weapon left in his hand wherewith to defend himselfe, he had surelie perished if rescue had not come: howbeit in this distresse one came running unto him, who overthrew the bull by plaine force, and held him down till the hunters came that killed him outright. For this valiant act also the King endued the aforesaid partie with great possessions, and his linage is to this daie called of the Turnbuls, bicause he overturned the beast, and saved the King's life, by such great prowesse and manhood" (*q*).

The beautiful lines of Sir Walter will fitly illustrate this anecdote:

"Through the huge oaks of Evandale,
Whose limbs a thousand years have worn,
What sullen roar comes down the gale,
And drowns the hunter's pealing horn?

Mightiest of all the beasts of chase,
That roam in woody Caledon,
Crashing the forest in his race,
The Mountain Bull comes thundering on.

Fierce, on the hunter's quiver'd band,
He rolls his eyes of swarthy glow,
Spurns with black hoof and horn, the sand,
And tosses high his mane of snow (*m*)."

In 1470, 180 fat oxen, 6 *wild bulls*, 1,004 sheep, and 300 calves, were the *Ruminates* discussed at Archbishop Neville's celebrated feast. The scarcity of the wild cattle, and the point made of having them, induces the belief that their flesh was viewed in the light of game, and Hector Boetius, who was born this same year, 1470, confirms it. Speaking as above of the great forest where Robert Brus was hunting, he thus describes the wild cattle:—"In this wood were sometime white buls with shackt (shagged) heares and curled manes like fierce lions, otherwise they were like unto the tame, nevertheless so wild and savage that they would never be made familiar, nor tast of any herbe or grasse that man's hand had once touched, after manie daies. Being taken also by the industrie of man (which was very hard to doo) they would refuse all sustenance, and starve themselves to death. As soone as any did invade them, they would rush upon him with great violence, and beare him to the

earth; as for dogs, nets, or any kind of weapon they feared not, neither cared for any maner of engine. * * * * *

Certes, the flesh of these beasts were reputed in old time as a most delicate food, and onlie meate for the nobilitie, notwithstanding that it be verie full of sinews and gristles, whereat some delicate feeders doo often take offence. In times past also they were bred in many places of the Calidon, but now they be all consumed by the gluttonie of the inhabitants, so that none of them are left, but onlie in Comerland."

The author of the article *Bos*, in the *British Cyclopædia*, is of opinion that the wild cattle are not descended from the aboriginal stock, but are domesticated oxen which have run wild, and that the race was originally imported by the ecclesiastics from Italy, where herds of wild cattle much resembling them still exist (*c*).

The only wild cattle bearing upon this extraordinary notion, as far as I am aware, were those in the Bishop's park of Auckland, and those of Gisburne in Craven.

The wild cattle are mentioned by Leland as remaining not long before his time at Blakeley, in Lancashire; and tradition records that they were transplanted into the dean's or abbot's park at Whalley, whence they are reported on the same evidence to have been DRAWN after the dissolution to Gisburne Park (*r*) "by the power of music."—33 Hen. viii. (1541-2) (*s*).

This was not so improbable a story as at first sight may appear, for in 1782 Whitaker saw at Edinburgh a stag who had followed the bagpipes of a Highland regiment from his native mountains, *captus dulcedine cantus* (*r*).

Whalley fell into the hands of the Asshetons soon after the dissolution, and it is singular that the Listers of Gisburne were connected by marriage with them, and eventually Thomas Lister, Esq., of Arnolds-biggin, married Katherine, daughter and coheiress of Sir Ralph Assheton, of Whalley Abbey, and died in 1745. The ancient house of Arnolds-biggin, at Gisburne, was for many generations the residence of the Lister family, who removed in later times to the lower hall of Gisburne, the demesnes of which having since been enclosed for deer, it acquired in the above Thomas Lister's time the name of Gisburne Park. Here is preserved the horn of a buffalo (?) nearly 20 inches long, and containing about two quarts; it is supported on three silver feet, resembling those of a man in armour. Round the middle is a fillet inscribed, "*Qui pugnat contra tres perdet duos*" (he who fights with my three feet may lose his own twain). A seasonable, though rather inconsistent warning to those who were invited to drink out of it. It has two other inscriptions—"*Nolite extollere cornu in altu—Qui bibat me adhuc siti,*" and a cross patee. The characters are Roman. There was a remarkable breed of sheep here also, a skull of which is figured by Whitaker. "Yet," says that historian, after mentioning the supposed Whalley origin, "much attention is due to the family tradition, which reports that they were brought from Guisborough Priory after the dissolution. This is strengthened by the following coincidence. That priory was founded by Robert de Brus in 1129, and it is related by Matthew Paris, that one of his descendants, having offended King John, purchased a return of favour by presenting him with 400 cows and a bull, all perfectly white. The disproportion between the numbers of each sex renders it likely that there is some error in the numbers. I am sorry that I have mislaid my reference to the old historian" (*t*). Perhaps, however, the story has its rise in nothing more than the identity of name between the two places Gisburne in Craven is mentioned in Domesday, and Guisborough, as is well known, was usually called Gisburne.

Leland mentions wild cattle at Auckland—"There is a fair park by the castelle, having fallow deer, wild bulls, and kin" (*p*).

Gesner (d. 1565) says that the Scottish wild cattle "were all slain, except in that part which is called Cummernad." Another author (qu. Boetius in the original Scotch) informs us that "thocht thir bullis were bred in sindry boundis of the Colidin Wod, now be continewal hunting and lust of insolent men they are destroyit in all parts of Scotland, and nane of them left but allenerlie in Cumernald" (*l*).

In "A brief note of the thingis done by the Erle of Lennox and his adherents," apparently written towards the conclusion of the year 1570, this nobleman and his party are charged, among other things, with having caused the destruction of the white cattle in Lord Fleming's forest of Cumbernauld:—"They have slain and destroyed the dear of his forrest of Cummernald, and the *quhit ky and bullis* of the said forrest, to the gryt destructione of polecie and hinder of the commonweill. For that kynd of ky and bullis has been keepit thir money yeiris in the said forrest; and the lyke was not mantenit in ony uther partis of the ile of Albion, as is weill knawin." (*u*)

It is probable that the hinder of the common weal referred to an occasional cross with the domestic species. The tenants of Raby and Brancepeth had certain rights of stint in the parks, (*v*) and tame cows in season have been turned out frequently amongst the wild cattle at Chillingham and admitted the bull. The calves thus produced were invariably of the same colour with the wild

breed, and retained much of the ferocity of their sire. (*v*)

Lesley, writing in 1578, gives a description of the wild cattle and their scarcity in Scotland, almost identical with that of Boetius. "In Caledonia, formerly, a forest bull was common, now however rare, which is of the whitest colour. It bears a mane, dense and hanging down like the Lion's, and is savage and wild, detesting the human race; so that in what places men either meddle with their hands, or blow much with their breath, from such, after some days, the bulls will altogether abstain. Such boldness too, was inherent in this bull, that not only when irritated would he furiously bear down horsemen, but were he never so little hurt, he would make for the men with his horns and hoofs indiscriminately; and the dog, which with us is excessively fierce, he would, in his attack, altogether spurn. His flesh gristly, but very sweet in its flavour. He used to be common in that most vast forest of Caledonia, but through the greediness of man, it is now supposed that he is left in three places only—Stirling, Cumbernald, et Kincarn." (*Strivillingii, Cumberauldiæ, et Kincarniæ.*) (*w*)

At about a like period in England, Harrison tells much the same story. He may mention lions consciously or unconsciously of the now known evidences for the probable truth of his statement. The *Bos primigenius* has been shown to be post-Adamite; and it is found cotemporaneously with hyænas, bears, and very large feline animals, one a large tiger, and another of even greater powers of destruction. (*v*) It may be, that these lingered like the herbivora they were intended to check. It may be, that our traditions of enormous and terrible wild cats allude to the last dying remnant of an extinguished species. Professor Owen has fully shown the error of an opinion that the large Felidæ are peculiarly adapted to a tropical climate. An abundance of herbivora for their support, of solitary thickets free from the interference of man, are still the conditions of their prevalence; and still they follow the ruminants to the verge of perpetual snow on the Hymalayan chain, and, darting beyond that barrier, to the 50th degree of latitude in the dreary wilds of Siberia. Harrison's intelligence was this:—"Lions we have had very many in the north parts of Scotland, and those with manes of no less force than they of Mauritiana were sometimes reported to be; but how and when they were destroyed, as yet I do not read. They had in like sort no less plenty of wild and cruel bulls, which the princes and their nobility, in the frugal time of the land, did hunt and follow for the trial of their manhood: and by pursuit either on horseback or foot, in armour, notwithstanding that many times they were dangerously assailed by them. But both these savage creatures are now not heard of, or at the least wise the latter scarcely known in the south parts." (*x*)

We may now come to a sequence of evidences, hitherto, probably, entirely unnoticed, which not only fix the habitat of these wild cattle in four parks of the bishoprick, in the 16th century, but give us minute particulars of their number, the mode of their preservation, and their of destruction. They also give us a favourable view of the liberality of the Nevilles, in not forgetting to gladden the palate of the poor with a taste of the scarce flesh. In 1588, it is expressly stated of the Bishop's palace at Auckland, that "the park their [was] replenished with fallow dere and wilde beasts." (*y*)

It is an odd coincidence with respect to the next document that Brancepeth was gained by the Nevilles from the *Bul*mers, to whom their celebrated badge of the Dun Bull evidently alludes. The village host, be it noted, with great propriety decks one of his rooms with a noble bull's head, not exactly the correct colour, but of unexceptionable size and valiant aspect (*z*). The Bulmers were originally, it is presumed, a Yorkshire family, and named after the place and wapentake of Bulmer.

It may be safely presumed that the ancient Neville badge and crest have reference to the wild cattle, the latter is sometimes white; and in the seal and monument of Ralph, the great seal of Westmoreland is distinctly furnished with a mane. (*aa*)

The record is now forthcoming through the care of the Queen's surveyor in keeping a copy of his return.

"Ep'atus Dunelm'
13 Januarij A.° R. R. Eliz. 39 ° 1596-7

Parcell' terrarum et possessionum Charoli nuper comitis Westmerland de alta proditione attincti modo spectan' et pertinen' ad serenissimam in xpo principem et d'nam n'ram Elizabetham dei gra' Anglie Francie et Hibernie Reginam fidei defensor, &c.

P'cella Dominij de Brauncepeth in E'patu Dunolm } Valet in { Firma et proficuis vigint' ferorum animalium, videlicet Taurorum, et vaccarum ferorum ibidem pascentium et renovari per annum. } li. V

MEMORANDUM within her ma'ties East parke of Brancepethe in the Bushopricke of Durham there haithe bene of auncient tyme certaine wild beastes & kyen whiche in the tyme of the late Earles of Westmerland were cherished and kept as in the nature and manner of thee wild deere in thee same parke; and yearelie there was one or two of the saide wilde cattle killed and bestowed of thee poore and most needie people in the Lordshipp of Brancepethe att the pleasure and appointment of the saide Earles. And likewise (as I am informed) there haithe bene

yearelie in the tyme of the said Earles certaine Runners or wild yonge calves killed and some yonge quie or yonge stott of that wilde stoore likewise killed and emploied to the use of the saide Earles. By vertue of a warrant from the right Honorable S'r John Fortescue, Knight, Chauncelour of her ma'ties Exchequer, and one of her highnes most honorable privie councell to Mr. Will'm Clopton her ma'ties Receiver and to me her ma'ties Surveior in the Bushopricke of Durham, or either of us of laite directed, I have vewed the saide wild cattle and did fynd at the makinge hereof remayninge in the same East parke of Brancepethe one bull two old kyen three yong quies and three yong bull calves whiche is all the store I found there. The number of the cattle in the Earles daies (as I ame crediblie informed) were commonlie foure and twentie yearlie att the fewest whereof five or six were bulls and the residue kien beside some yong store cherished for the supplie of those that were yearlie taken as abovesaide. There maye be kept and mainteined yearlie twentie wild beasts whereof foure to be bulls and the residue kien with sufficient allowance of haye in winter for the same in the saide East parke and yong calves for the supplie of the beastes yearlie to be taken respectinge that the yong store exceede not the number so as twentie old ones and six yong ones be there yerelie preserved according to that rate and for that the number of the beasts are but fewe at this present wherebie the rent abovesaid cannot be made of the same. Therfor so manie of them that are wantinge the romethes of them beinge letten for rent will answere the rate abovesaide.

Endorsed "p'ticuler cone'ninge the wild chattail of Brauncepeth" (*bb.*) p' me THOMAM CHAYTOR p'ticulurem sup'visorem ib'm.

Stour is an exact representation of the Latin synonym. Lord John Neville, in 1836, leaves to Ralph his heir, "CC vacas pro *stauro*, CC stottos et stirkes, MM bidentes, videlicet M in Episcopatu Dunolmensi, et M in comitatu Eborum." (*cc*)

In 1614, an elaborate survey of the manors of the Nevilles was taken for James I., from which these further particulars about the cattle of Brancepeth and their East Park are taken.

"Brancepeth Castle is the chief manor and mansion house of his Lordship, which hath been for the space of twenty-two years last, or thereabouts; and now is in the keeping and custody of Mr. Henry Sanderson and his son Samuel, or one of them as constables thereof, by patent, with a fee of ten pounds per annum. There is a garden belonging to the said castle, for the keeping whereof there was and is a yearly allowance and fee of five pounds, with the herbage of three kyne winter and summer in the Frythe and great wood of the East park, for a gardener to look unto the same. And when the said Henry Sanderson came first to be constable of the Castle, the same was kept and trimmed by the gardener there, as well with sweet walks and pleasant harbours as otherwise, till of late the said Henry Sanderson having gotten the said gardener's fee and beast gate by patent, and taking upon him the charge and custody thereof, the said harbours and walks are grown ruinous and clean out of all good order, &c.

"There are no forrests nor chases within the Lordship more than the two Parkes called the East and West Parke, and that the game in the said Park is toward the number of three hundred deer in either of them, having been better stored in former time." Sanderson's depredations on the deer, roes, and conies in both parks are here set out. "Also there are of *wild beasts* of all sorts, elder and younger, in the East Parke to the number of twenty-eight or thereabouts, which wild beasts the said Henry Sanderson hath, from time to time, since his being constable, both killed for his own use, given away to his followers and friends and disposed of at his pleasure." The profits of the herbage are stated to have been received by the under tenant and assigns of the Lady Anne, one of the daughters of the late Earl of Westmoreland, by virtue of a lease granted by Queen Elizabeth of the herbage. Henry Sanderson and his son Samuel claimed to be chief forresters and masters of the game by patent for lives, and whereas Henry's predecessors and himself used to have summer pasture for 12 kyne and 4 geldings in the East Park, *in a pasture there called the Great Wood*, and their winter pasture *in a place called the Great Frythe*, he had taken the whole profits of the Little Park, *within the East Park, in lieu of the summer pasture.* "Frythe is a plaine betweene woods." (*dd*) "George Brabant is keeper of the East Parke by patent during pleasure. And he hath heretofore had a convenient house called the East Parke Lodge, with a stable and a piece of enclosed ground, with pale and rail, called and known by the name of Lodge Garth, containing about an acre of ground, wherein is contained two little gardens; and hath, for the execution of his office, herbage for sixteen kyne and one bull yearly to go and depasture in the Great Wood in summer, and in the Great Frythe in winter, and two horses in the Frythe summer and winter, and a parcell of meadow ground, containing 16 days' mowing, with a fee of three pounds and eight pence per annum, and a fee buck and fee doe, and shoulder and skin of every deer and *wild beast killed.*" Yearly value of the office, £20. The East Park is stated to contain about 700 acres, and both parks were bounded with pale and ditch on the outside about 2 yards broad. The East one contained well-grown underwoods, well set with oak timber and ash, dispersed here and there. Both parks were so overstinted that those who rented herbage had their kyne

almost famished with hunger, and the deer died 50 or 60 in a winter. The wild cattle, it is to be hoped, took care of themselves. In the times of the Nevilles, the tenants of the Lordship paying rents under 40s. were under certain allowances to mow, make, and lead all the hay spent for the relief of the deer and wild cattle, and this service was extensively performed at the time of the survey.

At Raby, a close is defined as having been used by the Earl, "as a frithe for the deer, and for the breeding and feeding of calves and other young cattle of the said Earl." These would be most likely domestic, but we have express mention of wild beasts. "The herbage of the Middle Parke is divided by and between the said Sir George Frevile and Anthony Dale, Sir George having nine parts thereof, and the said Anthony the tenth, who together do yearly mowe, cutt, and carry away out of the saide Parke so much grass there growing as the Deer and *wild Beasts*, in the West Parke and Middle Parke aforesaid are in the winter time hardly sustained; notwithstanding the game there now being are not great or many. But should they be preserved and increased to such a number as in times past, the whole quantity of grass and hay yearly growing there would not be sufficient for their winter sustenance, for that he (the deponent) hath heard it by many officers and others there most credibly reported that the game hath been such and so fair, that having all the allowance that those Parkes would afford, the tenants have used in the winter-time, for relief of the game, to bring hay on their backs from other grounds to the same Parke. And he further saith that the deer and *wild Beasts* are altogether excluded out of the East Parke and of certain closes called Marwen Carr and Crewe Close, where they were always wont to go." In the boundaries of Brancepeth Lordship in this inquisition the *Bullring* is mentioned as not far from the wood bridge over the Derness near to *Nevill's Oak*. (*e*)

In the grant in 1626 of the demesne of Barnard Castle, in trust for Sir Henry Vane, "all the deer and *wild cattle* in the parks, free chase and warren," are expressly mentioned *in totidem verbis*. (*p*)

Sir Wm. Brereton, in his journey of 1635, mentions at Auckland, attached to the Bishop's palace, "a dainty stately park, wherein I saw wild bulls and kine, which had two calves runners. There are about twenty wild beasts, all white; will not endure your approach, but if they be enraged or distressed, very violent and furious; *their calves will be wondrous fat*." (*ff*)

This is a true outpouring of Sir William's temper. He turned republican, and was characterised as "a terrible slaughter-man at a thanksgiving dinner. Had he been cannibal enough to have eaten those he vanquished, his gut would have made him valiant."

"Will Brereton's a sinner,
And Croydon knows a winner;
But O take heed lest he do eat
The rump all at one dinner." (*ee*)

The Auckland cattle was probably destroyed in the storms of the civil war, when the Bishop's seat was the subject of low plunder. At that time the wild cattle of Scotland were nearly extirpated. The Cummings were at one period proprietors of Cadyow and Cumbernauld; and it is likely that in their time the white cattle were in both places. They seem to have partially survived the destruction of their race at Cumbernauld alluded to in 1570, but they have long been extinct there. The universal tradition in Clydesdale is that they have been at Cadyow from the remotest antiquity. They were, as just said, nearly killed during the usurpation, "but a breed of them having been retained for the Hamilton family, by Hamilton Dalzell, and by Lord Elphinstone, at Cumbernauld, they were subsequently restored in their original purity." (*l*)

A gap now occurs in my narrative, for the expression used in the burial register of Henry Mawer in the Bishop Middleham books of 1665, "hurt with Mr. Freville's bull in the park," does not warrant an assumption of *wild cattle* at Hardwick. With the commencement of the 18th century, a steady interest has been taken in the remnants of the old herds of white cattle. Sir Robert Sibbald describes the Scotch ones, in his time, as denuded of their manes.

Lord Tankerville in 1838 writes:—"The remains of the great wood of Chillingham were extant in the time of my grandfather. I remember an old gardener of the name of Moscrop, who died about 30 years ago, at the age of perhaps 80, who used to tell of what his father had told him as happening to him when a boy, relative to these wild cattle; which were then spoken of as wild cattle, and with the same sort of curiosity as exists with regard to them at the present. In my father and grandfather's time, we know that the same obscurity as to their origin prevailed." (*j*)

There is a prevailing tradition that, about 1735, when it was found necessary for a time to remove the Cadyow herd from one pasture to another, several hundred individuals, belonging to different baronies on the ducal estate of Hamilton, were called out, and that they only effected their purpose with much danger and difficulty. (*l*)

On Nov. 19, 1756, being the anniversary of Lord Ossulston's birth-day, the Earl of Tankerville gave an elegant entertainment at Chillingham Castle to his tenants, at which were present upwards of 200

persons; and on account of the inclemency of the season, and great scarcity of provisions, ordered a great number of the wild cattle to be slaughtered, which, with a proportionable quantity of bread, were on that day distributed amongst upwards of 600 poor people in that part of the country. (*gg*)

According to the writer of the statistical account of the parish of Hamilton, the wild cattle in the Duke of Hamilton's forest or park of Cadyow, "were exterminated from economical motives, about the year 1760." (*hh*) Sir Walter Scott attributes their extirpation to their ferocity. "Their appearance was beautiful, being milk white, with black muzzles, horns, and hoofs. The bulls are described by ancient authors as having white manes; but those of latter days had lost that peculiarity, perhaps by intermixture with the tame breed." (*m*)

About 1770, there were a few of the cattle at Chillingham with black ears, but the park-keeper had destroyed them before 1790; and there has never since been one with black ears. A few years before the latter date also, the wild cattle at Burton Constable, in Yorkshire, were all destroyed by a distemper. "They varied slightly from those at Chillingham, having black ears and muzzles, and the tips of their tails of the same colour. They were also much larger, many of them weighing sixty stone, probably owing to the richness of the pasturage in Holderness; but generally attributed to the difference of kind between those with black and with red ears, the former of which they studiously endeavoured to preserve. The breed which was at Drumlanrig, in Scotland, had also black ears." (*s*)

The stock at Chillingham was once nearly extinguished by a catastrophe resembling that at Burton Constable. The breed was reduced to a single cow in calf, and the offspring was fortunately a bull. (*n*) It is said that there was the utmost difficulty in inducing the cow to take any sustenance, she showing her grief at the loss of her ancient comrades in the most lively manner.

The hunting of the Chillingham cattle had nearly or altogether ceased before 1720, when it is described in these terms:—"The mode of killing them was, perhaps, the only modern remains of the grandeur of ancient hunting. On notice being given that a bull would be killed on a certain day, the inhabitants of the neighbourhood came mounted, and armed with guns, &c., sometimes to the amount of an hundred horse, and four or five hundred foot, who stood upon walls or got into trees, while the horsemen rode off the bull from the rest of the herd, until he stood at bay; when a marksman dismounted and shot. At some of these huntings, twenty or thirty of these shots have been fired before he was subdued. On such occasions the bleeding victim grew desperately furious, from the smarting of his wounds, and the shouts of savage joy that were echoing from every side; but, from the number of accidents that happened, this dangerous mode has been little practised of late years; the park-keeper alone generally shooting them, with a rifled gun, at one shot."

The description of the wild cattle in 1790, from which this hunting scene is taken, is the oldest one in any minute detail we have, and was written by Mr. Bailey, the Earl of Tankerville's agent. "There was formerly," he says, "a very singular species of wild cattle in this country, which is now nearly extinct. Numerous herds of them were kept in several parks in England and Scotland, but they have been destroyed by various means; and the only breeds now remaining in the kingdom are in the park at Chillingham Castle, in Northumberland; at Wollaton, in Nottinghamshire, the seat of Lord Middleton; at Gisburne, in Craven, Yorkshire; at Lime Hall, in Cheshire; and at Chartly, in Staffordshire. * * * * The ears and noses of all those at Wollaton are black. At Gisburne, there are some perfectly white, except the inside of the ears, which are brown. They are without horns, very strong-boned, but not high."

The following description refers wholly to the Chillingham breed:—"The principal external appearances which distinguish this breed of cattle from all others are the following:—Their colour is invariably white, muzzles black; the whole of the inside of the ear, and about one-third of the outside, from the tip downwards, red; horns white, with black tips, very fine, and bent upwards. Some of the bulls have a thin upright main, about an inch and a-half or two inches long.

"At the first appearance of any person, they set off in full gallop; and, at the distance of two or three hundred yards, make a wheel round, and come boldly up again, tossing their heads in a menacing manner; on a sudden, they make a full stop, at the distance of forty or fifty yards, looking wildly at the object of their surprise; but upon the least motion being made they all again turn round, and fly off with equal speed, but not to the same distance; forming a shorter circle, and again returning with a bolder and more threatening aspect than before, they approach much nearer, probably within thirty yards, when they make another stand, and again fly off; this they do several times, shortening their distance and advancing nearer, till they come within ten yards, when most people think it prudent to leave them, not choosing to provoke them further, for there is little doubt that in two or three turns they would make an attack.

"When the cows calve, they hide their calves for

a week or ten days in some sequestered situation, and go and suckle them two or three times a day. If any person come near the calves, they clap their heads close to the ground and lie like a hare in form, to hide themselves. This is a proof of their native wildness, and is corroborated by the following circumstance that happened to the writer of this narrative, who found a hidden calf, two days old, very lean, and very weak. On stroking its head, it got up, pawed two or three times like an old bull, bellowed very loud, stepped back a few steps, and bolted at his legs with all its force; it then began to paw again, bellowed, stepped back, and bolted as before: but knowing its intention, and stepping a-side, it missed him, fell, and was so very weak that it could not rise, though it made several efforts: but it had done enough. The whole herd were alarmed, and, coming to its rescue, obliged him to retire; for the dams will allow no person to touch their calves, without attacking them with impetuous ferocity." (This story in Poulson's Holderness is ascribed to Dr. Fuller, quoting apparently from Hamilton Smith, but it is added that the anecdote has been ascribed to Mr. Bailey, of Chillingham.)

"When any one happens to be wounded, or is grown weak and and feeble through age or sickness, the rest of the herd set upon it and gore it to death.

"The weight of the oxen is generally from forty to fifty stone the four quarters, the cows about thirty. The beef is finely marbled, and of excellent flavour." (*s*)

Bewick's cuts of the wild bull and cow, accompanying this account, are tame in comparison with his large, indeed is largest, cut, printed by Sol. Hodgson, at Newcastle, in the previous year, 1789. This well-known engraving, with the exception of Edwin Landseer's, is the most accurate representation of the Chillingham bull known to us (*c*), and it was only right that the draughtsman should be recompensed by fame for the danger he had undergone in getting it up.

At times the bulls will, without any preliminary wheeling and halting, directly attack any one approaching them. It is said that when Bewick was making the drawing, the leader of the herd gave chase to him, and that the artist only escaped by climbing a tree, where he completed his sketch very much to his own satisfaction, while the animal kept bellowing and pawing the ground below. (*hh*)

The size of the cut was 9½ inches by 7½, and only 230 copies were printed. After the few impressions were taken, the block broke into several pieces: these pieces were bound together with iron, with the exception of the figured border, which was about ¾ of an inch in breadth, cut upon several pieces of wood, and put round the block; and, in 1817, impressions were printed by Edward Walker, Newcastle, without the border; the size of the cut being then reduced to 7¾ inches by 5½ inches. About six proof impressions were taken off on vellum from the block in its original state, and of course are highly valued. (*ii*)

This is the usual statement; but in the catalogue of works illustrated by the Bewicks, recently published, a much more marvellous account occurs. "This beautiful cut, considered by Bewick himself as his *chef d'œuvre*, was undertaken at the request and by the direction of Marmaduke Tunstall, Esq. From the block, which was finished and sent to the printer's on a Saturday, four beautiful impressions were taken on thin drawing vellum, at the suggestion of Mr. John Bell, of Newcastle, land surveyor. These four copies were appropriated, one to Mr. Tunstall, another to Mr. Beilby (Mr. Bewick's partner), the third to Mr. Hodgson, the printer, and the fourth to Mr. John Bell, and is now in the possession of his son, Mr. John Bell, of Gateshead. It is understood that Mrs. Hodgson sold the copy belonging to her to Earl Spencer, and Mr. Beilby's copy has also been disposed of. The price obtained for one, if not both of these copies, is stated to be twenty guineas. The block, after these impressions were taken, was cleaned, and heedlessly laid in a window, where it remained until the Monday morning, and when the workmen arrived at the printing office, they found it split into two pieces, apparently by the influence of the heat during the Sunday. Mr. John Bell, of Gateshead, states, that he understands only the four vellum impressions were taken; but we have seen two impressions of the cut, with the border, and without any mark whatever of the fracture, and which have all the splendour and perfection of the vellum copies, namely, one in the collection of the Rev. Thomas Hugo, perpetual curate of St. Pauls, Halliwell, near Bolton, Lancashire; and another in that of Mr. Thomas Bell, of Cumberland Row, Newcastle. Immediate attempts were made to repair the accident, and the block was screwed together, and impressions were eventually taken for sale, but these impressions showed a deficiency in the cut, by a ragged white line running across it, hardly the breadth of a hair; afterwards it was found necessary to remove the ornamental border, so as to endeavour to screw the pieces of the block tighter together, which was done so as to remove the white line. The later impressions sold, however, are found wanting the border, but the cut still shows much of the brilliancy of execution it did at first. The last repair was made about the year 1817." (*jj*)

In the same work is mentioned a fac-simile of

this celebrated cut, of much smaller size and with the position of the animal reversed. "Impressions are of great rarity; the only copies we have seen are in the collections of the Rev. Thomas Hugo and Mr. Whitehead."

In 1812, Whitaker, in his Craven, gave excellent illustrations of a bull and cow of the Gisburne breed, and says:—"This species differs from those of Lyme, in Cheshire, and Chillingham Castle, in Northumberland, where alone in South Britain they are now preserved, in being without horns. They are white, save the tips of their noses, which are black; rather mischievous, especially when guarding their young, and approach the object of their resentment in a very insidious manner. They breed with tame cattle; but it is to be hoped that respect for so ancient and singular a family will preserve them from any foreign admixtures." (*t*)

About 1828, when the keepers were about to shoot a bull which they had ridden off from the herd at Chillingham, the infuriated animal suddenly turned upon Lord Ossulston, who was mounted on a pony, and after a short chase came up with him and threw his lordship and the pony to the ground. The bull then retired a few paces to gain the advantage of a run, but just as he was advancing to renew the attack, one of the keepers fired his rifle and brought him to the ground. The Countess of Tankerville was in the park and witnessed her son's imminent danger and escape. A tree was afterwards planted on the spot. The pony, we believe, was gored to death at the onset. (*n*, *hh*)

On Jan. 10, 1831, Lord Ossulston attained his 21st year, and instead of the usual general festivities, charity was munificently supplied to the necessitous poor on the Earl of Tankerville's extensive estates. His lordship's numerous labourers at Chillingham were regaled with beef and ale, for which purpose three of the wild cattle were shot, and the flesh, besides furnishing the labourers' dinner, served to afford a portion to every poor family in the parish. (*gg*)

Mr. ———, an *active* member of the Wernerian Society of Natural History, nearly fell a martyr to his love of science in September, 1833. He had advanced near the herd of the purpose of making some particular observations, when a gruff-fronted, sharp-horned bull, offended at the intrusion, turned upon the inquisitive naturalist, and coursed him over the park "in gallant style," and was gaining ground, when the chase ran to earth in a conduit adjoining the park wall. (*kk*)

The same year, 1833, as one of the keepers—being on foot, and having two or three persons with him—was endeavouring to separate one of the bulls from the herd, the animal turned upon the party, when each ran off and endeavoured to save himself as well as he could, according to the "good old rule, the simple plan," of "devil take the hindmost," invariably adopted in such cases. The whole of the party escaped over some high pales, except the keeper, who fell when he was at a short distance from them, and before he could rise, the bull came up, and threw him thrice in succession. The animal then left him and appeared to be going away; but seeing the keeper attempting to rise, he returned and attacked him again, tossing him and goring him with his horns, every now and then retiring a few steps and taking a *ra...race* at the unfortunate man, none of whose companions dared to venture beyond the paling to assist him. The bull continued to gore and toss him in this manner for nearly a quarter of an hour, till at length a cart was obtained, which being backed towards the spot, the keeper was lifted into it in a state of insensibility. For some time his life was despaired of, but though dreadfully gored and bruised, he at length recovered. (*hh*)

In this year (1833) the editor of Sir Walter Scott's Poetical Works states, referring to the slaughter of the Cadyow breed about 1760, that "the breed had not been entirely extirpated. There remained certainly a magnificent herd of these cattle in Cadyow Forest within these few years." (*u*) These are what are known as the Hamilton cattle.

In 1836, Sir William Jardine gave, in the Naturalists' Library, "a very interesting account of this Hamilton herd, furnished by Robert Browne, Esq., chamberlain to the Duke of Hamilton." In many respects its details are very similar to those afforded us in the descriptions of the cattle at Chillingham, and for the purposes of comparison it is here presented at tolerably full length.

"The chase is altogether of princely dimensions and appearance, amounting to upwards of 1,300 Scotch acres. The number of white cattle at present kept is upwards of sixty. Great care is taken to prevent the domestic bull from crossing the breed; and if accidentally a cross should take place, the young is destroyed. In their general habits, they resemble the fallow deer more than any other domestic animal. Having been exposed, without shade or covering of any sort, to the rigours of our climate from time immemorial, they are exceedingly hardy; and having never been caught or subjected to the sway of man, they are necessarily peculiarly wild and untractable. Their affection for their young, like that of many other animals in a wild or half wild state, is excessive. When dropt, they carefully conceal them among long grass or weeds in some brushwood or thicket, and approach them cautiously twice or thrice a-day

for the purpose of supplying them with the necessary nourishment. On these occasions it is not a little dangerous to approach the place of retreat, the parent cow being seldom at any great distance, and always attacking any person or animal approaching it with the utmost resolution and fury. The young calves, when unexpectedly approached, betray great trepidation, by throwing their ears back close upon their necks, and lying squat down upon the ground. When hard pressed, they have been known to run at their keepers in a butting, menacing attitude, in order to force their retreat. The young are produced at all seasons of the year, but chiefly in spring. The mode of catching the calves is to steal upon them whilst slumbering or sleeping in their retreat when they are a day or two old, and put a cloth over their mouths, to prevent them crying, and then carry them off to a place of safety without the reach of the herd, otherwise the cry of the calf would attract the dam, and she, by loud bellowing, would bring the whole flock to the spot, to attack the keeper in the most furious manner. These cattle are seldom seen scattering themselves indiscriminately over the pasture, like other breeds of cattle, but are generally observed to feed in a flock. They are very chary of being approached by strangers, and seem to have the power of smelling them at a great distance. When any one approaches them unexpectedly, they generally scamper off to a little distance to the leeward, and then turn round in a body to smell him. In these gambols they invariably affect circles; and when they do make an attack—which is seldom the case—should they miss the object of their aim, they never return upon it, but run straightforward, without ever venturing to look back. The only method of slaughtering these animals is by shooting at them. When the keepers approach them for this purpose, they seem perfectly aware of their danger, and always gallop away with great speed in a dense mass, preserving a profound silence, and generally keeping by the sides of the fields and fences. The cows which have young in the mean time forsake the flock, and repair to the places where their calves are concealed, where, with flaming eyeballs and palpitating hearts, they seem resolved to maintain their ground at all hazards. The shooters always take care to avoid these retreats. When the object of pursuit is one of the older bulls of the flock, the shooting of it is a very hazardous employment. Some of these have been known to receive as many as eleven bullets, without one of them piercing their skulls. When fretted in this manner, they often become furious, and, owing to their great swiftness and prodigious strength, they are then regarded as objects of no ordinary dread.

"The Hamilton breed of wild cattle differs in many respects from any other known breed. As compared with those kept at Chillingham, they are larger, and more robust in the general form of their bodies, and their markings are also very different. The body is dun-white, the inside of the ears, the muzzle, and the hoofs black, and the fore part of the leg, from the knee downward, *mottled with black*. The cows seldom have horns; their bodies are thick and short; their limbs are stouter, and their heads much rounder than in the Tankerville breed. The inside or roof of the mouth is black, or spotted with black. The tongue is black, and generally tipped with black. It is somewhat larger in proportion than that of the common cow; and the high ridge on the upper surface, near to the insertion of the tongue, is also very prominent. It is observable that the calves that are *aff* the usual markings are either entirely black or entirely white, or black and white, but never red or brown. The beef, like that of the Tankerville breed, is marbled, and of excellent flavour, and the juice is richer, and of a lighter colour, than in ordinary butcher-meat. The size of the smaller cows does not exceed 15 stones iron weight; but some of the larger sort, especially the bulls, average from 35 to 45 stones. The circumstances of their breeding *in-and-in*, of being chased so much when any of them are to be shot, of being so frequently approached and disturbed by strangers, and of having been exposed so long to all the vicissitudes of the seasons [did their ancestors fare any better?], and constantly browsing the same pasture, have no doubt contributed greatly to the deterioration of the breed, and must have reduced them much in size and other qualities.

"Instances are recorded of their having been taken when young, and tamed, and even milked. The milk, like that of most white cattle, is described as thin and watery. The usual number of ribs is 13 on each side; some have been slaughtered with 14 pair of ribs, but this is exceedingly rare. There is no park of cattle in Scotland of a similar description." (*l*)

There is something like a small mane on the bull in the design by Stewart accompanying this account. A calf is admirably pourtrayed with all its customary awkwardness of long legs. The allotted space for the cattle at Hamilton seems to be comparatively confined, and Sir William Jardine continues:—"In Chillingham Park they roam at large, and there is between 1,500 and 1,800 acres enclosed, combining, besides good pasture, a range of wild and rocky moor, interspersed with abundant wood and cover for their shelter, and approaching, as near as any enclosure can do, to the wild nature of their original habitation." "The oxen feed

heavier, and in shape and form approach near to the Lancashire breed, the horns being long, and beautifully turned."

The turning out of tame cows seems to have been no longer permitted at Chillingham, for the then keeper of the park at one time possessed a wild cow, which he had taken when a calf, in consequence of the death of its mother: it was gentle, was milked as a cow, and bred freely with the common bull; but the propagation was not allowed to proceed further, the calves being killed at an early age. At Hamilton, as we have seen, the same care is taken to preserve the breed, and if a cross should take place with the domestic bull, the young is destroyed. (*n*) We have no records of the fertile or unfertile character of the produce from any cross between the wild and tame beasts, a character which Mr. Bell considers would decide the question of identity of species.

Mr. Hindmarsh's paper, read at the meeting of the British Association in Newcastle, 1838, in which the testimony of the Earl of Tankerville himself was introduced, brings our evidences up to a more recent period than Bailey's account. The following is the Earl's account:—"It is said that there are some other places in which a similar breed is found: Lyme Park, in Cheshire; Hamilton; and Chartley Park (Lord Ferrers). The first I have not seen, but they are described as of a different colour, and different in every respect. Those at Hamilton, or rather, Chatelherault, I have seen, and they in no degree resemble those at Chillingham. They have no beauty, no marks of high breeding, no wild habits, being kept, when I saw them, in a sort of paddock; and I could hear no history or tradition about them, which entitled them to be called wild cattle. Those at Chartley Park, on the contrary, closely resemble ours in every particular; in their colour, except some small difference in the colour of their ears—their size—general appearance, and, as well as I could collect, in their habits. This was an ancient park, belonging formerly to Devereux, Earl of Essex, who built the bridge on the Trent to communicate with his chase at Channock, and Beaudesert, then belonging to him; and the belief is, that these cattle had been there from time immemorial." The Earl proceeds to give an animated sketch of the habits of his own wild cattle: "They hide their young, feed in the night, basking or sleeping during the day: they are fierce when pressed, but, generally speaking, very timorous, moving off on the appearance of any one, even at a great distance. Yet this varies much at different seasons of the year, according to the manner in which they are approached. In summer, I have been for several weeks at a time without getting a sight at them: they, on the slightest appearance of any one, retiring into a wood which serves them as a sanctuary. On the other hand, in winter when coming down for food into the inner park, and being in contact with the people, they will let you almost come among them, particularly if on horseback. But then they have also a thousand peculiarities. They will be feeding sometimes quietly, when if any one appears suddenly near them—particularly coming down the wind—they will be struck with a sudden panic, and gallop off, running one after another, and never stopping till they get into their sanctuary. It is observable of them, as of red deer, that they have a peculiar faculty of taking advantage of the irregularities of the ground; so that on being disturbed, they may traverse the whole park, and yet you hardly get a sight of them. Their usual mode of retreat is to get up slowly, set off in a walk, then a trot, and they seldom begin to gallop till they have put the ground between you and them in the manner that I have described. In form they are beautifully shaped, short legs, straight back, horns of a very fine texture, thin skin, so that some of the bulls appear of a cream colour; and they have a peculiar cry, more like that of a wild beast than of ordinary cattle. With all the marks of high breeding they have also some of its defects. They are bad breeders, and are much subject to the *rush*—a complaint common to animals bred in and in, which is unquestionably the case with these as long as we have any account of them. When they come down into the lower part of the park, which they do at stated hours, they move like a regiment of cavalry in single files, the bulls leading the van, as in retreat it is the bulls that bring up the rear. Lord Ossulston was witness to a curious way in which they took possession as it were of some new pasture recently laid open to them. It was in the evening about sunset. They began by lining the front of a small wood, which seemed quite alive with them, when all of a sudden they made a dash forward altogether in a line, and charging close by him across the plain, they then spread out, and after a little time began feeding. Of their tenacity of life the following is an instance:—An old bull being to be killed, one of the keepers had proceeded to seperate him from the rest of the herd, which were feeding in the outer park. This the bull resenting, and having been frustrated in several attempts to join them by the keepers interposing (the latter doing it incautiously) the bull made a rush at him and got him down; he then tossed him three several times, and afterwards knelt down upon him, and broke several of his ribs. There being no other person present than a boy, the only assistance that could be given him was, by letting loose a deer-hound belonging to Lord Ossulston, who im-

diately attacked the bull, and by biting his heels drew him off the man, and eventually saved his life. The bull, however, never left the keeper, but kept continually watching and returning to him, giving him a toss from time to time. In this state of things, and while the dog with singular sagacity and courage was holding the bull at bay, a messenger came up to the castle; when all the gentlemen went out with their rifles, and commenced a fire upon the bull, principally by a steady good marksman from behind a fence at the distance of twenty-five yards; but it was not till six or seven balls had actually entered the head of the animal (one of them passing in at the eye) that he at last fell. During the whole time he never flinched nor changed his ground, merely shaking his head as he received the several shots." (*j*)

Mr. Hindmarsh added some information collected from Mr. Cole, the keeper, and from his own observation: "There are about 80 in the herd, comprising 25 bulls, 40 cows, and 15 steers, of various ages. The eyes, eye-lashes, and tips of the horns alone are black; the muzzle is brown, and the inside of the ears red or brown, and all the rest of the animal white. Even the bulls have no manes, but a little coarse hair on their neck. They fight for supremacy, until a few of the most powerful subdue the others, and the mastery is no longer disputed. When two bulls are separated by accident, they fight when they meet, although friendly before, and do so till they become friends again. The cows commence breeding at three years old; the calves suckle nine months; they do not often die from disease, but they are seldom allowed to live more than eight or nine years, at which period they begin to go back. When slaughtered, they weigh from 38 to 42 stones. One was caught and kept, *and became as tame as the domestic ox*, and thrived as well as any short-horned steer could do, and in its prime was computed to weigh 65 stones. They are shy in summer, but tame in winter, and will eat hay from a fold, although they will not taste turnips." In the concealment of calves, and goring feeble companions to death, Mr. Hindmarsh's description of the cattle agrees with Bailey's. An old man was not long ago gored to death by one of the bulls of Chillingham. When a person lies perfectly still, they will not harm him, but a stir is danger. The victim not unnaturally forgot the rule (*k*).

A conversation followed the paper. Mr. P. J. Selby knew these cattle very well; they had been the same ever since he remembered them.—Mr. Swainson had thought them a different genus to the common ox, and placed them under Urus.—Mr. Gray thought them distinct from the Urus.—Dr. Greville mentioned the existence of wild cattle in Ribblesdale Park, one of which was stated by Mr. Turner to exist in the Manchester Museum of Natural History.—Mr. Webb Hall thought this an important paper, although opposed in its results to the received opinions of cattle breeders. Here was a race breeding in and in, yet retaining all its beauty, strength, and vigour. This was opposed to all known facts. We have been told that old "Tommy Bates," the great Yorkshire cattle breeder, was much struck with this paper, and afterwards, at a dinner, went into a full discussion about breeding in and in—to the horror of the company, there being several ladies present, but to turn him was to turn the falls of Niagara.

If it does turn out that the issue of a cross between the wild and tame breeds are fruitful, then the fact of our having the original stock of out island wealth of cattle would be quite as interesting as that of a distinct species lasting through all time. There does not appear one evidence leading to the supposition that these wild herds were once domesticated. In almost every occurrence of them we have the memories of frith and forest; and the natural inference is that the wild beast of the forest were gradually hemmed into isolated remains of their former kingdom of wood; and there the lords, struck with their singularity and beauty, cherished them in certain limits, hunted them in their splendour, and luxuriated over their flesh in the baronial hall. Their comparative plenty is clear, if we consider that in the county of Durham alone, four contiguous lordships—Barnard, Raby, Auckland, and Brancepeth—would conduct them over a large extent of country. Their colour is very peculiar, and perhaps an evidence of species rather than of prior domestication. It is not probable that separated domesticated branches would all assume in their wildness the same scarce tint.

The Chillingham Cattle have been decided at law to stand in the light of heir-looms, as do the wild deer.

W. HYLTON LONGSTAFFE.

Gateshead.

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CULTIVATION OF THE LENTIL.

We are not amongst those who expect any very great impetus to be given to agriculture by the introduction of new crops. No substitute for the turnip or the clover we ever expect to see fill up the hiatus which its failure has made. We have listened indeed to stories of the cow-cabbage, the Fullard's wheat, the skin-less barley, the St. John's day rye, the new maize, the Trifolium incarnatum; and we have seen their rise and fall in estimation, in a manner perfectly causeless. But still new plants or new varieties of crops have done good. The Italian rye-grass, the Chevalier barley, the winter bean, are all striking instances of the propriety and value of many plants unknown, or the revival of old ones as candidates for public estimation, when new modes of husbandry admit of their facile introduction.

We now more particularly allude to the *lentil*, which has been successfully cultivated in Scotland under circumstances which show it to be at least as deserving of experimental encouragement, as many perhaps possessing as disputable a share of real merit.

Mr. Guillerez has had this plant four seasons on a slope with a northern aspect, south of Queensferry. He planted them between the rows of beans, and had a return of sixty for one, and believed that had it not been for the rains of August, he would have had one hundredfold return. The failure of the potato first called this gentleman's attention to the plant as a crop. Knowing it to be very nutritious and very prolific, he had suggested to his mind the trial of this pulse. Mr. Guillerez perseveringly attempted the cultivation and acclimatization of these as a garden crop; and obtained the large gold medal of the Highland and Agricultural Society of Scotland for his perseverance and success. His first sowing of the seed was not very successful; but on resowing the acclimated seed the results were more favourable, and the plant attained a height and productiveness unequalled in the land of its cultivation, France. They grew the second year two, and as far as three feet high, and seldom in France will they be so favourable. His manure was sea-weed and farm-yard manure; and he sowed in March or the beginning of April, in rows twenty-four inches apart, when they are intended to run up stakes, but at eighteen inches distance when beans are sown as trainers for the lentils to run up. They require to be dibbled say six or eight inches apart, as they are a very branching plant, and their productiveness is remarkable. One hundred to one hundred and fifty pods will grow on a single stalk, and as many as 134 were counted by Mr. Guillerez on a single stalk.

In 1851 he sowed 5¾ lbs. of seed, and collected 21 bushels, weighing 167 lbs., from this small quantity of seed. The beans between the rows of lentils were also extremely good, which in a bleak and exposed aspect, so far north, must certainly speak in favour of the crop.

The soil in which the crop seems to grow best, is a dry soil, with an open subsoil. Hard sandy gravelly or calcareous soils suit best for their growth. The bean is the size of a pea, or nearly so, and the brown or yellow varieties are what Mr. Guillerez has cultivated and succeeded in acclimatizing so successfully.

Einhof gives the following as the proximate composition of the lentil, when dry, which shows it to be of a very nutritious character, though only 14 per cent. of water was lost by the process of drying.

Husk	18·7
Legumin, albumen, &c.	38·5
Starch	32·8
Sugar	3·1
Gum &c.	6·0
Salts and loss	0·9
	100

Boussingault agrees very nearly with Einhof, and gives 12½ per cent. only of water, less husk, more starch, and some little less albumen; but he gives 1½ per cent. of sugar.

The degree of exhaustion of the soil may be proved by the analysis of its inorganic elements. These are thus given according to Levi, in the Annal. der Chemie und Pharm., 1, p. 425.

Potash	34·31
Soda	13·30
Lime	6·24
Magnesia	2·44
Oxide of iron	1·98
Phosphoric acid	35·82
Chlorine	4·56
Silica	1·31
	99·96
The per centage of ash being	2·06

Now we have often interposed tares on light land as a substitute for clover. We have mown green and saved for winter fodder; and in a dry season they might be got in good order and made useful winter fodder; but in a wet season the leaves hang by so feeble a filament that they fall off with frequent turning, and the tares otherwise look damaged. But above all, the wheat crop, even if after a bastard fallow made after the tares, was so bad that we were under the necessity of abandoning their cultivation, even as a substitute of the clover and to encourage its future growth. The fact was, it so dephosphatised the land as to make it almost barren, 38 per cent. of its ash being phosphoric acid.

Now though less of the phosphoric acid appears as a per-centage of the constituent elements of the ash of the lentil, still if we are to expect it as so very abundant a crop, we may undoubtedly anticipate it to be a dephosphatizer, and so far an exhauster of the soil. Still it may possess power of assimilation to a greater degree; and as it seems to deprive the soil of little or any of its sulphates, we think it would not possibly be a bad auxiliary to the bean in substituting for clover on land sick of that plant. Mr. Stephens, of the Quarterly Journal of Agriculture, a very excellent authority, seems to give to it a considerable measure of favour.

What, however, can be done with it? It seems to have been from very remote antiquity a favourite food. The birthright of a Jew, valued at the highest price, the heirdom and privileges of patriarchal rule, was sold by Esau for pottage of red or brown lentils. The schools, hospitals, and the armies of Holland and Germany, as well as France, use it extensively; and it is the most analogous to flesh, having more azotized materials in it than any of the *leguminosæ*. Its straw, moreover, is delicate and nourishing for young animals; and it may be cut twice as green food; and its pulse swells so much in cooking, as to be very valuable for human food. It must also be highly nourishing for the purposes of early rearing, pig feeding, &c.

The following mode is recommended by Lawson for cooking the lentil.—Steep a few hours in cold water. Then mix with butter, bones, and salt in water, enough to cover, and place over a slow fire. They are then either eaten with bacon, or with water and salt as a salad. They swell so, that 2lbs. weight, costing four or five pence, will produce two large substantial and nourishing family dishes. We believe Mr. Guillerez will supply a small quantity for experimental trial. — Gardeners' and Farmers' Journal.

AGRICULTURAL EDUCATION—ITS NECESSITY AND MEANS.

ITS NECESSITY.

"All attempts," says the celebrated Robert Hall, "to urge men forward, even in the right path, beyond the measure of their light, are impracticable if they were lawful, and unlawful if they were practicable. Augment their light, conciliate their affections, and they will follow of their own accord." If ever there was a truth placed before us, this is one. From our own observation we have proved its verity. It applies to all men, and consequently to all classes of men. Looking at the philosopher, the commercial man, the tradesman, we could not but see this truth. We wandered forth into the field, acquainted ourselves with the farmer and the peasant, and again we recognised it. How many attempts to urge men forward with ill success, it is impossible to compute. Faith is not natural to man. It is pleasant to know where one is going—most unpleasant to be led, with eyes shut, one knows not whither. Work is performed with satisfaction so long as its result is not a matter of conjecture, nor its means matter of mystery. If a knowledge of neither the one nor the other is possessed, work is most unsatisfactory. Without light man cannot work, nor can he pursue his way; neither, in any sense of the word, can he live. Nor can a mind that is dark think, advance, or live. To say that a man is intelligent, is incompatible with his wandering about, unobservant of the sublimities, and the utilities, and slumbering over the beauties that are around him.

A clever workman must possess a quick perception, an accurate eye, and a thorough knowledge of his profession in all its branches. The eye of the statuary, for instance, sees in that huge block of marble the figure he is about to develop, and even before he has wielded his mallet, the treatment of the various limbs he discusses with confidence, for he knows how to apply the means that will bring them forth. To work with any kind of success, the statuary must possess a vast amount of knowledge. He must be versed in all the branches of learning and science that bear directly or indirectly on the art in which he strives for pre-eminence. A mason, a geometrician, an historian, a poet, he must, at least, be these before he can rise to distinction.

A systematic course of education is necessary to fit a man for the attainment of eminence in the school of science and art. The necessity is universally allowed, and in none of the sciences, save that of agriculture, would the student think of professing a competence without such a course had been completed. We can see the attainment of such a position only through a long avenue of laborious study. Men who have made the attainment can look back not only on the path by which they reached it, but on the station itself at which they originally aimed; for they always arrive there with a force of will that projects them beyond it. Progress is therefore constantly seen and felt in an educated profession. That it is not seen and felt in agriculture is known; the fact is not only well known, but greatly deplored by all that desire its advancement. The cause is most obvious: a systematic education is needed for the farmers; hitherto a majority has been unmindful of this. In this day we must not pursue the laissez faire system with regard to them. Some one must meddle with them; they must be stimulated to advance; their own labourers, arising from the school-houses that are thickly dotting our land, clear-headed men and women, will push them forward, or pass over them if ignorant men obstruct the way.

There are few subjects more hackneyed than this of education, and yet there are none upon which opinion at the present time is more divided. Although there may be many individuals who entertain peculiar views of the best methods of educating the people, and who propagate those opinions perhaps with irritability, there are none that do not concur in a high valuation of the principle at stake. We therefore do not propose to consider so much the necessity there is for education—because the fact is allowed—as the methods and appliances best suited to secure to the farmer the benefit of instruction in those departments of science which lie beneath or border upon his peculiar province. We shall also see what may be done for the labourer, through the farmers.

The labour of the present generation occupies a larger space, and requires more exertion than that of the last. Labour now requires more knowledge and more experience than has hitherto been expended upon it. Men of most professions keep pace with the times; but to how many farmers have the "exigencies of the times" been as foolish talk? How many have heeded when friends told them they were lagging behind? They must now awake; and they will awaken in a critical season. Thought must be resorted to—purpose must be formed and executed with determinate ingenuity. We come, then, again to the fact that people cannot farm without being educated, any more than they can engage in any other business without having passed through a fitting preparation. It may be said that no farmer does engage in the cultivation of land without previous practical acquaintance with the various methods adopted; but we maintain that not one in ten of the farmers of England are properly qualified. To be intimately acquainted with the practice of agriculture in all its bearings, is not sufficient. To know as much as our fathers knew is not sufficient. And pray what is sufficient? do you ask. We reply that, as they would value their own interest, and as they desire the success of their profession, the farmers should attach great importance to the knowledge of those branches of learning that bear in any degree upon that profession.

As a science of the very first importance, the art rests upon chemistry. The relation of chemistry to agriculture is most evident: the earth, the air, the water, the animal, and the plant, come within the sphere of this science, are regulated by its laws, and continually exhibit its truths. The study of geology is most eminently a study for the agriculturist. Should he, of all men, be ignorant of the origin, formation, and nature of the soil upon which he works, and from which he derives his subsistence? With botany he must be acquainted, since it treats of the constituents, the growth, and the habits of the plants he cultivates. Surely such information cannot be unimportant, neither can a close familiarity with the physiological principles of the animal creation be to him valueless. With the laws of mechanics he should be conversant, for reasons that need not be here mentioned. In truth, the benefits resulting from such knowledge to the farmers have been so frequently stated, and the points where these sciences inpinge upon agriculture so frequently and clearly defined by other writers, that it is now unnecessary to reiterate them.

The few instances that occur of a professional education, supplied by a peculiar gift for combining traditionary and acquired knowledge by habits of observation, lessen not the necessity for a regular education. When we think that every art keeps pace with the intellect and information of the persons employed in it, this fact must be looked upon as true—not as fallacious. Science cannot be longer despised by the farmer as the mere speculation of theorists. He already begins to discover and accredit its practical utility, and he becomes more willing to examine its suggestions, and to employ them where he thinks they will profit him. But how can he do so with any *certainty*, since he knows not the laws by which the materials he desires to employ are governed? A good workman must know the use of each tool he employs: such knowledge economises strength, and saves money. If the farmer be ignorant on the matter of the economy of strength and means, let him learn. The time has come when he must seize upon all available floating materials that will help to bear the weight of his difficulties, and carry him forward. Nothing may be left that can be impressed into his service. During these days of heavy taxation he requires all the aids that he can obtain. And we remind him that he must not look abroad for them all. Nor must he depend upon Government for them all.

We are sorry to see that the farmer still regards with unreasonable suspicion what he styles theory. But what is true theory but that which will eventually become practice? and what is practice but that which was formerly theory? The application of any other than animal-power was once theory; the manuring of land was once theory; drainage was also esteemed a theory. Each was laughed at in its turn as unfeasible; but who laughs at them now? If we laugh, it is at the unwieldy sus-

picions of our ancestors, or at whatever resembles such suspicions in these days. Is there nothing like them now? Are not geology, chemistry, botany, &c., still as myths and theories to many a farmer? while to be cunning in the handling of a sheep, the age of a horse, the breed of a beast, and to be acquainted with the routine of cultivation, is the perfection of practice.

By far too great a stress is laid upon experience. Its sense, with the class of men who now occupy our attention, is too confined. By it they mean a practical knowledge of the entire details of farm management, extending its meaning to little or nothing else. It is with them the result of ocular observation. An experienced man is one who has held a particular farm for a great number of years with general merit; and such experimental knowledge is deemed by nearly all the community amply sufficient to insure them success. This is the only test of all ability. But we know the origin of that maxim "which," as Mr. Hume remarks, "has been so industriously propagated by the dunces of every age, that a man of genius is unfit for business."

Now in what consists this boasted experimental skill? A talent for minute observation, a ready memory, a presence of mind, a degree of perfection in the external senses and in the mechanical capacities of the body. These its elements are acquired by habits of active exertion. Without such training, therefore, experimental skill is not to be acquired.

"It is shown," says the celebrated Prof. Stewart, "that mere experience without theory may qualify a man, in certain cases, for distinguishing himself in both. It is not, however, to be imagined that in this way individuals are to be formed for the uncommon or for the important situations of society, or even for enriching the arts by new inventions; for as their address and dexterity are founded entirely on imitation, or derived from the lessons which experience has suggested to them, they cannot possibly extend to new combinations of circumstances. Mere experience, therefore" (mark this, all students of agriculture!), "can at best prepare the mind for the subordinate departments of life, for conducting the established routine of business, or for a servile repetition in the arts of common experience."

Now that we are on this line of remark we cannot refrain from introducing a lively picture, drawn by Mr. Burke, in his celebrated speech on American taxation, of the insufficiency of mere experience to qualify a man for new and untried situations. The observations are of so general a nature that they apply to any class of men: "Mr. Grenville was bred to the law, which is, in my opinion, one of the first and noblest of human sciences; a science which does more to quicken and invigorate the understanding than all the other kinds of learning put together: but it is not apt, except in persons very happily born, to open and liberalise the mind in the same proportion. Passing from that study, he did not go very largely into the world, but plunged into business; I mean into the business of office, and the limited and fixed methods and forms established there. Much knowledge is undoubtedly to be had in that line, and there is no knowledge which is not valuable. But it may be truly said that men too much conversant in office are rarely men of remarkable enlargement. Their habits of office are apt to give them a turn to think the substance of business not to be much more important than the forms in which it is conducted. These forms are adapted to ordinary occasions, and therefore persons who are nurtured in office do admirably well as long as things go on in their common order; but when the high roads are broken up and the waters are out, when a new and troubled scene is opened, and the file affords no precedent, then it is that a greater knowledge of mankind, and a far more extensive comprehension of things is requisite, than ever office gave, or than office can ever give."

Thus much for an experience that may suffice for such as believe in the stationary tendency of society; and we must leave them to it. Most of us, however, happily for agriculture, believe in the advancement of society. Some excursion must be made beyond the experiences of our forefathers; we must rout out every available material from among the experiencies of science. Every one should do something to increase the store of knowledge accumulated by his ancestors; else the assiduous coral-worm will shame us: that little insect, that performs its share of labour, little apprehending that it is a necessary part of the wonderful whole. We could enter more deeply into this subject; but, time failing, we must postpone any further remarks, and close with the observation of Sir Humphrey Davy—"that the soil contains inexhaustible materials, which, when properly appreciated and employed, will tend to increase our wealth, our population, and our physical strength." As a nation we possess advantages in mechanical ingenuity and economy of labour, common to none other. That energy of character and vastness of resource which have raised us to our present elevation, which have secured to us the highest reputation as a working and a learned people, may apply to raise us as agriculturists beyond all fear of competition.

ITS MEANS.

We have already spoken of the existing necessity for education—now for a few words upon system.

What system can be introduced likely to produce the general effect that is desired? A professional education has been mentioned. Is it meant that agricultural colleges and experimental farms are to be the schools of resort for such practical and scientific training? Not entirely so—they are, in their present conduct, liable to heavy objections. The nature of agriculture precludes the possibility of teaching the practice and science in combination; and if the practical operations be made to accompany the scientific studies, by means of local institutions, it only constitutes an education for the particular circumstances of the situation. One *scientific* institution might be sufficient for a whole country; but the fields of *practice* are numerous and variable, and a distinct institution would almost be required for each locality.

We are pleased to see, from a late report of Scottish

farming, that a committee was formed about two years ago, for promoting the introduction of agricultural education into all the elementary schools of the rural districts. Of the working of such schools we will furnish a notice on a future occasion. Who can tell us a reason why such a plan may not be resorted to with good effect in England?

Our country schools must be conducted on quite a different principle than that which now governs them, and limits their usefulness—our rural schoolmasters will have to be knowing in rural affairs. They must not only be able to give instruction in grammar, writing, arithmetic, geography, book keeping, practical geometry, and trigonometry; but they must also be competent to give lessons on the theory and practice of agriculture, on botany, and on agricultural chemistry; the elements of natural philosophy should also be inculcated, and mechanics, machinery, and the combination and application of mechanical powers should be treated of. This knowledge would lay the foundation for a clear notion of the principles of work, the uses and construction of farm implements, and would afford the students a facility of judging of the merits or demerits of the numerous new inventions that spring from our foundries, and dazzle the eye with glaring colour. The mechanical laws of fluids should also be made to engage the attention. As to chemistry, in such schools as those for which we are sketching a plan, a foundation only for future progress can be laid. It will be requisite to impart a practical knowledge of the chemical laws and operations which are at work around us in daily life. These laws and operations should be illustrated by experiments. The master must therefore be possessed of a museum of substances and chemical agents, with appropriate apparatus. Geology can be taught by lectures and diagrams, &c. The study of botany can be made very practical: specimens may be collected, their peculiarities displayed; they may be classed, named, and preserved.

There should also be an acquaintance with animal physiology. The external appearance of the human frame is familiar to all; but its internal structure is generally unknown, together with the manner in which the vital and other functions are performed. To farmers who have so much to do with live stock, and so great an interest in the preservation of health amongst it, such information surely is invaluable; and it would be a thorough foundation for the veterinary art. The master should then be competent to lecture on physiology, the diseases of cattle, the specific action of medicine, illustrating and explaining chiefly by means of diagrams, however rough they may be.

Subsequent to such elemental training, the parents of those students that discover ability, should draft them to one of the larger scientific institutions. Under the direction of the agricultural chemist a course of analysis must be threaded, &c. Our young men will then come forth equipped for the service of time—as chemists, botanists, geologists, and mechanists—useful working, practical men, bringing a strong sense and a critical knowledge ingeniously to bear upon our agricultural operations—well qualified to remodel old customs, and to introduce new modes.

It may be said that the simple practice of farming would be absolutely neglected by lads thus otherwise busied. By no means. During the elementary course, which has been mentioned as carried on in the rural schools, abundant opportunity would be afforded for maintaining an acquaintance with such matters; indeed, a practical attention to such work would have to be enforced. Besides, were it not so, the training to which we have alluded would fit the mind of the student for the formation of a speedy intimacy with those methods of cultivation peculiar to his own district. The perusal of the examination papers of the Royal Cirencester College would set any one at rest upon the point, however. When an opportunity occurs we hope to bring those papers more prominently before our readers—they speak with a strong clear voice for the system we propose. However defective the organisation and working of the Cirencester college may be, and it is the only one worthy of mention, we must not conclude that all such institutions must *necessarily* be inefficient. During the very few years it has existed the managers of the college in question have gained much wisdom in the conduct of affairs, and improvement may always be anticipated as the natural consequence of untiring, patient zeal.

But it may be asked, what are the young men of the present time to do? These schools are not yet erected—the schoolmasters have to be trained, and all things made ready. It is not designed that they should stand one moment idle. The coming generation may bear upon it the stamp of their character, be it good or bad, if it be but *energetic*. Let them see to it then that they work as leaders, and loiter not as obstructionists.

It may not be in the power of all parents to secure for their sons an education at one of the agricultural colleges. Eighteen months in London, with a daily attendance at the Royal College of Chemistry, and the Royal Veterinary college, where a most sound practical intimacy with the branches of science there taught is insured at a *cheap rate*, affording opportunities also of frequenting other schools, would be of inestimable benefit to any young man who possessed a full appreciation of his advantages. There are at the present time several young farmers at work at both these institutions from day to day. Many have gone to their farms from thence, and by the experiments they have made, the improvements they have already introduced, and the sagacious manner in which they conduct their affairs, fully justify whatever laudation may be passed upon such education. Let us advise such young men to establish an agricultural chemistry association: let them diffuse knowledge by lectures and otherwise among the agricultural body, guide the farmer in the use of manure, and have for their view the enlargement of the store of actual knowledge.

To those who cannot obtain access to these superior benefits, there is yet left a resort to books. Few of this class are so poor that they cannot make themselves masters of a little stock of books. A thorough ac-

quaintance with "Johnston's Chemistry" would be a broad field of wealth to any young man: this work is wonderfully comprehensive, abounding in all sorts of useful information relating to the daily concerns of life. Daniel's, Turner's, or Brand's Treatment of Chemistry, may then follow. From amongst books on geology, we would select the following, Lyell's "Principles," Professor Hitchcock's work, Morton on Soils, &c. The volume published by the Society for the Diffusion of Useful Knowledge is the simplest treatise on Botany that we can recommend. Their four volumes on Natural Philosophy contain also the cheapest and simplest abstract of the subjects classed under this head. Moseley's "Illustrations of Mechanics," is a cheap and useful book; and upon Animal Physiology we would mention Dr. Carpenter's admirable Treatise. Indeed we could find it easy to lengthen this paper considerably with a list of books that may be studied by young farmers with the utmost advantage; the purchase of those suggested, however, will lay as heavy a tax upon a slender purse as it can bear.

Young men, look to it that these matters have your consideration. Learn to be jealous of the many hours spent at the market-table, or elsewhere, in senseless conviviality. Be above the prejudices of your class against book-learning and scientific pursuits. Shun above all things the abuse of leisure time.

There may be perceived on all sides of us an unwearied industry exerted in promoting the advancement of knowledge in every department of human affairs, all done with a view of improving the moral and social condition of the human race. Why is there little or no attention paid to the acquirement of knowledge relating to the cultivation of the earth, the most essential of all arts? Let us look to it. "The high roads are broken up, the waters are out, a new and troubled scene is opened—the file affords no precedent. A far more extensive comprehension of things is now requisite than ever experimental skill gave, or can give."

F. R. S.

ROYAL AGRICULTURAL IMPROVEMENT SOCIETY OF IRELAND.

A MONTHLY meeting of the Council was held on Tuesday, March 2. Present: John Bolton Massy, Esq., in the chair; Colonel Shaw; William B. Wade; Captain Lindsay; Thomas Ball; Stephen Roche; William Owen; Hon. C. J. Trench; Thomas Seymour; Colonel Hall, C.B.; Dr. Kirkpatrick; J. L. W. Napier, V.P.; Alderman Roe; Sir Robert Kane; and Robert C. Wade, Esqrs.

Members of the Society present: Sir Frederick Foster, Bart.; William Maffett; Sir James Murray, M.D.; J. Ganley, and Cornelius Lundie, Esqrs.

The following new members were proposed and admitted:—
Sir Josias Coghill, Bart.
Thomas Franks, Esq., Lower Fitzwilliam-street.
Richard Allen, Esq., Sackville-street.
Hugh Ferguson, Esq., Grafton-street.
Richard F. Mulvany, Esq., Sackville-street.
W. H. Rathbourne, Esq., Cabra Villa.
John Jameson, Esq., Malahide.
Alderman Gresham, Temple-street.
Sir James Murray, M.D., Monkstown.
Sir R. Shaw, Bart., Bushy Park, Rathfarnham.
Messrs. Purdon, proprietors of the *Irish Farmer's Gazette*.
Robert Orme, Esq., Mount Annville, Dundrum.

THE FARMERS' CLUB AND LIBRARY.—This subject was fully discussed; the draft prospectus and rules and regulations being brought before the meeting by Colonel Shaw. The meeting ultimately ordered that those documents be printed and extensively circulated, requesting replies to be sent to the secretary, whether the proposal was approved.

THE KILDARE CHALLENGE CUP.—A report by the committee (Messrs. Ball and Lundie) appointed to report upon Sir Compton Domville's draining, was read, ordered to lie on the table, and the secretary instructed to transmit a copy of it to Mr. Sherrard, agent to the proprietor.

GALWAY SHOW.—Communications from the local committee and secretaries to the Council were read, and a deputation of Messrs. Ball and Wade, jun., was named to wait upon the local committee, and confer as to arrangements for the show.

AGRICULTURAL LITERATURE.—The secretary presented to the Council, in the name of Mr. Caird, of Baldoon, his recent work upon English agriculture. The Council directed their thanks to be communicated to Mr. Caird. An article and letter by J. H. Dickson, Esq., of Loudon, on flax culture, were presented to the meeting, and ordered to lie upon the table.

JOURNALISM.—The managing committee were instructed to report as to the proposed journal of the society.

MEDALS TO LOCAL SOCIETIES.—Mr. Ball brought under the notice of the Council the imperfect workmanship of the medals and cases furnished for the local societies: Ordered—That same be returned to the medalist, in order that the cases may be renewed, and the engraving better executed.—*Dublin Advocate.*

FLAX COTTON.—The *New York Journal of Commerce* says: "The flax-cotton movement will surprise the world yet. It would seem that Chevalier Claussen's mode of converting the flax into cotton, ready for the ordinary cotton machinery, has fully succeeded. It will be, however, a greater boon to this country than to Europe. In England and Ireland the soil is too valuable for the product of food to admit of raising flax. It will be better for them to look to our American cotton at its ordinary price for their material than to flax cotton for their own production. But this country will soon become largely productive of flax, and the raw material as well as the fabrics from it will no doubt become one of our chief articles of export. Either the statements and estimates as to the cost of the preparation of the cotton from flax are erroneous, or it is certain that flax cotton must soon become one of the great staples of the western and middle states. Rights have been purchased already for the preparation of the article in the states of New England, New York, and Illinois. It is thought that Virginia will be particularly benefited by the introduction of the culture of flax. It will give all the advantages of a cotton growing state. She will not only produce the article, but manufacture it. The fabrics from flax cotton, whether pure or mixed with other materials, are very strong and handsome. Among the fabrics now on exhibition at the capitol are pantaloon stuffs and army clothing, all very strong, The plain linen cloth also is excellent, as are also the specimens of linen and cotton hosiery. The flax cotton can be sold to the manufacturer at six cents. per pound, and leave an ample margin for the profits of those who produce the flax and prepare it."

HOWDEN FARMERS' CLUB.

At a meeting of the members of the above club, held on the 7th of February last, the subject for discussion was "Tenant-right." After many interesting remarks by the members present, an act of the last sessions on tenant-right being produced by Mr. James Campbell, from which it appears no doubtful or existing tenant rights were referred to, nor any prospective ones secured without the concurrence of the landlord, whose concurrence by an agreement would require no legislative enactment, it was finally resolved and requested that Mr. James Campbell, one of the oldest practical valuers in the neighbourhood, should give his opinion upon all such matters as might be said to be connected with tenant right and customs, and their foundation; first subjecting it to the inspection of Messrs. Stoar, Thompson, and Bell, highly respectable valuers, extensive farmers, and members of the club; afterwards to be read at the annual dinner of the club, which took place at Mr. Bowman's, Commercial Inn, Howden, on the 4th of March last, P. Saltmarshe, Esq., of Saltmarshe, in the chair; on his right hand T. Clarke, Esq., of Knedlington, and on his left Rev. W. Hutchinson, of Howden; also between thirty and forty of the members and friends. After partaking of an excellent dinner, and the usual loyal toasts, &c., &c., having been drunk, and the appointment of officers for the ensuing year, Mr. Campbell was called upon, by the president, and read the following paper, which was unanimously approved of, both by landlords and tenants then present:

"The subject of tenant-right has now for some years engrossed the attention of the most enlightened of the tenant farmers, whose attempts at improvement in the management of their farms, equal to the increased knowledge which every period keeps developing, have been in too many instances prevented, for want of a correct knowledge of those rights which ought in common justice to belong to them, as a necessary consequence of the landlords, in letting the farms and thus establishing customs, chiefly considering what, in their opinion, was only essential to their own interests. The views of many landlords are greatly changed upon this subject; and an indispensable necessity exists in the minds of all intelligent tenants to progress with the age, as the only means whereby they can hold a position in society anything like equal to what they are entitled to, either in an individual or national point of view. Nevertheless, the difficulties arising from difference of soil, situation, and climate in the United Kingdom, are such as to render it a task of no common character to obtain a legislative enactment for that object. We are, therefore, of opinion that no farm should be taken but under a written agreement, founded upon the first principles of protection—protection to the existing interest of the landlord, and protection to the tenant for the unconsumed, purchased or expended improvements, with as few restrictions as possible upon him, in order that his talent and capital may develop themselves, whereby he may be induced, by the security thus given, to farm with advantage to himself and landlord. One important clause wants introducing, not existing at present, viz., upon all farms where the landlord is the owner of the manure, a value of the same ought to be made in the usual way, as a permanent interest of the landlord's; and at giving up, a valuation should be again made, and whatever improved value it has attained, or may possess, the off-going tenant should be paid by the in-coming one, as tenant-right. If, on the contrary, by bad management it is found reduced in value below the landlord's interest, it should be deducted from any interest the tenant may possess at quitting. Thus the landlord's interest is secured, and a just tenant-right insured to the good farmer."

N. B. A more intellectual and interesting meeting was never held in Howden; and terminated in the addition of several new members.

THE STATISTICAL SOCIETY.

At the meeting of the Statistical Society, on the 16th Feb., Sir Charles Lemon, Bart., M.P., vice-president in the chair,

Five fellows were elected, and five foreign honorary members.

A paper was read by Joseph Fletcher, Esq., her Majesty's inspector of schools, honorary secretary, containing the experience of farm schools, as they are employed in foreign countries, for the education and reformation of pauper and criminal children. Its data were chiefly those collected for the Belgian government by Mr. Edouard Ducpetiaux. More than 50,000 children and young persons under 16 are constantly dependent upon the public guardianship in England and Wales, in

workhouses or gaols, in which they are trained for the most part to indolence and vice.

To meet such evils on the continent spade husbandry has of late years been variously employed—1. In free colonies or farm workhouses *(fermes hospices)* which have failed in Holland, but succeeded in Belgium. 2. In colonies for the repression of adult mendicancy and vagabondage, which have universally failed. 3. In agricultural reform schools, refuges and home colonies for young paupers, mendicants, vagabonds, orphans, and foundlings, deserted children, and those who are contaminated with vice, or in moral danger (moral orphans, as they are expressively called), the number of which establishments is large, and constantly on the increase in Germany, Switzerland, Holland, France, and Belgium, while they are but now struggling into permanent existence in England. 4. Agricultural penitentiaries, or correctional and reformatory schools, directed exclusively to the training of children and young persons actually found guilty, or acquitted only as having acted without knowledge (discernment), but detained for the purpose of being brought up under wholesome discipline to a stated age.

The first step out of the horrible system of pauper slavery still lingering in Flanders, and once common to the whole continent, is due to the inexhaustible charity of the Protestant cantons of Switzerland; the first among the men of piety and refinement who could no longer endure its existence being Jean Henry Pestalozzi, of Zurich, who gave his whole life and fortune to efforts which produced great changes in the views entertained of education generally. His work was recommenced with zeal by De Fellenberg, at Hofwyl, in 1799, and is still continued by his disciple, Verhli, at Kreutzlingen. It has been imitated throughout Switzerland, n farm schools, chiefly deriving their origin, like the *fermes hospices* of Flanders, from private beneficence and public subscription, seconded by contributions from the communes and the cantonal governments.

These are commonly for children of both sexes, from 30 to 50 and upwards in number, economically managed on the plan of an enlarged peasant family by a married couple, styled respectively "house-father" and "house-mother," the former of whom is their leader in industry and their instructor in school. Simplicity, piety, order, and happiness appear to reign in these institutions; and from 1837 to 1840 the Swiss Society of Public Utility commissioned Mr. Kruatly to study the best means of applying the same happy discipline to reformatory purposes. This object he realized in the latter year in the establishment of the Reformatory School at Bachtalen, the peculiar features of which are, its being for one sex (boys) only, and its employment of an enlarged proportion of moral agency, by the subdivision of the young people into smaller families, each under its own assistant "house-father." The mean cost of maintenance and management in thirteen of these Swiss establishments was found to be 185 francs per annum, or 50 cents. (5d.) per day; while on the old system of selling the door by auction it was about 2d. per day.

Many of the states of Germany have nearly kept pace with Switzerland in these efforts to rescue from destruction the children thrown, physically or morally, destitute upon society; and in Wurtemburgh especially, the reform schools date from 1828, and now form a complete system under the guardianship of the state. Here the cost of each child is 60 florins per annum, or nearly 4d. per day.

But the most remarkable German institution of this kind is the Reformatory School at Hamburgh, called "The Rauhem Hause," at Horn, under the management of Mr. Witchern, and from the advanced views of which Mr. Kruatly derived the detail of his plans for the organization of Bachtalen. The "house-fathers" here form a Protestant religious fraternity of normal school students for similars labour and for missionary work. The cost of each of the 86 children in this institution is not less than 300f. per annum, or about 8d. per day; while at the Prussian establishment at Dussenthal, with 178 children, it is 180f., or about 5d. per day.

In France and in Algeria, where the farm schools have chiefly come into existence between 1837 and 1848, there appear now to be 41 home colonies for children and young persons, classed as follows:

	No.	Average of Land.	Number of Inmates.	Average daily cost of Maintenance.
				Fr. cts.
Penitentiary colonies, founded and directed by private individuals	12	2,988	1,933	1 18
Penitentiary colonies, directed by the State.....	4	1,052	384	0 77
Colonies of orphan, foundling, deserted, and pauper children	25	8,375	1,582	0 81
Totals.....	41	12,415	3,899	0 84 & 4-11

The daily cost in France is thus seen to average nearly 8½d. per day, while in England the net cost of each criminal is about 13½d. per day, with little if any expenditure for reformatory purposes.

The conclusions derived from the experience of these institutions on the continent, as applicable to ourselves, appeared to be:—

1. That the farm schools of the continent applied to education for the *prevention* of crime hold a social position precisely analogous to that of our workhouse schools.

2. That for the children in these schools, as in those of the continent, a trainin n vigorous rural industry and close domestic economy, by means of farm schools conducted on the principles of a Christian family, will yield the greatest attainable moral vigour, with the least amount of indolence and self-deception.

3. That by far the greater number of the present workhouse schools are now producing converse results, and that we have no experience strongly favourable to regimenting and warding the children in large district edifices, however pleasing their mechanism, while we have ample testimony in favour of the farm school system.

4. That the children at a proper farm school, required to work steadily at all its out-door and domestic duties, as well as at their own mental cultivation, will certainly not cost more to the public (if so much) than under the present system, or that of the contemplated district asylums, while the saving in their improved conduct for the future will be very great.

5. That to have good *preventive* schools for the training of the pauper children is the great practical step towards obtaining good *reformatory* schools for the retraining of criminal children, if these are ever to be realized on principles well understood and economically applied.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR MARCH.

Under the influence of unusually fine weather in most parts of the United Kingdom, no rain worthy of notice having fallen during the month, all out-door farm labours have progressed rapidly, and the whole of the spring corn has been sown under the most favourable auspices. In another point of view the absence of moisture has been beneficial to the farmers, viz., the fine condition in which it has enabled them to thresh out their wheats; hence, most of the samples brought forward since we last wrote have proved fit for millers' purposes, without a large admixture of foreign. The trade, however, notwithstanding that comparatively high prices are ruling throughout Germany, the result of scarcity, has become in a very inactive state, and prices have had a downward tendency—the fall in them having amounted to about 2s. per quarter. Numerous inquiries have been made in reference to the supplies on hand in our large districts; but, in the absence of statistical details, it is impossible to arrive at anything like accuracy on so important a point. It is evident, however, from the very large sales effected since the close of harvest up to the present time, that last year's crop was a very abundant one. Fair average supplies of barley have appeared on sale; nevertheless, the majority of the samples have been unfit for malting purposes. In other spring corn, the receipts of which have slightly increased, only a moderate business has been doing.

The increase in the sale for, and consequently use of guano, has of course tended to enhance rather than diminish the pretensions of importers, and the effect has continued to work favourably for the lucky holders of Peruvian Bonds. Within the last few days those securities have advanced in the London Stock Exchange to 105! We refer to this fact for the purpose of again protesting against an exclusive agency for, and a fixed price of an article, which is thus placed beyond the reach of a large portion of the agricultural body—and wherefore? Simply because the dividends on the foreign debt of Peru may be secured to the bondholders! Now it is perfectly well known that all other guano, save that imported from the islands in the immediate vicinity of Callao, is comparatively worthless—indeed, scarcely worth the freight to England; hence a most unjust advantage is taken in the possession of an article which must, in order to keep pace with the times, be applied to certain lands, in order to increase their productive capabilities. From a report drawn up last year we find that a sum exceeding £100,000 was realized by its sale; and it is tolerably clear that a much larger amount will be netted this season; consequently the bonds have increased in value, under the impression that the approaching dividends will exhibit a corresponding increase. Whenever the interests of bondholders are jeopardized in any way, instant co-operation is to be met with in the city; remonstrances and agents are speedily forwarded abroad to represent the views of the aggrieved parties, and from which very beneficial results frequently arise. Numerically speaking, farmers in this country show a large excess compared with the Peruvian creditors; why, therefore, should not their just claims be fairly and fully represented to the government of Peru, through an agency, not from Capel Court, but from their own body? Surely the task is far from a difficult one; and when it is considered that millions of tons of guano—we here write within bounds—still remain in a state of accumulation in the islands above referred to, and which offer good employment to our shipping trade, it requires but little consideration to prove that ship-owners in general would be willing to assist in breaking down a most absurd and an injudicious monopoly like the so-called "guano contract."

Immense quantities of potatoes, in excellent condition, have appeared on sale in our leading markets, and we understand that very large supplies are still in the hands of the growers for the time

of year. As we anticipated some months since, the imports from abroad have been trifling in the extreme; hence, the demand, which has ruled excessively heavy, has been wholly met by our own producers. The advantages of railway communication in reference to this description of produce were never more apparent than during the present year, the metropolis having drawn large quantities from almost every county, including, of course, Scotland. That the growth in 1851 must have been considerably in excess of most former years, even after making due allowance for losses by disease, is now clearly apparent; but we much doubt whether the crop, owing to the low prices at which it has been disposed of up to this time, has proved a source of much profit.

The fineness of the weather has been very favourable for the lambing season. The "falls" are represented as strong and healthy, and the losses few in number. Flock-masters have been compelled to part with a portion of them; but the trade has been very dull, and the quotations have continued low.

The contrary winds having kept back supplies, there has been some little improvement in the demand for, and value of linseed; but present prices are not considered safe, as there cannot be less than 200,000 quarters on passage from India, and the Black and Mediterranean seas. That fat stock has paid better than grain of late years is too evident to require any lengthened observations, consequently we perceive that the use and consumption of oil-cake are steadily increasing, with a fair prospect as regards value, because we perceive that the continent has very little to spare for us, owing to the large demand on the part of the Dutch and Danish graziers.

Much anxiety has been manifested of late in reference to the future supplies of wool from our Australian colonies. The last accounts from Sydney, as well as from Port Philip, state that the shipments had exhibited a falling off, compared with those of the corresponding season, of about 5,000 bales, arising from the allurements of the gold diggings, and the great scarcity of labour on most farms. It is clear that an improvement in the existing state of things—for it cannot be denied for a moment that the abstraction of the labour of some 10,000 persons from the usual employments of life, and in a portion of the world where the population is very thinly scattered—can only be effected by emigration on an extended scale. We do not think that the imports of wool into this country during the present year will show any large decrease; but it is evident that any great extension in our clothing trade will have the effect of causing a material effect upon the value of good colonial fleeces.

The increase in country slaughtering of animals for the London markets having chiefly supplied the demand on the part of provincial chandlers, the tallow trade has been much depressed, and prices have again given way. Russian houses still hold upwards of 30,000 casks, and the prevailing low rates of value are calculated to check all speculation on the part of English firms.

The hay and straw markets have been liberally supplied, and the demand has ruled exceedingly inactive, at from £2 15s. to £4 per load for meadow hay, £3 5s. to £4 6s. for clover, and £1 4s. to £1 10s. for straw.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

For the time of year, the various cattle markets have been somewhat extensively supplied with each kind of fat stock during the month just concluded. Owing to the season of Lent, and the immense quantities of country-killed meat which have been forwarded from the provinces and Scotland to Newgate and Leadenhall, the general trade in Smithfield has been in a very inactive state, and prices of both beasts and sheep have ruled the turn in favour of buyers. We may observe that the stock has come to hand from Norfolk and Scotland in first-rate condition, it having carried rather over an average weight of internal fat. From most of our large grazing districts, very favourable accounts have reached us on the subject of the disease. No losses worthy of notice have been experienced for some time past; and the great abundance of food on most farms has prevented the necessity of purchasing largely of cake, although it is pretty clear that the consumption of the latter article has been on the increase.

About average arrivals of foreign stock have been reported into London, but those at the outports have been comparatively small. The general weight of the beasts has not improved; but it is pretty generally understood that a large quantity of heavy stock will be shipped from Holland during the present year. The imports into London have been as under:—

	Head.
Beasts	1,416
Sheep	4,485
Calves	843
Pigs	3
Total	6,747

In the corresponding period in 1851 we received 8,381; in 1850, 6,004; in 1849, 8,034; and in 1848, 4,421 head.

The total supplies exhibited in Smithfield have been:—

	Head.
Beasts	18,699
Cows	448
Sheep and lambs	100,465
Calves	1,280
Pigs	2,629

COMPARATIVE SUPPLIES.

	March, 1850.	March 1851.
Beasts	16,715	16,040
Cows	506	314
Sheep and lambs	95,480	85,920
Calves	1,321	1,236
Pigs	1,881	2,184

The droves from Norfolk, Suffolk, Essex, and Cambridgeshire have amounted to 8,100 Scots, short-horns, &c. From other parts of England, 3,000 of various breeds have come to hand; and the supply from Scotland has exceeded 2,000 horned and polled Scots, chiefly per railway.

COMPARISON OF PRICES.

	March, 1850.		March, 1851.		March, 1852.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Beef	2 4	to 3 8	2 4	to 3 10	2 4	to 3 8
Mutton	2 8	to 4 4	2 10	to 4 8	2 6	to 4 4
Lamb	5 0	to 6 0	5 0	to 6 0	4 8	to 5 0
Veal	3 0	to 3 10	3 0	to 4 0	3 4	to 4 6
Pork	3 0	to 4 0	3 0	to 4 0	2 6	to 3 10

In Newgate and Leadenhall the trade has ruled heavy, as follows:—Beef, from 2s. 2d. to 3s. 4d.; mutton, 2s. 6d. to 3s. 6d.; veal, 3s. to 4s.; pork, 2s. 4d. to 3s. 8d. per 8lbs. by the carcass.

The lambing season having proved very prolific, a dull season is anticipated for all breeds. Up to the present time, prices have ruled unusually low.

SOMERSETSHIRE.

I have delayed longer than usual writing this report; but this time of the year, although of importance to the coming crop, is not so great as the coming months of spring. A finer week than the past could scarcely be wished; previously the work was rather backward, but now far advanced as regards preparation, planting, and sowing. The weather is too cold and dry for progress in growing; and our spring crops, unless we have rain soon, cannot be otherwise than late; and there are but few instances of the seed coming up, although now more than a month in ground. Potato-planting has made great progress, but the early ones will be late in the season. A good deal of the fine blossom of the apricots is cut off, but there is none down of the peach and nectarine, and pears and plums promise a fine blossom. Altogether the wheat looks well, but backward, and the winter beans are much the same; there has been a fine time for hoeing them. Cattle have done well out of doors, but there is likely to be more hay consumed than was expected. The clover crop of last year has turned out well, and one of the best crops grown. Indeed it has proved worth the fair price it has sold for, and a timely assistance in paying the spring rents. There was such a bulk that farmers have not, in many instances, had it fit for delivery when sold. The thrashing-machines have had more than they can do, and the men for shelling it have not for years earned so much. The best seed sold as high as 54s., but it is now come back to 48s., and a good deal sold from 40s. to 44s. A very large quantity has been sent out of the county, Ireland taking a considerable amount. Our wheat markets have been very dull; in the beginning of the month there were large supplies, but they are now fallen off. The millers have been very cautious, and have been lowering their stock, the bakers doing the same, while the consumption has increased since there has been so much work out of doors. Prices have come down from 6s. 3d. extreme to 5s. 10d.; best white wheat, 64lbs., 6s. to 5s. 6d.; new-mixed red, 5s. to 5s. 3d. This may be about present average rates; in some markets rather lower. Flour, 32s. to 33s,; 34s. being about the top price it has reached. Some millers ask 31s. to 31s. 6d. Beans have been steady; for feed, 4s. to 4s. 2d., and for planting 4s. 3d. to 4s. 6d. Oats, 18s. to 22s.; some inquiry for seed. Grinding barley, 28s. to 30s.; for malting and seed, 30s. to 32s. per qr. There is much complaint of the sale of fat stock; 7s. 6d. to 8s. is about the most that can be obtained, and at that price there is no life. Poor stock is ruling better in proportion. Fat sheep are not so high as they were, or the sale so brisk; 6d. to 6½d. in the coats. There has not been much demand for the early lambs; altogether the season for lambing has been propitious, and there will be a good increase. Poor sheep keep up their price as well as anything; a continuance of the cold weather is likely to slacken the demand. Fat pigs have been as low as 6s. 6d., but are now worth from 7s. to 7s. 3d. They have not, although purchased low when poor from the high price of corn, paid for fatting. Cows and calves are about the same as last year, but cheese is much lower, particularly the middle qualities. The best extra will reach 54s. per cwt., but the great bulk of best cheese is sold from 40s. to 48s.; the low qualities from 28s. to 38s. Very little doing in wool. There has been some speculative sales of teazles; the quantity grown in this county is much lessened; the old stock got very low.—March 26.

A PROLIFIC SHEEP.—On the 18th inst., a half-bred Down and Norfolk ewe, belonging to Mr. J. W. Hicks, of Walton Hall, was discovered by the shepherd to have yeaned the unprecedented number of six lambs. For some time previous, the shepherd noticed the ewe was of an extraordinary size; and finding it unable to stand and graze, he kept it penned up in a shed, and fed it by hand. At the time they were found, one of the lambs was dead, and four others did not outlive the day of their birth. The remaining lamb is now alive and doing well. An instance transpired a short time since in Dorsetshire of a sheep having yeaned the extraordinary number of five lambs, but the present case is one, as far as known, unparalleled.—*Chelmsford Chronicle.*

METEOROLOGICAL DIARY.

Day.	Barometer. 8 a.m.	Barometer. 10 p.m.	Thermometer. Min.	Thermometer. Max.	Thermometer. 10 p.m.	Wind and State. Direction.	Force.	Atmosphere. 8 a.m.	Atmosphere. 2 p.m.	Atmosphere. 10 p.m.	Weath.
	in. cts.	in. cts.									
Feb. 23	30.57	30.58	30	42	34	N. East	brisk	fine	sun	cloudy	dry
24	30.49	30.38	31	41	36	N. East	brisk	cloudy	cloudy	cloudy	dry
25	30.33	30.30	34	42	33	E. by North	brisk	cloudy	sun	fine	dry
26	30.30	30.27	36	43	35	E. by North	lively	cloudy	cloudy	cloudy	rain
27	30.14	30.04	34	42	33	N. Westerly	gentle	fine	sun	fine	rain
28	29.76	29.62	33	48	35	N. West	gentle	cloudy	cloudy	fine	showers
29	29.72	29.84	32	41	32	N. N. West	gentle	fine	cloudy	fine	dry
Mar. 1	29.80	29.70	29	48	38	W. by S., W'ly.	lively	fine	cloudy	cloudy	showers
2	29.70	29.82	34	41	28	N. N. Easterly	gentle	fine	cloudy	fine	dry
3	29.94	30.20	24	40	28	N. Easterly	gentle	fine	sun	fine	dry
4	30.25	30.52	24½	42	28	S. by East	gentle	fine	sun	fine	dry
5	30.60	30.72	20	42	28	S. S. Easterly	gentle	fine	sun	frost	dry
6	30.73	30.70	24	43	32	E. by North	lively	fine	sun	fine	dry
7	30.66	30.56	27	47	36	E. by North	fresh	fine	sun	fine	dry
8	30.55	30.43	32	45	38	Easterly	lively	cloudy	sun	cloudy	dry
9	30.43	30.40	36	48	36	Easterly	lively	cloudy	sun	fine	dry
10	30.40	30.34	35	48	33	Easterly	lively	cloudy	sun	haze	dry
11	30.27	30.20	31	43	38	N. East	lively	cloudy	cloudy	cloudy	dry
12	30.33	30.35	35	45	33	N. East	gentle	cloudy	sun	haze	dry
13	30.37	30.40	33	46	34	N. East	lively	cloudy	sun	fine	dry
14	30.40	30.40	32	43	37	E. by North	lively	cloudy	cloudy	cloudy	dry
15	30.40	30.40	26	43	40	N. Easterly	lively	cloudy	sun	cloudy	dry
16	30.41	33.34	37	47	42	N. Easterly	gentle	cloudy	cloudy	cloudy	dry
17	30.33	30.30	35	49	32	N. Easterly	gentle	cloudy	sun	fine	dry
18	30.30	30.19	32	40	37	E. by North	lively	cloudy	cloudy	cloudy	dry
19	30.19	30.10	34	44	34	East	brisk	cloudy	sun	cloudy	dry
20	30.10	30.09	30	51	42	S. East	lively	fine	sun	fine	dry
21	30.10	30.10	36	58	47	S. by East	gentle	fine	sun	fine	dry
22	30.10	30.11	43	65	48	S. by E., by W.	gentle	fine	sun	fine	dry
23	30.11	30.—	35	64	47	S. by E., S. W.	calm	fine	sun	fine	dry

ESTIMATED AVERAGES OF MARCH.

Barometer. High.	Barometer. Low.	Thermometer. High.	Thermometer. Low	Thermometer. Mean.
30.77	28.87	66	24	43·9

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
46	31.4	38.7

Weather and Phenomena.

February 23 to 26—Wind generally cutting till about sunset. 26 and 27—A mere hint of occasional drizzle. 28—Some showers. 29—Cold, overcast; night starry, just a fraction above freezing.

Lunations.—First quarter, 29th day, 5 h. 31 m. morn.

March 1—Changeable; gleams, and a few showers. The future course to the equinoctial day is worthy of particular notice. 2—Clear and frosty after sunset. 3—Here commences the long period of easterly wind, and keenest nights of the winter. Brilliant warm sun till the 7th. On the 8th clouds formed, and the atmosphere was generally dark and gloomy; the wind penetrating, but generally lulling at or about sunset. Ice was collected on the 5th. As a remarkable and beautiful phenomenon, we here notice a lilac and citron blush or glow extending from the zenith to the western horizon, at sunset, *to the 11th*. To the 17th, north-easterly wind, and nearly sunless, cold weather. 20—*Equinox*—superb clouds disappeared, and superb splendour followed. Yet the reader may perceive the gradual approach of a probable change.

Lunations.—Full moon, 6th day, 5 h. 30 m. morning. Last quarter, 12th day, 8 h. 29 m. morning. New moon, 20th day (*Equinox*), 6 h. 45 m. afternoon.

Remarks referring to Agriculture.

We have never recorded a finer third month—

the very contrast of March, 1851; yet the summer which followed that was rich in productiveness. The *Equinox* of this year offers no manifest prognostic, so consistently fine has been the weather. Nevertheless *a change* has been preparing since the very day (20th), and much wet will doubtless occur. At present, so benign and seasonable have been the checks, early and late, that the growing crops are in strong but not rank condition. The seed time has also been propitious.

J. Towers.

Croydon, Feb. 23.

CALENDAR OF HORTICULTURE.

Conservatory.—The continued prevalence of cold easterly and north-easterly winds will require the exercise of a considerable degree of caution in giving air to this structure, when, from the necessity of fire-heat to keep the temperature at or near 50 deg., and from the number of plants from still warmer structures usually congregated therein, too free an admission of cold draughts of air would be very injurious. To remedy this state of things, give the principal air by opening the top sashes, and keep the temperature of the lower part of the house down by shading for a few hours in the middle of the day when the sun is out bright, which will also assist in retaining plants in bloom for a longer period than would be the case if the full power of the sun is allowed them, however much the temperature may be lowered by the admission of air. Great care must also be taken to keep the atmosphere moderately moist by sprinkling the floors and borders two or three times a day, the last of which should be applied at the time the house is closed for the night. Remove Camellias and Indian Azaleas which are past flowering to a cooler place for a few days, and afterwards transfer them to the forcing-house or stove, to perfect an early growth for forcing another season. These plants are peculiarly liable to be affected with one of our greatest pests, the thrips. To keep down and extirpate them, it will be necessary to fumigate these structures once a week: and it will be of great advantage to cut up some pods of chilies or capsicums, and mix with the tobacco. I see in another publication that Cayenne pepper is recommended; and although I do not doubt its efficiency, I have used the former for some years past, and have every reason to be quite satisfied with its effects, and would recommend an extra quantity to be grown for the purpose. Apply water liberally to Amaryllidæ and other bulbous plants in pots, when growing freely; and bring in a fresh supply from the pit for successional blooming. Look well after the advancing stock of choice annuals, amongst which the Cockscombs will now be sufficiently advanced to distinguish which are likely to make good heads of bloom. Discard all the bad ones, and give the rest a liberal shift, and grow them on in a frame, with a brisk bottom heat.

Stove.—Give air freely in suitable weather, and shut up early with a good amount of solar heat, at which time also the house should be well charged with air-moisture by a liberal syringing with tepid water. Cuttings of all sorts, required to keep up the general stock, may still be put in as they can be procured. Those recommended last month to be struck for winter-blooming should now be potted off, and every possible encouragement given them to cause a good, healthy, stocky growth. There is no better place to bring them on than a dung-bed frame with a brisk bottom-heat ranging about 75 deg. Plants in a free state of growth will require a liberal supply of water, and now and then a dose of diluted tepid manure-water to some of the softer-wooded ones.

Orchid House.—Continue the potting of such plants as are prepared for it, which will be indicated by their starting into growth; also renew the blocks and baskets to such as require it. Apply water freely to plants in an active state of growth, and remember that air moisture is indispensable to success. The forwardest plants advancing into bloom should be assigned the warmest places; on the contrary, such as are past flowering must have a cooler temperature, and a gradual lessening of water. Keep up a brisk growing heat, and regulate the temperature during powerful sunlight by a free admission of air rather than by too much slackening of fires; the night temperature should not exceed 65°. Constant care will be necessary to keep down insects, particularly woodlice, which are very destructive, and they find such congenial quarters amongst these plants that if not disturbed they breed by thousands. A few large toads will be powerful auxiliaries.

Pits and Frames.

A steady and uniform temperature, both at bottom and top, must now be maintained to Melons and Cucumbers in every stage. Air must also be given every day more or less, according to the state of the external weather; and in very bright hot sun apply a slight shading during midday. Ridge out successional beds both of Melons and Cucumbers, and sow more seed for later purposes. Sow also some ridge Cucumber for planting under hand-lights for the earliest crops out of doors. Attend well to watering and air moisture, and carefully impregnate choice kinds for seeds; to prevent them from being crossed by the bees after impregnation, carefully and lightly tie up the corolla with a string of matting, and then cover it with an inch of soil, and by the time it breaks through there will be no fear of fur-

ther crossing; other means may be adopted to attain the same end, but this method is simple, quickly performed, and efficient, providing the plants are healthy and the heat brisk. Remove Strawberries which have set their fruit from the pits to the shelves in the vinery or other heated structures to ripen, and bring in a good number for succession. Be very careful of the Roseberry's and Keen's seedling, from which the fruit is gathered; set them in a light airy shed on a cool dry frame for a time, and keep them dry, or nearly so, to create a season of rest. In the mean time prepare a portion of an east or west border by trenching, and an addition of some strong fresh loam, and plant them out about the middle of next month at 18 inches apart. They will supply very fine runners for future forcing, and in most seasons a tolerable crop of fruit in the autumn.

Flower Garden.

The main sowing of hardy annuals of all sorts must now be got in without delay; also throw up a bed for a gentle bottom heat for the principal sowings of tender annuals. The choice kinds, such as Partulacca, Messembryanthemum, Rhodanthe, &c., should be sown in pots or pans; but those of stronger habits may, to have space, be sown broadcast on the bed, taking care to have proper places in readiness to prick them out as soon as they can be well handled. Asters will do best if sown under small hand-glasses on a south border. Attend to the securing a good stock of Climbers and other plants for trelliage and vase work, and by all means encourage them with a shift, if convenience serves, and tie up as they advance. Finish off the dressing of flower borders as fast as possible. After the very dry time we have had, it is probable that fresh-planted evergreens, particularly Rhododendrons, will require watering; it is best to attend to this in time to assist the protrusion of the spring growth rather than wait until summer, as is too often done, to the manifest injury of the plants so neglected. Be careful in forking through the Rosary to replace all rotten stakes, and also to get a good supply in readiness for summer use.

Kitchen Garden.

With so fine a seed time there ought to be but little left to do in the way of committing to the earth the necessary crops of all kinds for summer and autumn use. Yet, as the seasonable cold weather will have kept things back, those which have been unavoidably delayed may still keep pace with the season by putting a little extra strength to the work. Beds of Jerusalem Artichokes, Seakale, Rhubarb, Horseradish, &c., may still be planted, but lose no time; above all, if you are so unfortunate as to have any ground left to be planted with Potatoes, lose not a day. Sow Salading of all sorts; also Peas, Beans, Onions, Parsley, Spinage, and a little red Beet, and get a bed ready for Carrots next week. Earth up and stake the early Peas, and keep the surface soil well stirred amongst all advancing crops. C.

SHREWSBURY GREAT ANNUAL HORSE FAIR.

It would be idle to enquire, at the present moment, why a town so important as Shrewsbury, and so admirably situated, as the centre of one of the finest agricultural districts in England, should have so long remained without a great annual fair for the sale of horses; whilst other places comparatively insignificant—both as regards the extent of their accomodations, and every other circumstance that bears on the subject—should have combined to maintain a considerable amount of popularity in this respect. Long famous, as Shropshire and the adjoining counties have been for the excellence of their breed of horses—an excellence so fully appreciated and acknowledged, that many of the principal dealers, both metropolitan and provincial, have, for years past, been in the habit of periodically scouring the country in search of them—it remained with a few gentlemen, in the years 1851 and 1852, to suggest and carry out the grand experiment of seeking to make Shrewsbury, as it ought always to have been, the greatest mart in this part of England for the sale of this description of stock. The experiment has been made, its practicability has been tested, and the most sanguine anticipations of its warmest advocates and supporters have been more than realized. Nothing could have been more triumphantly successful; and in recording this success, we feel that we shall only be giving expression to a strong public feeling, when we state that whilst the mayor and committee of management are deserving of the highest praise, it is to two members of that body, Mr. Blakemore, their secretary, and Mr. Jones, saddler, that our thanks are especially due; for it is to the spirit, activity, and intelligence of these gentlemen that we are mainly indebted for the satisfactory result at which we have arrived. No expense or trouble was spared in giving the utmost publicity to the matter, every possible exertion was made to bring together the purchaser and the breeder; and how perfectly and thouroughly this has been accomplished, it is now our pleasing duty to announce. Indeed, the pages of this *Journal* have throughout warmly, and, from the origin of the subject, almost weekly, advocated and encouraged the measure, as one of the utmost importance both to the town and country; and, therefore, it is with something of almost parental satisfaction that we record its entire success.

The fair commenced, as was previously announced, on Wednesday last, and continued over the two following days. For nearly a week prior to this, we had been aware that most of the best stabling in the town had been engaged, so that we were prepared for a large display of horses; but we confess the number was much greater than we had an-

ticipated. The attendance of dealers also exceeded our expectations. The names of nearly all the great London dealers, familiar as household words to the breeders of horse-flesh, were in the list of purchasers here—Anderson, Tawney, Phillips, Collins, Osborne, and Shakel. The well-known provincials were also, most of them, in attendance; amongst whom we may mention James, Chapman, and Haynes, of Cheltenham; Gethen, of Grantham; Wheeler, of Oxford; and the Cotterills, Sankeys, &c., of Birmingham. East, of London, accompaied by Major Wingfield, on the part of the government purchased several young horses for the army; and it is especially worthy of remark that several Lincolnshire farmers were in attendance; and secured many raw young horses for the purpose of making up. What is still more to the purpose, we can state with the greatest confidence, that nearly all the dealers in attendance expressed themselves highly gratified with the display, and gave to all enquirers not only an assurance of the success of this year's meeting, but, as the best warrauty of future prosperity, the promise of their attendance on all like occasions.

We have no desire to seem invidious by particularising where it is impossible, in so short a space, to do justice to all parties; and yet we cannot avoid mentioning a few of the breeders of those animals which struck us as most deserving of notice. At the Fox stables were several exceedingly fine horses, among which were distinguished those of Mr. Pugh, of Gwernlwd, and Mr. Powell, of Buttington; at the George, those of Mr. Done, of Aston, Mr. Gardiner, of Asterley, and Mr. Eddowes, of the Betton, were worthy of particular mention; as were also those belonging to Mr. Davies, of Bin-weston, at the Old Post Office, of Mr. Stephen Matthews, at the Elephant and Castle, and of the Rev. E. Pardoe, of Hopton Castle, and Mr. Geo. Farmer, of the Lower Down, at the Unicorn. At the Raven, the display of valuable horses was also very great, amongst the breeders of which must be distinguished the names of Lord Hill, Mr. Davies, of Knighton, Mr. Bowen, of Ensdon House, Mr. Hoggins, of Smethcott, and Mr. Callcot, of Betton. There were also a number of first-rate animals at Wicks's stables, for the most part steady carriage horses, and seasoned roadsters and hunters, the property of the Earl of Powis, the Hon. and Rev. H. N. Hill, of Berrington, Capt. Owen, Mr. Eyton, of Gonsall, Francis Harries, Esq., of Cruckton, &c., &c. We believe we may add, that most of these changed hands; and that the prices in very many instances exceeded a hundred pounds, and, in one or two cases, reached nearly double that amount. Mr. James, of Cheltenham, was probably the largest purchaser numerically, and after him may be ranked Anderson, of London, and Gethen, of Grantham.

On Wednesday and Friday, Messrs, Smith and Preece, auctioneers, of this town, held large sales in the Raven Yard, for horses of all descriptions. There was a good attendance of buyers, and fair prices were realized.

In conclusion, we have only occasion to remark that the Shrewsbury Great Annual Horse Fair has now been placed, by the exertions of all parties interested, on the most promising footing; the attendance of first-class purchasers is insured, and it only remains with the farmers and other breeders to seek to maintain the supply. We have already, and next year we shall doubtless have many more, a great number of horses from long distances. Not only Montgomeryshire, but also Radnorshire, Herefordshire, Staffordshire, Cheshire, and Merionethshire have contributed their quota to the supply; and there is no reason why we should not continue to extend even still farther our market. The Races have been distanced; and our fine old town has seldom witnessed such an influx of strangers, as during the past week. Every branch of the trade must have been benefitted by this, either directly or indirectly; and, therefore, every individual who reads this, will, we are sure, concur heartily in our wish, which, indeed, is almost a certainty, for the continued prosperity and success of Shrewsbury Great Annual Horse Fair.

This fair, which commenced [so successfully, is under the patronage of the Lord Lieutenant of the county of Salop, the Viscount Hill; and to show the interest his lordship takes in the encouragement of the breed of horses in this county, which it has been so long and justly celebrated for in the London and continental markets, has just purchased from Mr. Percival, of Wandsford, Lincolnshire, the thoroughbred stallion "Magnet," by Newby, whose stock is in such great repute in the above and other great hunting countries.

We have been told some other noblemen and gentlemen have expressed their intention to imitate Lord Hill's example in that district.—Eddowes's Jour., March 10.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

ALSTON FAIR.—A very small supply of cattle of every description, which was attributed to the farmers being well supplied with fodder. Short-horned calvers were from £8 to £12, black do. from £6 to £10; geld cattle few, and no sales. The show of horses superior to other years. The railroad laying off so many caused a larger supply of nags than usual, and they brought prices varying from £12 to £30. Nice smart looking ponies, fit for the saddle, in fair request from £8 to £12.

ANDOVER FAIR.—Although the weather was very fine throughout the day, very little business was transacted, and but few purchasers attended. The supply of Cheese was small, the prices of which were as follow: fine Cheddar, 60s, to 65s.; Somerset, 56s. to 60s.; Wiltshire, 52s. to 56s.; thin, 40s. to 45s., and skim, 21s. to 25s. per cwt. There was a short supply of horses, horned cattle, and pigs, which on the whole met with a dull sale.

BARNSTAPLE FAIR.—There was a good supply of stock of different descriptions, and at an early hour most of the choice lots found purchasers. A good many excellent heifers were produced; we particularly noticed a very handsome animal, the property of James Banks, Esq., Bishop's Tawton. Among the steers was a very prime drove, belonging to Mr. Turner, Bideford: there were many other lots claimed attention. Prices may be quoted as follows: Cows and calves, £10 to £14; yearling steers, £8 to £12 the pair; two-year-

old ditto, £10 to £14; three-year-old and upwards, £14 to £28 per pair; fat bullocks were not very plentiful, and fetched 7s. 6d. to 8s. per score. In the sheep market many prime lots were to be found, and the anticipation of sellers ran high with respect to prices, which occasioned a dulness in the sale, as the butchers did not appear inclined to advance on previous rates. Mr. J. Martin, of Ileanton Court Barton, had a prime lot of sheep, 150 in number, but they were driven away unsold. Great complaints were made by the butchers concerning the extreme fatness which prevailed among the sheep brought to market, which renders the meat unsaleable, and consequently unprofitable to the tradesman and the purchaser. Fat wethers realized 5¼d. to 5½d. per lb.; hoggerals, 21s. to 25s. each; horn couples, 22s. to 28s.; nott ditto, 25s. to 38s.

CASTLE DONINGTON FAIR.—The attendance was not large. Barren cows were much in request, and the demand considerably exceeded the supply, at fair prices. The quantity of cheese pitched was small, and made 5d. per lb.

CLITHEROE FAIR.—There was not such a good show of cattle, and only a moderate amount of business was transacted. The show of Scotch sheep, however, was large, but the sale dull, the dealers asking about 19s. per head—about two shillings above the average price of last year.

DUNFERMLINE MARCH MARKET.—The day being good, the stock was shown to advantage. The show of fat cattle was neither so good nor so numerous as in former years. Among the principal lots were—12 queys, sold by Mr. Tod, of Lachran, at £12 each, to Mr. Mather, Glasgow; Mr. Menzies sold a lot of stots to Mr. Thomson, at eleven guineas; Mr. Berwick, of Vantage, sold five cattle to Mr. M'Gregor: Mr. Thomson, Grange, sold a lot of fine Highland cattle to Mr. Forbes; Mr. Watt sold a lot to Mr. Downie; Mr. Beveridge sold a lot at £9 each to a dealer. Top price of best cattle, 6s. 6d. per Dutch stone; secondary and inferior 5s. 6d. to 6s. We had a large show of milch cows of rather an inferior description, which met with a very dull sale. Prices ranged from £5 to £11 each, and fully the half turned out unsold. Very few grazing cattle were shown, and these were very inferior. There was a large supply of very superior draught horses; sales were flat. Mr. M'Airtney showed a very splendid lot of first class animals. He sold one splendid black mare at £50; another changed hands at £45. First class horses brought good prices; in secondary and inferior there was little business done.

HELSTON FAIR was not so well supplied with cattle as it usually has been, though the attendance of dealers was good. Fat beef was very scarce and dull of sale at about 42s. per cwt. Store cattle sold freely at from 30s. to 33s. per cwt.

KELSO FORTNIGHTLY MARKET.—We had a full market of fat cattle, the greater part of which were of prime quality. There was a large attendance of buyers, and sales were more quickly effected than at our previous market, but upon the same terms. Beef from 5s. to 5s. 3d., and some superior lots about 5s. 6d. per stone. The sheep market was well supplied; and, though the demand was not brisk, almost the whole were disposed of at 5½d. per lb. There was a large number of cows, the greater part of which were of an inferior description. Good cows were selling at from £9 to £12.

KENDAL FORTNIGHTLY FAIR.—Of sheep there was a very slender supply; and, with the exception of two pens of South Downs, none in very good condition. South Downs were offering at from £2 8s. to £2 14s.; cross, from 19s. to 22s.; small blackfaced sheep from 17s. to 18s. Cattle was below an average supply, but many were in fair average condition; cows of the best class were selling at from £12 to £14; aged and inferior sorts from £8 to £10; heifers were altogether of small size, and were at from £8 to £10; calves from £1 15s. to £3; milk cows are numerous of late. Good cows were selling at from £12 to £13; secondary sorts from £9 to £10; young heifers from £5 to £6. A very large portion of the stock were disposed of before the close of the market. Average price per lb.:—Beef, 5d.; mutton, 5½d.; Veal, 5d.

LEEDS FORTNIGHT FAIR.—There has been an average show of horned cattle, and a fair amount of business was done. Buyers were numerous. Cattle, of which they were 750, were sold at 5s. 4d. to 5s. 6d. and 6s. per stone of 16lb. Sheep, 3,400, all were readily sold at an average of 6d. per lb. Lambs were sold at 25s. to 30s. each.

LINCOLN FAT STOCK MARKET.—There was a large show of fat stock, and, there being rather a scarcity of buyers, business was in consequence more depressed than of late. Some very good stock of both sorts were shown, and where business was transacted the rates quoted for the last two or three weeks were realised.

MARNOCK FAIR.—There was a great display of cattle from all the neighbouring districts—much larger, indeed, than at any former market. From the large show of beasts, the market was first very stiff, and a considerable time elapsed before any movement took place. A beginning being made, however, the greater part of the good beasts on the stance were disposed of. Fat stock seemed in most request; grazing beasts were little sought after, although several sales of that description of stock were made. There did not seem to be many superior horses shown. Work horses seemed to be in demand, but there were not many fine animals on the ground. We heard of some good prices being paid for aged animals. Of roadsters it might almost be said that there were none.

RETFORD FAIR, as far as the weather was concerned, was one of the finest we have experienced for several years. The company attending the same was large—perhaps larger than usual; and, taking it altogether, a fair amount of business was done. The exhibition of fat stock was very fair, and some capital things were offering; but, owing to a heavy market at Rotherham on the previous day, the proceedings were slack; and prices gave way in a trifling degree, the prices ranging between 5s. and 5s. 6d. per stone. There was only a small show of store beasts, which were much enquired for, particularly drapes, which realized good prices—say from £2 to £3 a head more than last year at this time. The show of sheep was a good one; but, owing to the dryness of the weather, the sale was only a slow one, and all offered were not sold. Good hogs, in wool, fetched from 5½d. to 6d. per lb.; clipped ones, from 4½d. to 5d. There was a tolerably good show of store hogs, which ranged from 30s. to 40s. per head. The horse-fair was a bumper, and amongst them some of the best carting colts we ever saw. In proof of this, we may state that as high as from £40 to £50, and even £60 a-piece, was made of several. Inferior horses were exceedingly plentiful, at commensurate prices. For good ones, and anything likely for business, there was a brisk sale. A large quantity of cheese was pitched, which realized a dull sale at somewhat lower prices. Derbyshire make fetched from 48s to 50s. per cwt. Trent-side, new milk, from 45s. to 50s., and a few prime ones by retail at 60s. Blend-milk, 38s. to 40s. A dull sale altogether, and much remaining unsold.

SCHOLES FAIR.—The stock exhibited was more than usually meagre, and the amount of business transacted correspondingly small.

STOURBRIDGE HORSE FAIR.—The dealers in attendance were numerous, and many excellent horses already brought into the town have found a speedy sale.

STAMFORD FAIR.—There was a moderate show of sheep, but of both fat and store beasts the number was limited. For sheep the demand was active, but in the early part of the day very few sales were effected in consequence of sellers asking higher prices than the buyers felt disposed to give, and the latter, aware, no doubt, of the scarcity of keep, held off purchasing; eventually a reduction was conceded, and most of the pens were cleared at about the following prices: lamb-hogs (to which the show was principally confined), 30s. to 35s.; one pen of superior hogs, belonging to Mrs. Hunt, of Barnack, fetched as high as 40s. per head: the few fat sheep offered made about 5½d. per lb.; shearlings, 34s. to 36s. each. For beasts the demand was not over active, and prices were lower than at the fair held in November; beef, 5s. 3d. to 5s. 6d. per stone. Some fat beasts belonging to Mr. Lowe, of Essendine, were much admired.

YORK FORTNIGHT MARKET.—We had rather a limited supply of fat beasts, which met with good sale, at from 4s. 9d. to 5s. 3d. per st. We had also a moderate show of mutton sheep, with a large number of grazing hogs, both of which sold well: the former, ewes and heavy weights, 5d. to 5½d.—wethers and gimmers, light weights, 6d. to 6½d. per lb. A good supply of short-horned steers, heifers, and drip cows for grazing, which had fair demand, but at very low prices. Lean Irish cattle sell at any price, on account of the prevalence of distemper amongst them. In-calving and dairy cows were in good supply, but they had slow demand from the cheese dairy districts, consequently prices tended downwards.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF MARCH.

It has been definitely stated by the leaders in both Houses of Parliament, that the government do not contemplate making any change in the laws regulating imports of grain, &c., until the feeling of the country on the subject shall have been ascertained at the next general election. The opposition have tried hard to force Lord Derby to dissolve Parliament immediately, and it seems probable that after the supplies for the army and navy estimates, and other necessary measures shall have been completed, the House will be dissolved. The great question as to whether free trade is to be continued or not will, therefore, most likely be put to the country before the close of the ensuing summer; the result must depend in a great measure on the electors themselves.

The tone of the grain trade has not been much influenced by the prospect of a re-consideration of the corn laws, as it is certain that nothing can now be done till after harvest. The tendency of prices has, contrary to general expectation, been downward, and the value of wheat is about 2s. per qr. lower at present than it was when we last addressed our readers. This has not been caused by any great pressure of foreign produce on the different markets, the arrivals from abroad having been moderate, and we are therefore inclined to attribute the decline to the anticipation of more liberal supplies in the summer. Those who calculated on scarcity and high prices, have long ere this discovered their mistake. We endeavoured, months ago, to point out the fallacy of the argument on which those favourable to a rise based their calculations, viz., the scarcity of food in Germany, &c., and the consequent probability of a material falling off in the importations from the Baltic. That this might have some influence we readily admitted; but we maintained, and still maintain, that with a good average crop, such as the last, Great Britain does not require foreign assistance, or at all events not to the extent the free-traders would have us believe. To argue, therefore, that because we imported at the rate of a million quarters per month in a year when the wheat crop was exceedingly deficient, and potatoes suffered extensively from blight, the same ratio of supplies would be needed under quite different circumstances, was simply absurd.

The importations have, however, not been altogether unimportant. During the month ending 5th January 178,839 qrs. wheat, and 366,750 cwts. flour; the succeeding month 126,354 qrs. of the former, and 192,102 cwts. of the latter; and again up to the 5th inst., 117,614 qrs. wheat, 172,709 cwts. flour, of foreign growth and manufacture, were received into the United Kingdom. These supplies, though small as compared with those of the corresponding months in 1851, have proved amply sufficient under the altered circumstances in which the country has been placed by the superior produce of last harvest.

As regards the future, we can see no reason to conclude that affairs will be different than they have been ever since our ports have been open to receive the surplus growth of other countries. The scarcity of food in the north of Europe may perhaps prevent us being overwhelmed with foreign produce; but more than sufficient is likely to come forward; and we fear that the competition between the foreign growers and our own will be of a character to keep down quotations here below the level necessary to remunerate the British farmer. Very good red wheat, weighing 63lbs. per bushel, may at present be bought, at the principal markets in the agricultural districts, at 40s. to 42s. per qr., prices which even the free-traders admit will not pay with existing rents, &c. We fear, however, that we cannot encourage our friends to expect any material advance on these rates, feeling satisfied that a very moderate rise would lead to increased importations. The tone of the foreign advices has already become more subdued, and though prices are as yet too high, as compared with ours, to hold out much inducement to consign, still we are by no means certain that the supplies from the north of Europe will, when the season shall have somewhat further advanced, continue as moderate as they have been of late.

We are now approaching a period of the year when the weather will have more influence on the course of the trade than any other circumstance; and what we have already said about prices must be understood as wholly independent of what may be brought about by atmospherical changes. So long as nothing occurs to give rise to uneasiness for the crops on the ground, we shall probably have but slight fluctuations in the value of wheat; prices are, we think, too low to be much further depressed, and we are disposed to believe that even with favourable seasons good red wheat will not decline much below 40s. per qr.: how high it might

rise, if the summer should prove decidedly unpropitious, no one can pretend to foresee, but the state of Europe would then tell. The acknowledged dearth in the interior of Germany, the reduced state of the stocks in France, and the comparatively moderate quantity of grain on passage from the Black Sea, would all tend to encourage speculators.

Thus far, however, the seasons have been particularly auspicious. The autumn was favourable for farm operations—wheat sowing was commenced and concluded very satisfactorily. The winter, though open, was not of a forcing character, and the plant did not at any period present a too luxuriant appearance. In the early part of February we had an abundant fall of rain; March has been remarkably dry, and the sowing of spring corn has been as favourably accomplished as could possibly be wished; and should we now have genial showers there would be little to be desired in respect to the prospects for the future.

We have no means of knowing positively the extent of land under wheat, but from careful inquiry we are disposed to think that the breadth is quite as great as usual, notwithstanding the loss which has attended the growth of this crop of late years.

We shall now proceed to give our usual retrospect of the operations which have taken place at Mark Lane since our last.

The arrivals of wheat coastwise into the port of London have not been large, nor has the quantity received by the different lines of railway been particularly abundant; this has, no doubt, been in a great measure owing to farmers having been busily engaged with out-door labours; these being now nearly completed, an increase in the home supplies may be reckoned on in the ensuing month, and the expectation of more liberal supplies has perhaps influenced millers the last week or two. The demand has at all events become exceedingly slow, and the tendency of prices has, since our last, been decidedly downwards. No actual fall took place till the 8th inst.: the reduction then submitted to amounted to fully 1s. per qr. This concession did not lead to any improvement in the demand, and with a small show of samples on the Essex and Kent stands, on the 15th a further reduction of 1s. per qr. occurred. Since then factors have manifested increased anxiety to realize, and the turn has been in favour of the purchaser. Good runs of Essex and Kent red wheat, such as were worth 44s. to 45s. per qr. at the close of February, have lately been offered at 41s. to 42s. per qr., without exciting much attention; and capital strong qualities, the growth of Lincolnshire and Cambridgeshire, might now be bought at similar rates.

The arrivals of foreign wheat have been quite moderate. But it is a curious fact that a considerable proportion of what has come to hand has been from ports where prices have actually been quoted several shillings per qr. higher than in the London markets: this has puzzled many, and remains unexplained. Several cargoes have been received from Rotterdam and Amsterdam, though quotations have been considerably above ours at those places; the same is the case with regard to Rostock: still the stuff continues to come forward. The demand for foreign wheat has throughout the month been of a strictly retail character. The English supplies have come forward in such dry condition that there has been little necessity to employ old foreign for mixing; and the new Rostock, &c., having been held relatively higher than our own growth, the millers have given the latter the preference. Notwithstanding, therefore, the smallness of the supplies, stocks in granary have not diminished. Holders have, however, remained firm, and the decline which has taken place in the value of English has failed to produce much effect on that of foreign. Small lots of Danzig and the very finest qualities of old red Baltic have realized comparatively high terms; but to have made any progress in the disposal of secondary and inferior kinds, it would have been necessary to have submitted to a reduction quite as great as that which sellers of English have had to accede to. New Rostock is certainly not worth more than 42s. to 43s. per qr., at present, being about the price paid for it free on board at the other side; to sell, therefore, from on board ship would entail a loss of quite 5s. per qr. to the parties concerned. In the early part of the month some business was done in floating cargoes of wheat on passage from the Mediterranean and Black Sea, at very full terms, 40s. having been paid for Polish Odessa, and 30s. per qr., cost, freight, and insurance, for Egyptian. These purchases were said to be for Dutch and Belgian account. During the last week or two we have heard of no sales, and the nominal quotations are now 2s., and in some cases 3s. per qr. below those named above. There have been a few offers latterly from the Baltic, but generally at higher rates than buyers have been inclined to pay, and the business in free-on-board cargoes has during the past fortnight been altogether unimportant.

The inquiry for flour has been languid throughout the month, and the London millers found it necessary to reduce the top price 3s. per sack on the 15th inst.; this has, however, failed to lead to a more extensive sale, which may be partly accounted for by bakers having previously bought pretty freely, and partly by the unwillingness generally felt to hold heavy stocks in the spring of the year,

when the article is apt to go out of condition on warm weather setting in.

The arrivals of flour from abroad have been quite moderate; and the decline in the top price of English has, therefore, been without much effect: the best qualities of French and American having been held nearly as high as before in this market; but at Liverpool, where the arrivals have been more liberal than with us, both sorts have receded 1s. to 1s. 6d. per sack and barrel.

English barley has come to hand rather sparingly; the maltsters and distillers having, however, conducted their operations with extreme caution, the tendency of prices has been downwards: the fall has hardly been of sufficient importance to warrant alteration in the general quotations, but the turn has nevertheless been in favour of the purchaser. Very good malting samples have lately been sold at 32s., and on Monday last it was difficult to exceed 34s. for the finest descriptions, 35s. being considered an extreme quotation. Grinding sorts have not varied materially in value: the few samples of English which have appeared have sold on much the same terms as before, and the supplies from abroad have not been so liberal as to give buyers any particular advantage: from 26s. to 28s. per qr. may be regarded as about the value of heavy sweet qualities, whether of home or foreign growth.

Malt has for some weeks past been almost totally neglected, and quotations must be considered as in some measure nominal, so little has been done in the article. The large brewers seem to have secured as much as they are disposed to take, and large sales have been out of the question; this having been the case, factors have deemed it useless to try to press business, and have demanded nearly former rates of needy buyers.

The weekly arrivals of oats have scarcely amounted to what is estimated to be the consumption of the metropolis; but this has apparently caused no inconvenience to the large dealers, who have shown no symptoms of being in want. The supply which came to hand from the Dutch ports, towards the latter part of last month, caused some pressure on the market the first week or two in March; but the greater part was ultimately cleared off without much giving way in prices. What the dealers then took has enabled them to go on without buying largely; and though, as already remarked, the receipts have during the last fortnight been quite moderate, factors have been unable to establish any advance. Lincolnshire feed oats, weighing 37 to 37½ lbs. per bushel, are at present worth 20s. to 20s. 6d. per qr., and other kinds proportionate rates. This, on reference, will be found to be nearly the same as the prices current at the close of last month. The home stocks of oats appear to have been reduced into a very narrow compass, and it is tolerably clear that considerable importations will be required before harvest. The accounts from Holland state that the shipments made to England during the autumn and winter have left little in the hands of either farmers or merchants; but we are inclined to think that Denmark will furnish some quantity, and in June or July we shall probably receive the usual supply from Russia.

The quantity of English beans brought forward has not been large, but it has sufficed for the demand, and previous prices have been supported with difficulty. Egyptian beans, to arrive, were in some request in the early part of the month, at 22s. to 22s. 6d. per qr., cost, freight, and insurance, and a cargo or two changed hands, it was said, for shipment to the continent; latterly the demand has become languid, and 22s. per qr. may be regarded as the top price for parcels on passage.

Peas have excited very little attention, and their value has undergone no alteration; fine English boilers have moved off slowly at 35s. per qr., and other sorts have been offered at corresponding rates.

Most of the cargoes of Indian corn which have arrived off the coast during the month having been sold previous to coming to hand, and the offers of parcels on passage not having been by any means numerous, there has been no pressure. The demand on Irish account has, however, slackened, and there has been no disposition to speculate. The prices asked for Galatz Indian corn (Bill of Lading, dated in March) are 29s. to 29s. 6d. per qr., cost, freight, and insurance, and other sorts are held at corresponding terms.

We shall devote the remainder of our space to a notice of the position of the corn-trade at the various foreign markets at the date of the latest advices.

The general tone of the accounts from the north of Europe is much more subdued than was the case when last we addressed our readers, and the present state of affairs at some of the Baltic ports proves that the opinion we have at various times expressed, viz., that the rise in prices in that quarter had been caused in a great measure by extensive speculation, was not ill-founded. At Danzig, quotations have been tolerably well supported; but at many of the lower ports a very considerable reaction has taken place, more especially at Stettin, where the speculative operations were during the winter carried on very extensively. Letters from Danzig, dated the 23rd inst., state that hardly any business had been done there the preceding week, the accounts from Stettin having had more or less influence. A day or two previous, a

parcel of wheat was sold by public auction at rates about 1s. per qr. below those of the preceding week. Rye had been offered at reduced terms, say 36s. per qr., without exciting attention. The weather had become very fine; bright sunny days, but rather frosty nights. The Vistula was still closed, but was expected to open in the course of a few days as low as the fair water.

The latest advices from Konigsberg state that, though buyers had acted with considerable caution, the moderate character of the supplies had rendered sellers unwilling to make any concession, and former terms had been insisted on, as well for wheat as for spring corn.

Stettin letters of the 23rd inst. inform us that something like a panic had occurred there. A very large share of the business done there during the winter has been what may be termed time bargains, that is, the sales were made deliverable on the 15th March. The consequence of this has been, that as the time for delivery approached supplies from the interior increased, and many having bought more than they needed, under the impression that prices would be higher in the spring, the quantity pressing on the market was sufficient to cause a material fall in quotations. Rye declined 10s. to 12s. per qr. in the course of eight or ten days; and the reduction in the value of wheat within the same period had, it seems, amounted to 6s. to 7s. per qr., and good qualities of the latter, such as had previously sold at 47s. per qr., might then have been bought at 40s. per qr., free on board.

At the other ports, where the trade during the winter has been of a more legitimate character, and where prices have not been run up so high as they were at Stettin, comparatively little change has occurred; and at Rostock, on the 23rd March, fine 62 lbs. wheat was still worth 42s. to 43s. per qr., free on board, whilst good 53 lbs. barley was held at equal to 25s. 6d., and fine boiling peas at 28s. per qr., free on board.

At Hamburg, on the 26th inst., holders manifested an evident anxiety to realize. It is now admitted that considerable stocks are held there by speculators, who are beginning to fear that they will lose by re-sales, the demand from the interior having all of a sudden ceased. Wheat from outports had been offered 1s. 6d. to 2s. per qr. lower, say 61 to 61½ lbs. from Wismar, such as a few days before had been held at 42s., might then have been easily bought at 39s. to 40s. per qr., free on board. Wahren wheat, on the spot, weighing 62 lbs. per bush., was still quoted 42s. to 43s. per qr., free on board. The inquiry for spring corn had also slackened, and barley had been sold 6d. per qr. cheaper than before; for 53½ to 54 lbs. from Jutland 25s., and for the same weight from Seeland 25s. 6d. per qr., free on board, had been accepted. Oats on the spot had given way about 6d. per qr., but for cargoes from the Danish Islands former terms had been asked. The weather was fine, and very auspicious for all kinds of farm work, which was consequently progressing rapidly.

The accounts from the principal Dutch markets are also of a subdued tone. The demand for wheat for the interior of Germany seems to have fallen off very suddenly, and as the advices from hence were considered to be discouraging, prices had given way more or less at Amsterdam, Rotterdam, &c.

The reports from Belgium are of a similar character; and it may be regarded as tolerably certain that quotations at most of the northern European ports will, during the ensuing summer, be regulated by prices here. Whether this will also be the case in France is not so certain; that the last crop in that country gave only an indifferent yield has been fully ascertained, and as the French are a large bread-consuming people, prices may be supported there without reference to the position of affairs here; indeed, it is not improbable that before harvest purchases may be made here of wheat for French account, and we deem it very unlikely that any supplies of magnitude will reach us from thence. By the most recent advices we learn, however, that prices were giving way, in consequence of the dull English and German accounts.

From the Mediterranean we have nothing of much interest to communicate; there does not appear to have been much done there for shipment to Great Britain, and the quantity expected from ports lying east of Gibraltar is certainly much below what it was at this period last year.

From Alexandria we learn that, after a period of excitement, business had again become very calm. The latest sales of Saide wheat had been at 24s. 4d., and Behira had been offered at 21s. 7d. to 23s. 5d. per qr., free on board. The shipments from thence since the commencement of the present year had been large, and had exceeded what was despatched during the same period in 1851. The quantities having been, in January and February last, wheat 321,000 ardebs, beans 120,000, barley 73,000; and in the same months in 1851, wheat 222,000 ardebs, beans 210,000, barley 29,000.

We have advices of very recent dates from America, by the steamer Africa. The markets on the other side of the Atlantic appear to have remained in rather a dull state, and large supplies from the interior being expected, prices of wheat and flour had given way at all the principal ports on the east coast. The shipments for Great Britain had not been very extensive, but we are inclined to think that rather large supplies of flour will reach us during the summer from the United States and Canada.

CURRENCY PER IMPERIAL MEASURE.

	Shillings per Quarter
WHEAT, Essex and Kent, white	42 to 46 fine up to 52
Ditto ditto old	42 45 „ 52
Ditto ditto red, new	40 42 „ 44
Ditto ditto old	40 42 „ 44
Norfolk, Lincoln, & Yorksh., red	40 42 „ 44
Ditto ditto old, none	„ —
Ditto ditto white new	42 44 „ 46
Ditto ditto old, none	„ —
BARLEY, malting, new	28 32
Chevalier	34 36
Distilling	26 28
Grinding	24 25
MALT, Essex, Norfolk, and Suffolk, new	53 55 extra 60
Ditto ditto old	45 48 „ 51
Kingston, Ware, and town made, new	60 61 „ 64
Ditto ditto old	50 53 „ 55
Irish feed, white	19 20 fine 22
Ditto, black	18 19 fine 21
OATS, English feed	19 20 fine 22
Ditto Potato	21 24 extra 26
Scotch feed	21 23 fine 25
Ditto Potato	23 25 fine 26
RYE	26 28 old 26 28
BEANS, Mazagan	27 28 „ 27 29
Ticks	26 28 „ 28 32
Harrow	29 30 „ 30 32
Pigeon	32 34 „ 32 34
PEAS, white boilers	34 35 „ 32 35
Maple	30 31 „ 30 32
Grey	29 30 „ 29 31
FLOUR, town made, per sack of 280 lbs.	— — „ 35 40
Households	— — „ 33 35
Country marks	— — „ 30 33

FOREIGN GRAIN.

	Shillings per Quarter
WHEAT, Dantzic, mixed	42 to 44 high mixed 46 48 extra 54
Konigsberg	42 44 „ 45 46 „ 48
Rostock, new	43 46 fine old 48 49 „ 50
Pomera., Meckbg., and Uckermk., red	43 44 extra 44 46
Silesian	„ 41 43 white 43 46
Danish and Holstein	„ 39 41 „ 41 45
Rhine and Belgium	„ 41 44 old 43 45
French	„ 40 42 white 42 44
Odessa, St. Petersburg, and Riga	36 38 fine 40 41
BARLEY, grinding	24 27
Distilling	26 28
Malting	none — —
OATS, Dutch, brew, and Polands	21 22
Feed	18 19
Danish and Swedish feed	19 21
Stralsund	20 21
Russian	20 21
French	19 20
BEANS, Friesland and Holstein	26 28 Konigsberg 30 32
PEAS, feeding	28 30 fine boilers 32 34
INDIAN CORN, white	28 29 yellow 28 29
FLOUR, French, per sack	30 33 fine 34 36
American, sour per barrel	20 21 sweet 22 24

IMPERIAL AVERAGES.

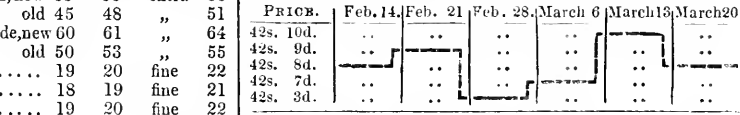
FOR THE LAST SIX WEEKS.

WEEK ENDING:	Wheat. s.	d.	Barley. s.	d.	Oats. s.	d.	Rye. s.	d.	Beans s.	d.	Peas. s.	d.
Feb. 14, 1852	42	8	30	7	18	9	29	11	29	10	29	7
Feb. 21, 1852	42	9	31	0	19	4	30	5	30	2	30	5
Feb. 28, 1852	42	3	30	7	19	6	30	7	29	10	29	5
March 6, 1852	42	7	30	1	19	4	32	5	30	2	29	6
March 13, 1852	42	10	30	5	19	9	30	5	30	1	29	7
March 20, 1852	42	8	30	3	19	9	31	11	30	4	29	10
Aggregate average of last six weeks	42	7	30	5	19	5	30	11	30	1	29	9
Comparative avge. same time last year	37	2	22	11	16	3	23	8	25	6	26	3
DUTIES	1	0	1	0	1	0	1	0	1	0	1	0

COMPARATIVE PRICES AND QUANTITIES OF CORN.

Averages from last *Gazette*.	Qrs.	s.	d.	Averages from the corresponding *Gazette* in 1851.	Qrs.	s.	d.
Wheat	85,125	42	8	Wheat	79,371	37	5
Barley	56,365	30	3	Barley	51,857	23	3
Oats	21,765	19	9	Oats	24,296	16	9
Rye	73	31	11	Rye	120	22	8
Beans	8,161	30	4	Beans	6,491	25	8
Peas	1,813	29	10	Peas	1,133	25	9

DIAGRAM SHOWING THE FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT DURING THE SIX WEEKS ENDING MARCH 20, 1852.



AN ACCOUNT SHEWING THE QUANTITIES OF CORN, GRAIN, MEAL, AND FLOUR, IMPORTED INTO THE UNITED KINGDOM IN THE MONTH ENDED 5TH MARCH, 1852, 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.
Wheat, from British Possessions	qrs. bush.	qrs. bush.	qrs. bush.
	—	—	9 2
Barley, do.	—	—	—
Oats, do.	—	—	—
Peas, do.	0 2	0 2	—
Maize or Indian Corn, do.	—	—	—
Wheat, foreign	116523 3	117614 1	5642 3
Barley, do.	44928 6	44928 6	15 5
Oats, do.	68265 7	68265 7	24 0
Rye	58 5	58 5	—
Peas, do.	5699 6	5699 6	—
Beans, do.	28551 6	28951 6	3808 5
Maize or Indian Corn, do	72987 6	72987 6	—
Buckwheat	532 1	532 1	—
Malt	—	—	—
Beer or Bigg	—	—	—
	cwts. qrs. lbs.	cwts. qrs. lbs.	cwts. qrs. lbs.
Flour from British Possessions	258 2 14	258 2 14	6 3 18
Flour, foreign	172450 2 20	172450 2 20	1230 3 6

PRICES OF SEEDS.

The arrivals of Cloverseed consisted last week of 1,364 bags and 5 casks. Business this morning was dull, but superior qualities were not lower. Canaryseed was rather easier to buy, and spring Tares moved off very slowly. In other articles we have no change to notice.

BRITISH SEEDS

Linseed (per qr.).. sowing 58s. to 60s.; crushing 45s. to 48s.
Linseed Cakes (per ton) ..... £8 0s. to £8 10s.
Cow Grass (per qr.) ..... 60s. to 70s.
Trefoil (per cwt.) ..... 21s. to 26s.
Rapeseed, (per last) new £21 to £23 ..... old £21 to £22
Ditto Cake (per ton) ..... £4 5s. to £4 10s.
Mustard (per bushel) white 5s. to 6s.; .. brown, 7s. to 9s.
Coriander (per cwt.) ..... new 17s. to 19s., old 15s. to 16s.
Canary (per qr.) ..... new 39s. to 40s.; old 40s. to 42s.
Tares, Winter, per hush., 4s. 6d. to 5s.; Spring, 4s. 6d. to 5s.
Carraway (per cwt.) ..... new, 33s. to 34s.; fine 36s.
Turnip, white (per bush.).. 8s. to 11s.; do. Swede, 10s. to 12s.
Cloverseed, (per cwt.).... red 44s. to 54s., fine 55s. to 60s.

FOREIGN SEEDS, &c.

Clover, red (duty 5s. per cwt.) per cwt. 44s. to 50s., super. 52s.
Ditto, white (duty 5s. per cwt.) per cwt. ..... 42s. to 60s.
Linseed (per qr.) .. Baltic 44s. to 47s.; Odessa, 46s. to 48s.
Linseed Cake (per ton) ..... £7 10s. to £9 0s.
Rape Cake (per ton) ..... £4 5s. to £4 10s.
Hempseed, small, (per qr.) 32s. to 34s., Do. Dutch, 36s. to 37s.
Tares, (per qr.)..... small 32s. to 36s., large 36s. to 40s.

HOP MARKET.

BOROUGH, MONDAY, March 29.

For all Hops of good quality prices continue to be well supported; the demand is, however, but moderate, being restricted to the immed te wants of consumers.

	Per cwt.
Mid and East Kent.....	140s. to 250s.
Weald of Kent do.....	126s. to 145s.
Sussex pockets	112s. to 126s.

COVENT GARDEN MARKET.

THURSDAY, March 25.

FRUITS.	s.	d.	s.	d.
Pine-apples, English, per lb..	4	0 to	8	0
Hothouse Grapes, do.	15	0	20	0
Lisbon Grapes	0	9	1	6
Apples, per bushel	2	0	3	6
Pears (dessert), per dozen	2	0	6	0
Strawberries, per oz.	1	0	2	0
Cobnuts, per 100 lbs.	80	0	100	0
Lemons, per dozen	1	0	2	0
Oranges, per 100	3	6	10	0
Almonds, per peck..	0	0	5	0
Spanish Nuts, do..	4	0	5	0
Spanish Chesnuts, do.	3	0	5	0
Brazil Nuts, per bushel	12	0	14	0
Barcelona Nuts, do.	20	0	22	0
VEGETABLES.				
Rhubarb, per bundle	0	6	1	4
Horseradish, per bundle	1	0	4	0
Asparagus, do.	3	0	7	0
Mushrooms, per pottle	1	0	1	3
Parsley, per dozen bunches	2	0	3	0
Spinach, per sieve	1	0	1	6
Greens per dozen bunches	2	6	3	9
French Beans, per 100	2	0	3	0
Savoys, per dozen	0	10	1	8
Red Cabbages, do.	2	0	4	0
Red Beet, do...	0	6	1	0
Sage, per dozen bunches	1	0	1	6
Watercress, per dozen bunches	0	6	0	0
Mint, do.	1	6	2	0
Turnips, per dozen bunches..	1	9	3	0
Carrots, do.	4	0	7	0
Potatoes, English, per ton	45	0	80	0
„ per cwt.	2	0	5	0
„ Cornwall, new, per lb.	0	1½	0	2½
Sorrel, per half sieve	1	3	1	6
Shallots, per lb.	0	8	0	10
Onions, per half sieve	2	0	3	0
Spanish Onions, per box	12	0	18	0
Celery, per bundle	0	8	1	6
Marjoram, do.	0	3	0	4
Fennel, do.	0	2	0	3
Savory, do.	0	2	0	3
Thyme, do.	0	2	0	3
Garlic, per lb.	0	6	0	8
Leeks, per bunch	0	1	0	2
Radishes, per dozen hands	0	6	0	8
Brussels Sprouts, per half sieve	1	0	1	6
Broccoli, per bundle	0	9	1	4
Parsnips, per dozen	0	4	1	0
Sea Kail, per basket	1	3	2	6
Endive, per score	1	0	2	6
Jerusalem Artichokes, per half sieve	0	9	1	0
Cucumbers, each	1	0	3	0

HAY MARKETS.

THURSDAY, March 25.

At per load of 36 trusses.

	Smithfield.	Cumberland.	Whitechapel.
Meadow Hay....	55s. to 77s.	58s. to 80s.	55s. to 78s.
Clover Hay	70s. 85s.	70s. 84s.	70s. 86s.
Straw.....	24s. 29s.	25s. 30s.	24s. 29s.

POTATO MARKET.

SOUTHWARK, WATERSIDE, March 29.

During the past week the market has been well supplied to the coastwise and by rail. The trade still continues dull, and lower prices have been submitted to for second-rate sorts.

The following are this day's quotations:—

	Per Ton.
York Regents.....	60s. to 80s.
Scotch do.	60s. to 70s.
Perth and Forfarshire Cups	60s. to 65s.
Fifeshire Ditto	55s. to 60s.
Kent and Essex	60s. to 75s.
Cambridge and Wisbeach	50s. to 65s.

COUNTRY POTATO MARKETS.—SHEFFIELD, March 23: Prince Regents, 6s. to 7s.; Shaws, 5s. to 6s. per load of 18 stones.—MANCHESTER, March 23: Potatoes, 5s. 6d. to 9s. per 252lbs.

PRICES OF BUTTER, CHEESE, HAMS, &c.

	s.	s.		s.	s.
Friesland, per cwt.	86	to 88	Double Gloucester,		
Kiel	86	88	per cwt.	46	to 56
Dorset ..... new	96	100	Single do.....	42	48
Carlow ..... old	74	80	York Hams	60	66
Waterford.... „	70	76	Westmoreland do.	60	66
Cork ..... „	74	78	Irish do.....	52	58
Limerick .... „	64	70	American do.	28	36
Sligo ..... „	70	80	Wiltshire Bacon,		
Fresh Butter, per doz.	10	12	green, ...	50	54
Cheshire Cheese, per			Waterford Bacon ..	50	52
cwt., ...	50	70	Hamburgh do.	44	50
Cheddar do.	56	68	American	—	—

BELFAST, (Friday last.)—Butter: Shipping price, 78a. to 85s. per cwt.; firkins and crocks, 9d. per lb. Bacon, 42s. to 45s.; Hams, prime, 56s. to 60s.; second quality, 50s. to 52s. per cwt.; mess Pork, 67s. 6d. to 70s. per brl.; refined American Lard, in bladders, 50s. to 52s.; kegs and firkins, 48s.; Irish Lard, in bladders, 52s. to 55s.; kegs or firkins, 50s. per cwt.

	Butter.		Bacon.		Dried Hams.		Mess Pork.	
March	per cwt.		per cwt.		per cwt.		per brl.	
25.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1848	90 0	96 0	58 0	62 0	50 0	65 0	75 0	80 0
1849	80 0	84 0	48 0	50 0	68 0	75 0	77 6	80 0
1850	78 0	84 0	38 0	40 0	68 0	80 0	76 0	77 6
1851	86 0	90 0	43 0	44 0	60 0	62 0	60 0	62 0
1852	78 0	84 0	42 0	45 0	56 0	60 0	67 0	69 0

WOOL MARKET.

BRITISH.

LEEDS, March 26.—The demand for combing Wools this week has been very flat, and prices have a tendency in favour of the buyers.

LIVERPOOL, March 27.

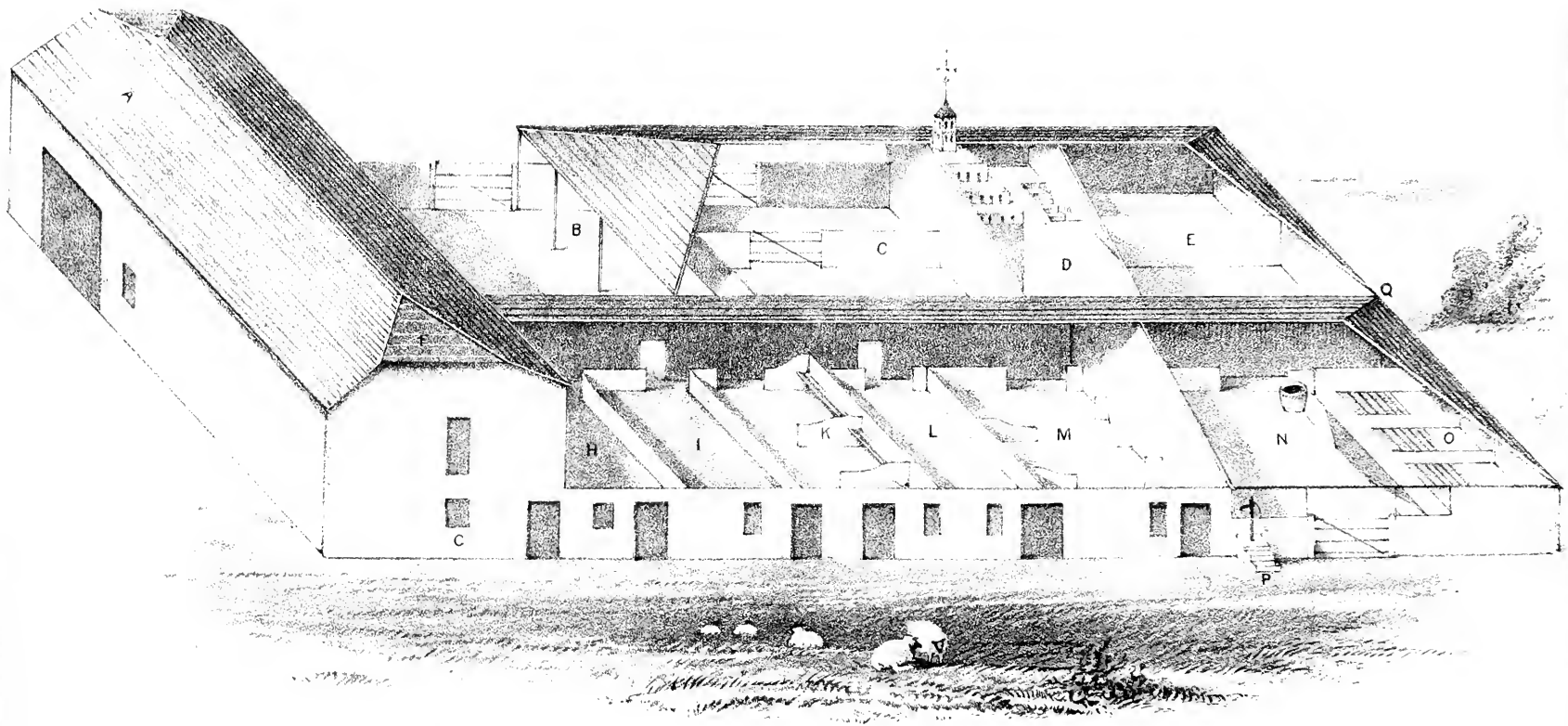
SCOTCH.—There is more doing in Laid Highland, rather under late prices. White Highland is less inquired for. In Crossed and Cheviot there is more doing at very irregular prices, depending on the feeling of the holder.

		s.	d.		s.	d.
Laid Highland Wool, per 24lbs....		9	0	to	9	6
White Highland	do.....	11	6		13	0
Laid Crossed	do...unwashed	10	6		11	6
Do.	do...washed	11	0		12	6
Laid Cheviot	do...unwashed	11	0		13	0
Do.	do.. washed	13	6		15	6
White Cheviot	do... do.	22	0		24	0

FOREIGN WOOL.

CITY, MONDAY.—The market is very dull for most descriptions, although there are not many sellers. Stocks are light, and considerable purchases continue to be made on the continent, of Wool from the next clip.

Printed by Rogerson and Tuxford., 246, Strand, London.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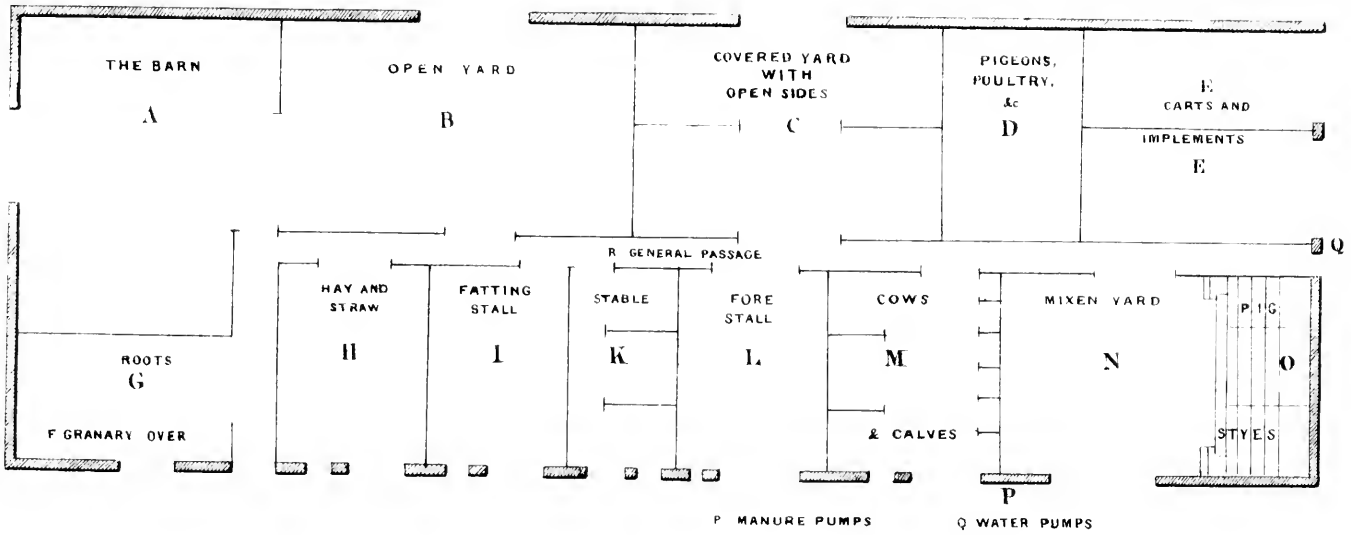
SKETCH & PLAN OF A MODEL OF IMPROVED FARM YARDS AND BUILDINGS,

DESIGNED BY **J. BAXTER, LEWES,** *AND SHOWN*

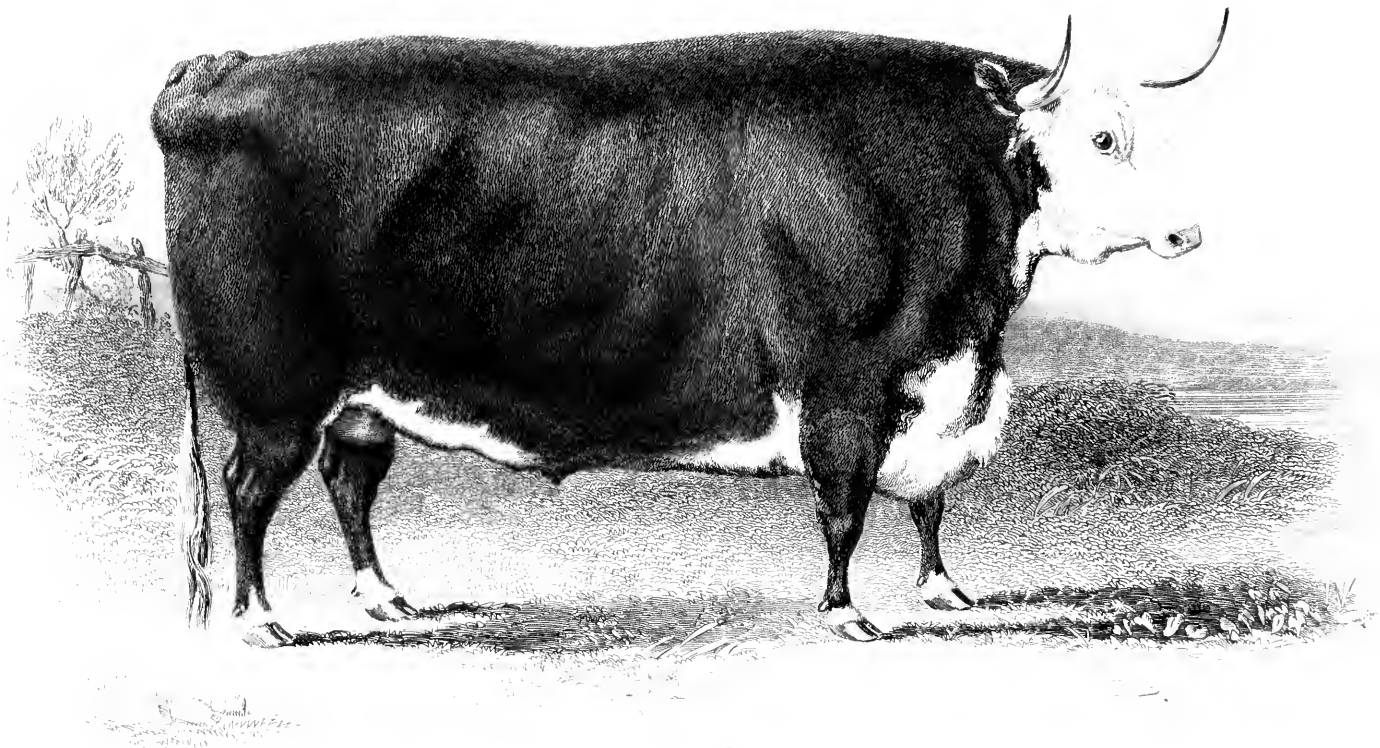
AT THE EXHIBITION OF ALL NATIONS. 1851.



Scale $\frac{1}{16}$ to a Foot.

ROCERSON & TUXFORD,

246, STRAND, LONDON.



THE FARMER'S MAGAZINE.

MAY, 1852.

PLATE I.

FARM BUILDINGS.

BY MR. JOHN BAXTER, LEWES.

(For description see page 386.)

PLATE II.

A HEREFORD STEER,

The property of Edward Longmore, Esq., of Adforten, near Ludlow, Salop, for which the first prize of Thirty Sovereigns was awarded in Class 2, at the Smithfield Club Cattle Show, in December last. This animal was purchased at the show by Mr. Nott, of Birkenhead.

ON THE COVENANTS IN A FARM LEASE AS TO MANURE.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The covenants in a farmer's lease, it is often said, are seldom even read by either the landlord or his tenant. But as this remark is not universally correct, it may be well to consider the subject of one of the clauses the most commonly introduced (and often injuriously so) with regard to the management of farm-yard manure. Now it is a correct general observation, as I have in another place had occasion to remark, that these covenants, with regard to fertilizers, are often worse than useless; encumbering the efforts of the skilful cultivator, and rarely improving the practice of the ignorant, lazy, and unprincipled. Thus, by some leases, the farmer is allowed to sell his straw and hay on certain conditions, such as bringing on to the farm in its stead a given weight of manure (commonly two tons of stable dung for a load of straw, and three tons for a load of hay); in others, he is restrained from selling either; in others, from liming or chalking his soil. In most leases he covenants to spread the manure on his farm, and to leave it in the concluding year of his term, properly laid up in heaps, if it is not already employed on the land.

It would be well, I think, if the tenant was in almost all cases allowed to dispose of his hay and straw, bringing upon his farm an equivalent proportion of manure. In many instances, indeed, it is to the farmer's interest to *produce* food for his live stock (in order to increase the bulk and improve the quality of his manure) to a far greater amount than the consumption of his hay and straw can yield. In other instances he can exchange much more and much richer manure for these than his stock can make from them. In other cases he can furnish his lands with so much manure by the use of the grass from irrigated meads, or other sources, that his farm can spare both its hay and its straw without deterioration.

These truths I have elsewhere endeavoured to illustrate, when I remarked—The quality of farm-yard compost naturally varies with the food of the animals by which it is made; that from the cattle of the straw-yard is decidedly the poorest; that

from those fed on oilcake, corn, or swedes, the richest. Of stable dung, that from corn-fed horses is most powerful; from those subsisting on straw and hay, the poorest; the difference between the fertilizing effects of the richest and the inferior farm-yard dung is much greater than is commonly believed; in many instances the disparity exceeds one-half,* and as the food consumed so materially influences the quality of the manure, it follows, as a natural consequence, that that made in summer by the clover, grass, and tare-fed stock, is much superior to that produced during the winter months by the store-fed cattle of the straw-yard, which is usually still further impoverished by the rains and snows. Hence, too, the superior richness of the manure of fatting swine to those of pigs in a lean state, and the far superior strength of nightsoil to any manure produced from merely vegetable food. Chemical examinations are hardly necessary to prove these facts. Every farmer who has had stall-fed cattle will testify to their truth; every cultivator will readily acknowledge the superiority of "town made"—that is, corn-produced stable-dung, to that from horses fed only on hay and straw; and that nightsoil is far superior "in strength" to either. The relative quantities employed by the cultivator betray the same fact; for on the soils where he applies twenty loads of good farm-yard compost per acre, he spreads not half that quantity of nightsoil. Mr. Dixon, of Hathershaw, deems "six tons of nightsoil in compost with peat amply sufficient for an acre." Mr. Hewitt Davis is of the same opinion. It is not, as the farmer is well aware, the mere straw of the farm-yard manure which influences its fertilizing quality, but the excrements with which that straw is mixed. Thus other substances, when thoroughly saturated with the stercoraceous matters of cattle, are found to be just as fertilizing as straw: saw-dust, peat, tanners' bark, or turf, are as serviceable in this respect as the best straw. Arthur Young found this to be the case when turf was employed mixed with urine (*Annals of Agriculture*, vol. ix. p. 652—*Ibid.* vol. iii. p. 67—79). Lord Meadowbank, Mr. Dixon, and others, have successfully employed peat in a similar way (*Jour. Roy. Ag. Soc.*, vol. i. p. 138), and the latter agriculturist often makes his excellent compost-heaps of merely peat and urine. The liquid or soluble portion of farm-yard manure constitutes in fact its richest portion. Of the powerful effect produced by the urine of cattle and other liquid fertilizers, I shall have hereafter occasion to speak, when treating on liquid manure.

The quality of the manure produced by live stock is in fact effected by various circumstances; most of these have been examined by Mr. Sprengel *Jour. Roy. Ag Soc.*, vol. i. p. 457). Thus, *the age* of the animal has a very considerable effect, for young animals require phosphoric acid, lime, and nitrogen, for the formation of bone, in a larger proportion than full-grown live stock, and it can only be from their food that they obtain these. The excrements of a young beast, therefore, cannot contain so much of these materials as those of a full-grown one—a deficiency which one would suppose, says M. Sprengel, must be felt when they are applied to crops such as wheat, barley, beans, clover, and turnips, which require much phosphoric acid, lime, and nitrogen for their perfect development. The same remarks apply in fact to the other constituents of the bodies of growing animals, all of which are assimilated from their food. Indeed, it has long been considered by the farmer that the manure obtained from young stock is poorer than that from other animals. The quality of the manure is also considerably affected by the degree of exercise the animal takes; by its giving milk; those which are at rest, and are not milked, yielding the most powerful manure; that of fattening animals being the richest—that of animals growing thinner from hard work on bad diet the worst. That of animals in winter is poorer than that produced by them in summer, for the digestion of all animals is more perfect in cold weather than in warm.

"When animals," continues M. Sprengel, "are so badly kept that they daily lose flesh, their excrement also becomes lower in quality in the same proportions, since the body in such case not only expels fewer of its own worn-out particles, but the food itself becomes more powerfully exhausted by the digestive organs. If, on the contrary, the animals are kept on abundant and nourishing food, their excrements also are very strong in quality, for these will not only contain much refuse animal matter, but the food itself also is less exhausted. Hence the manure of fattening stock is the best. Animals immoderately fed give indeed, for reasons which do not require explanation, the most power-

* Thus, that produced by cattle fed upon oilcake is fully equal in value to double the quantity fed upon turnips. Mr. Hewitt Davis, late of Spring Park, near Croydon, had occasion to notice this in an experiment which commenced in 1834. In that year on half of a field of turnips fed off with sheep he gave them oilcake, on the other half they fed only on the turnips. The succeeding crops were all distinguished by their superiority on the half of the field where the sheep had oilcake; and in 1838, when the field had again a crop of turnips, the half of the field on which, four years previously, the sheep were fed with oilcake, had by far a better crop of turnips than that which had been manured in common with the rest of the field and fed off in the ordinary manner.

ful manure, with the disadvantage, however, that the food has not undergone a proper change. Accordingly, the more nutritious in general the food is, the better are the excrements resulting from it, supposing the animals to obtain so much of it as to gain instead of losing flesh and fat; for the excrements resulting under these circumstances are abundant in phosphorous, sulphur, soda, potash, chlorine, lime, magnesia, and nitrogen. Fatting stock, as we learn by experience, yield very strong manure when they are allowed the free use of salt. It is likewise maintained that the excrements of oxen fed on scalded fodder are of superior quality to those of stock fed in the ordinary manner: this, however, is scarcely possible; they must, on the contrary, with equal quantity and quality of food, be inferior, for by the process of scalding the materials are so prepared for the digestive organs as more easily to yield their best portions to them. For this reason we give cows a less quantity of the scalded fodder than of that which has not been so prepared. The excrements of oxen fed on scalded food come sooner into effective operation, since the woody fibre and the hardened vegetable portions of the food are softened by the process of scalding, and consequently, when in the state of excrement, are decomposed more rapidly. On account of this quicker effect, the excrement of cattle fed on scalded food is supposed to be the best, though it is not really so."

I have added what Sprengel says about the imaginary alteration in the richness of the manure by previous boiling the food of the stock; and this may be true, provided the same food is given in both cases; but we are not to confound this state of things with the result produced upon the manure by boiling only inferior food—food which, without this previous preparation, would not, perhaps, be available by the feeder. To the former class we may assign the plan of boiling linseed as food in the way described by Mr. J. Marshall, of Bedale, in Yorkshire (*Jour. Roy. Ag. Soc.*, vol. vii, p. 394), who remarks, when speaking of its effects on the manure of the yard—"The increased quantity and superior quality of the manure thus derived have doubled the produce of the farm. Independently of other matters, the main source from which the feeder of stock should look for remuneration is his manure heap. He cannot grow corn without manure, nor have manure without cattle. Whoever can feed the largest quantity of stock, and thus secure the most and the richest manure at the cheapest rate, is the best able to augment the produce of his farm, and thus to meet competition in the market. Up to this time linseed cake, given in large quantities along with roots, has been considered to yield the best manure. But why should linseed, unadulterated, be inferior in its feeding and manuring properties to linseed, from which all its richest and most feeding matter has been extracted, and which has afterwards in many cases been adulterated with rubbish of any and every description? The effects of this system have been so apparent, in the increased fertility of the farm where it has been practised, as to induce my neighbours to follow my example." And at *ibid*, p. 395, Mr John Hutton, of Sowber, near Northallerton, adds, as the result of his practice, "the manure is of the best quality, and very soon fit for use. No manure I have seen has equalled in efficacy that derived from this process." And at p. 397, Mr. T. S. Walker bears his testimony to the same fact—"From this mode of feeding cattle (with linseed), the manure produced will probably contain more oil, and less of the phosphate of lime, and other saline matters of the linseed, than the manure produced from cake-fed stock. The accurate observation, therefore, will be very valuable, which shall determine the comparative fertilizing duration of both. It is certain that the saline and other portions of the linseed, are of very considerable value, but we are not inclined to go the length of M. Kuhlman, when he concludes (*Trans. High Soc.*, 1847, p. 622), that if all the oil was extracted from linseed oilcake it would not be diminished in its fertilizing effect upon the land." And he admits that the practice of the Belgian farmers does not accord with his opinion, for he tells us that "in the neighbourhood of Lisle, the farmer makes a distinction between the oilcake of the town and that of the country. He gives the preference to the latter, because, being manufactured by the less powerful presses of the windmills, they retain more of the oil than the oilcake made in the manufactories where the presses are driven by steam power."

I have alluded to cases where, from the large supply of manure produced by the use of the green food from irrigated meads, or other sources, the use of hay or straw-made manure is almost needless. The Honourable F. D. Fortescue describes a farm of this kind, near Glasgow, in a recent valuable communication to the General Board of Health (*Minutes*, p. 66). In this case he reports that a supply of liquid manure is obtained from a dairy of 700 cows, attached to a large distillery; the entire drainage from the former flows in a full continuous stream into a tank containing 30,000 or 40,000 gallons, whence it is pumped up immediately by a 12-horse power engine, and forced through 4-inch iron pipes, laid about 18 inches under ground, into large vats or cisterns placed on the highest points of the land to be irrigated. From these it descends by gravitation through another system of pipes

laid along the ridges of the hills, finding an outlet through standcocks placed at intervals, from which it is distributed through moveable iron pipes fitting into each other, and laid along the surface in whatever direction the supply is required. The land thus irrigated consists of three farms lying at some distance apart, the farthest point to which the liquid is conveyed being about two miles, and the highest elevation 80 feet above the site of the tank and engine. The principal use to which the irrigation has been applied has been to preserve the fertility of the pastures, the general appearance of which was at first rather disappointing; but this was explained by the fact that they are fully stocked, and that the cows rush with avidity to those parts that have been last irrigated, and eat them down quite bare. As is the case in other instances, however, by far the most profitable application has been found to be to Italian rye-grass, of which 15 (Scotch) acres were under cultivation, some with seed supplied by Mr. Dickinson, whose successful cultivation of it by similar means near London has long been known. The first cutting of this had yielded about 10 tons the acre, the second nine, and the third, which was ready for cutting, was estimated at eight or nine more. Some crops of turnips and cabbages were pointed out to us in a state of vigorous growth, and with more than common promise of abundance; these were raised by a dressing of ashes and refuse (of little fertilizing value, having been purchased at 2s. 6d. a ton), conjoined with four doses of liquid, one after the preceding crop of oats had been carried, one prior to sowing, and two more at different stages of growth. The enterprising gentleman who has carried out these works at his own expense, and in spite of the discouragement arising from partial failure in his earlier attempts, though speaking cautiously, as was natural in a tenant on a nineteen years' lease, of the pecuniary results of this undertaking, imparted some facts which leave little doubt that it must have been largely remunerative. Besides maintaining, if not increasing, the fertility of the pastures, to which the solid manure from the byres was formerly devoted, at a heavy expense of cartage (the whole of which is now saved), he is enabled to sell all this manure, of which we estimated the quantity at about 3,000 tons a-year, at 6s. a load. For a good deal of the Italian rye-grass not required for his own consumption he obtained upwards of 13s. a ton, the profits on which, taking into account the yield before stated, may easily be imagined.

These results fall infinitely short of what might be done by carrying out the same system on an improved scale; the urine, instead of being diluted, as has been found most expedient in practice, with three or four times its bulk of water, is delivered on the land in nearly its full strength, or with not more than one-third of water, thereby occasioning an enormous waste, greatly increased by the impervious nature of the soil of the pastures, from the surface of which it flows off in large quantities, to the loss of its fertilizing effects, and to the pollution of the waters of the neighbourhood. The breaking-up and cultivating more of this land in Italian rye-grass and root-crops would add immensely to the productiveness of the farm. I must mention that the mode differs in applying the liquid to the pasture and to the cultivated land; on the former it is distributed from a hose of gutta percha or vulcanized caoutchouc; on the latter a succession of short lengths of iron pipe, 3 feet long, 1½ inch diameter, laid down between the drills, are added on almost as quickly as a man can walk, and the liquid is thus shed about the roots of the plants, without touching the leaves, so as to be capable of innocuous application, if desired, at the latest periods of growth. It is interesting to know that these works were undertaken under the combined influence of the late Mr. Smith of Deanston's representations of the immense waste of valuable material that formerly took place, and of the remonstrances of parties in the vicinity, to whom the flow of refuse into the adjoining canal was an intolerable nuisance.

Upon the whole, then, I think it will in the great majority of instances be the wisest course, for both landlord and tenant, for the lease to be so framed as to allow the farmer the free use of his reason in the exchange of his hay and straw, or other farm produce, for an equivalent amount of manure. In these days of open competition and unrestricted trade, the doctrine, if applied to other manufacturers, must surely not be restricted so as to exclude the members of the most difficult of them all—the manufacturers of bread and meat.

GREAT EXHIBITION FARM BUILDINGS.

BY MR. JOHN BAXTER, LEWES.

Mr. John Baxter, of Lewes, the well known publisher of the "Library of Practical Agriculture," exhibited two models of farm buildings, of which, as each building contains precisely similar departments and conveniences, a description and engraving of one of the models will be all that is necessary. We select No. 1, as of a square, and more convenient arrangement than No. 2; the latter is under one roof, and is half the width, and double the length of No. 1.

REFERENCE TO THE ENGRAVING.

A. The barn, which is the common English one, for flail or portable thrashing machine.

B. Open yard and hovel.

C. Covered yard, with open sides.

THE APPLICATION OF PHYSIOLOGICAL PRINCIPLES TO THE IMPROVEMENT OF THE BREEDS OF ANIMALS.

BY M. M. M.

(Continued from the last volume.)

With certain limitations and restrictions there can be no doubt that the broadest principle of breeding is to select the best animal on both sides. This has been the great and leading principle with all the breeders who have attained any degree of celebrity. To improve a race of animals, the first thing necessary is to search out those sires and dams who have the requisite qualifications in a strong degree. It does not always follow, however, that at first they certainly impress these qualities on the successor immediately following them.

Some animals possess greater tranmissive powers than others; and it may easily happen that they are not fairly balanced, and hence the power of counteraction is not sufficiently great in some selected animals. But this power prevails through a race. That some ancestor possessed it, is quite sufficient to induce it to reappear, though for one generation it had been overcome. A little Galloway blood inserted in a tribe of short-horns will, long after the general symptoms of the cross have disappeared, manifest itself in black-nosed calves; and in pigs a single cross with a coarse-haired animal will not affect the whole of the animals in the litter, while on some it will be absolutely predominant.

Nearly all breeders, however, breed more or less from their own stock. When this is the very best of all they can find, there seems to be little question that common sense would dictate that they are pursuing a correct course.

The great weight of modern writers have for some time taken an opposite course; and advocated the crossing in preference to the in-and-in or too close breeding of animals. Nearly all the thoroughly scientific men who have written, say for ten or fifteen years, seem to have taken it for granted to be an evil. Youatt was amongst the first who very decidedly denounced it; Spooner speaks against it still more decidedly; while Stephens seems to disapprove of it with certain limitations. Yet even Youatt in his more recent works says less in condemnation of it than in his more early publications.

In his Horse he said, "It is a fact, however some may deny it, that strict confinement to one breed, however perfect or valuable, produces gradual deterioration. Crossing should be attempted with great caution." p. 319. Spooner says, "The practice possesses certainly both advantages and disadvantages. It offers the readiest and most certain method of preserving the perfections of an improved breed; but on the other hand, it endangers this breed by perpetuating and strengthening those hereditary faults and predispositions to which nearly all breeds are liable. Intermarriages amongst near relatives, such as cousins, are strongly objected to by human physiologists, who regard it as a fertile source of many diseases; and more particularly those affecting the mind" (p. 337.)

Stephens is more cautious. He indeed admits, in reference to Bakewell's stock, that it might not be injudicious. "Perhaps," he says, "a stock brought to the highest degree of perfection, and at the same time possessed of sound constitution, may be supported, free of deterioration, for many years, by the peculiar skill of its owner; and I can conceive a high-bred stock full of young blood, such as Bakewell's was during his lifetime, to be increased and supported by its own members, though bred in-and-in, that is, supported by near kindred or consanguinity." He takes an opposite view by the following passage: "Mr. Mason's fine short-horn stock latterly showed symptoms of the bad effects of this system; and Mr. Robertson's, of Ladykirk, which contained at one time by far the finest short-horns in Scotland, suffered after his demise from the same cause as was apparent on the animals presented at the sale which dispersed them" (p. 1268).

But by far the most vigorous assault made on in-and-in breeding from a practical pen, was made in the Journal of the Royal Agricultural Society by a short-horn breeder of great ability—Mr. Wright, then of Romeley, near Chesterfield; and he did much certainly to damage it in the estimation of the best breeders of the present day; and this is the most surprising, as he often gave, as a judge, prizes to a herd which was repeatedly and incestuously bred from the nearest ties of consanguinity for many years. Nor did he err in this matter. It only shows how practice may at least vary with the rules of theory; and proves that caution and reservation should be used in dealing with general principles, especially where *life* is concerned.

He first sets out with an account of the success of the Collings, in a system of breeding in-and-in; and though he says that in the majority of animals

bred in close affinity the failure has been both extensive and lamentable, he still admits that "there are instances of superior animals bred in the closest affinity." Comet, the finest and perhaps the very best bull all in all ever bred, at any rate the sire of the greatest number possessing excellence, was bred from the closest consanguinity.

Mr. Mason, of Chilton, is adduced as another proof of the impropriety of breeding in-and-in; and so fine and delicate had his herd become, that Mr. Wright says they were once reduced to four animals; and he attributes the turn being given to his herd by the use of the bull Jupiter, "whose affinity of blood was *supposed* to be remote." Mr. Wright further instances fowls and pigs in proof of his doctrines—those of Mr. W. Clark, who bred them so close that the latter refused to fight, and which cowardice was cured by a cross with Mr. Leighton's birds.

He cites his own experience in pigs and bred closely. Four or five sows, all sisters, were served by their brother, and their descendants were put to him for seven generations: in some instances, he says, they failed to breed, in others only a few lived, in some, the animals were *idiots*, a favourite charge to bring against connexions of close degrees of consanguinity; but he admits that the best sow of all was the produce of the seventh generation, but the only pig of the litter. To clinch the whole these gilts were sent to other and foreign boars, and to them they bred readily and productively.

Nor was this at all surprising. We know Mr. Wright's pigs, they are of excellent quality, readily feed, and soon attain maturity. Now the consequences of these two qualities are well known on all breeds of animals. They soon decay.

It is a rule by far too well known now to admit of any dispute, that the earlier mature an animal or plant becomes, the sooner does its vital powers cease to act; and his boar had been kept by far too long, which was quite enough to account for the want of virility, or that the offspring were feeble or defective. But this is not all. It is well known how the rapidity to lay on fat injures the tendency to breed. It sometimes extinguishes even the sexual desire. We have known both rams and bulls who would not look at their respective females when in season. It is usual for ram breeders who usually let their rams in July, to keep them till October on the sparest diet; and to absolutely starve them to sharpen the procreative propensity. Hence the fat boar deficient from age and fat, both of desire and physical power, might easily be the parent of few and feeble offspring.

Let it be remembered by all objecters to in-and-in breeding, that there is scarcely a name celebrated for superior or improved stock, who was not an in-and-in breeder. Bakewell, the two Collings, Mr. Mason, of Chilton, and last, not least, Mr. Bates, were in-and-in breeders.

Of Bakewell it has been alleged that his stock grew too small by a simple perseverance in his system. But his aim was at reducing the size; and if he pushed it too far, especially if he constantly selected the smallest and most delicate to breed from, he merely carried his notions too far, and this is no argument whatever for the error of close breeding itself.

Mr. Mason got into the same error. He selected invariably the most delicate of his stock, and saw the consequences; and hence selected Jupiter, who is not known to have any remote affinity to his breed. In a remark he made years ago to Sir John Sinclair, the president of the Board of Agriculture, he said, "In selecting a male from a small number, do not choose the weakest animal, though it may possess the most delicate form and approach the nearest to female symmetry, for if the same system were to be continued for a few generations it may easily be supposed that such a breed will dwindle, compared to one left to the process of nature, in which the strongest males, driving off the weakest, are exclusively employed for the propagation of the kind."

Of the Collings' nothing need be said. They possessed not only the best animals in the kingdom, but confined their breeding strictly to their own herd; and where under the sun had any two partners so many good bulls as Comet, Lord Bolingbroke, and Foljambe? not to mention Favourite, who was from an union of a brother and a sister.

Nor must the late Mr. Bates be forgotten. He was for many years a most incestuous breeder; and let it be remembered that at his sale (now when short-horns are become the property of so many owners, and so generally and openly diffused) his herd of 68 animals sold for £4,558! At his sale it could not be said that there was one either bad or even middling animal.

Mr. Culley, a disciple of Bakewell, is a defender of in-and-in breeding. He declares that some of the very best of Mr. Bakewell's stock had been bred by the nearest affinities; and advances the instance of the wild cattle of Chillingham park to prove that the most severe in-and-in breeding even for a long period did not prevent hardiness, size, nor want of constitutional or visible vigour.

We now come to some opposite testimony. Youatt seems to half unsay his condemnation of the system of close breeding, in his more recent works. He says in his treatise on Cattle: "The breeding from close affinities, or *in-and-in*, has many advantages to a certain extent. It may be pursued until the excellent form and quality of a

breed are developed. It was the source whence sprang the cattle and the sheep of Bakewell, and the superior cattle of Colling."

Mr. Pawlett, of Biggleswade, who has taken so many prizes at the meetings of the Royal Agricultural Society, says, "I cannot see the utility of crossing for the sake of crossing or changing, unless I can perceive superior qualities in another person's flock which mine does not possess; even in that case, if my neighbour's flock were not quite so wellbred as my own, I should long hesitate before I had anything to do with it, as the more I see of breeding, the more I am convinced of the advantages to be derived from using well-bred, indeed the best bred animals."

Mr. Milburn, the author of the recently published work on the Cow, says, "Analogies are attempted to be made between the human subject and the brute. It is said that in the former the most serious physical and mental disorders arise from too near consanguinity. A family intermarries, afflicted with mania, or consumption, or scrofula. Intermarriages, where these diseases exist, will increase the virulence of the tendency, until the family may become weak and feeble, or may become extinct. They do so, not because they breed in-and-in, but because they disregard the first principles of increase: they render permanent the defects of the stock by alliances of similar tendencies. Mr. Bates's rule was, 'breed in-and-in from a bad stock and you commit ruin and devastation: they must always be changing to keep it moderately in caste; *but if a good stock be selected you may breed in-and-in as much as you please!* If deficiency of mental power be a consequence of in-and-in breeding, surely it will be an advantage in feeding animals, for the sensuous with them ought entirely to swallow the intellectual" (p. 50.)

The dragging of human beings into the controversy, is only an indifferent resource. With their intellectual and sensitive tendencies a very different range of physiological principles may apply. But let it never be forgotten that there is one race of human beings who have the highest authority for preventing intermarriage with any but their own family, aye, and in general only but their own tribe. For 2000 years they have kept separate and distinct in all quarters of the globe, have thriven alike in the torrid, the frigid, and the temperate zones, in the eastern and western hemispheres; have overcome persecution, fire and sword; and have retained the same characteristics of face, of head, of general character indeed, for four times ten centuries. Their parent was married to his first cousin, and was the son of a parent who had a similar affinity—nay, more, his grandfather also married in a similar manner; and yet this self-same race is probably destined to be the masters of the world. So much for the futility of reasoning in want of power, of intellect, of permanence in close human affinities!

The Northamptonshire Farmers' Club, who had a discussion on this point, arrived at conclusions very nearly similar to those advocated in this paper. They laid down two rules, the first of which was, that though the system of in-and-in breeding was not in all cases to be strictly adhered to, yet when a race of animals exists of the proper form, it is the only means we have of retaining that form. The second was, that very high feeding was what was really detrimental to health; and therefore left the inference to be drawn that it is often to that, rather than to breeding from close affinities, that deterioration of pure breeds was traceable.

Admitting for a moment that the tendency of in-and-in breeding is to reduce the size of animals, it did of Mason's, and Bakewell's, and Culley's, though the same cannot be said of Bates's, whose stock were as full-sized at his death, as they were ever perhaps before, after a half century of incestuous alliances in his herd—the Northamptonshire club lay down a rule that a small animal is (other things being equal) better as a feeder than a large one. It is not the absolute size of an animal which is the real test of his excellence. It is the frame and quality which produce the largest number of pounds of meat on the smallest amount of food; and hence if four large sheep can be kept on an acre, and produce, say, 400 lbs. of meat, and six small sheep can be grazed on the same acre and produce 480 lbs., it would seem that the acre produced 80 lbs. more meat by the grazing of a twenty than by a twenty-five pounds per quarter sheep.

In-and-in breeding has, however, its peculiar tendencies on any animal. It always retains fine qualities. Mr. Bates's stock, however by some it was supposed to have a little degenerated in form, possessed finer quality perhaps than any herd of the same extent in the kingdom, and that quality perfectly uniform. Smallness of bone, however, as a rule, generally follows the adoption of the practice; but it may be that the instances selected are those kinds which Mr. Bates used to say should not be bred in-and-in: it has a tendency, also, to become condensed, and hence the Arabian horse, bred in-and-in so constantly, every Arab emulating to approach as near the celebrated Kochlani breed as possible, are remarkable for density and smallness of bone. The skin becomes thin and fine, and this is said to have its effects upon the constitution of the animal; and the coat or crop partaking of the nature of the soil on which it grows—the skin—becomes short, smooth, as regards its quality, but rich and curly. A mossy coat is amongst the first

indications the grazier possesses of the quality of a beast; and an open silky wool of the same peculiarity in the sheep. The body is usually rounded, the extremities fine, and the coarse parts gradually diminish; so that all the animal assumes a finer and more delicate cast.

The object of the breeder therefore, generally, being to produce fine animals, is usually the easiest and the speediest carried out, by adopting a judicious system of in-and-in breeding, abating it when it goes too far, and keeping it within natural limits.

Diametrically opposed to this, is the crossing of animals. This is, as such, repugnant to nature. If practised out of certain limits the abhorrent law of being stops the violation of its decrees; and the mules of two different species of animals becomes barren. The Mosaic law seems exponent of this principle, which forbade the mingling of non-allied species. The races of the same origin will generally breed together, and sometimes successfully; but occasionally monstrosities are the result of the intermixture; and often the offspring will partake of the character of neither of their ancestors. Nay, more—climate, training, soil, and circumstances may so operate as to render the offspring of one common race incapable of being successfully crossed. It is said that the female aborigines of South Australia, after intercourse with an European, becomes incapable of having family by one of her own countrymen again. And may not this, as well as anility, luxury, and disease, be one cause of the black population giving way before the Anglo-Saxon race, elevated and inured to toil, to hardship, and with iron nerves and sinews as they are, and thus asserting their dominancy. The effect of uncultivated hardships is often visible in the lower orders of animals. Thus a well-bred shorthorn cow will often cease to breed to a fine delicate shorthorn like herself, but will be quite prolific to a common country bull. So wonderful are the limits and the ranges of man's power, and such are the natural safeguards against the undue mixing of the refuse and the vile with the beautiful and the pure.

But where shall we place a limit to crossing? Some animals may be crossed by a male of one species and a female of another, and be a successful cross; whereas *vice versâ* it will be useless. The cross, for instance, between a south-down ewe and a new Leicester ram is far more successful than the reverse; and the same may be said of the new Leicester and the horned Scottish Highland sheep.

A small-breed and a large-breed pig will produce, not a middle breed, but perhaps a few of the one and a few of the other. It is the largest animals of each distinct breed which must be selected if size is an object, and not a risk of destroying the whole race by the alloy of an improper and injudicious cross.

These are, however, it is probable, results arising from crossing far beyond the range of our generally received notions. Animals have been known, not in one nor two rare instances, but frequently—where, one having intercourse with a particular male, and all their subsequent produce bear distinct marks of resemblance to him. This is a very interesting subject, and has lately obtained considerable attention: the author of the "Cow" enters into it somewhat at length. He says: "It is questionable where crossing stops. Some very grave facts have been arranged and classified to show that when a pure-bred animal has been once impregnated by one of another breed, such impregnated animal is thereby for ever afterwards a cross, and may be expected to produce cross-bred and no more pure-bred young. But the notion is capable of being carried further still—that a female animal will always produce young resembling in character the animal by which she was at first impregnated, whether of a cross breed or of the same breed as herself. Now if this approaches to correctness—if a single cross will stamp its character for ever upon the animal which is the subject of it, there arises the necessity for the utmost caution in selecting a male animal, especially in the first impregnation of the female"—p. 50.

It requires almost a lifetime of dear-bought experience to know the precise effects of a cross. There is little recorded on this matter—there are very few recorded *facts*. These are, however, what are wanted; and breeders are far behind-hand with cultivators in recording their opinions. There are a few broad facts, however, and these are worth knowing, though they establish only negative ground. It is sometimes as useful to know what will fail, as to know what may be expected to answer. A cross between the hard-muscled Devon and the sleek fat forming short-horn—the activity of the one is lost while it absorbs the fat-forming power of the other. The same takes place between a short-horn and an Alderney. The tendency to produce fat, and the same to produce milk, come together like two opposing forces, and absolutely annihilate each other—destroying, in fact, the strong tendency to both. Again, the wild Kyloe crossed with the Hereford also failed, the wildness of the former ruined the complacent nature of the latter, and lost the qualities of both.

The Galloway will give bone and substance to the short-horn—a single cross with a Galloway Scot, carried back immediately to the short horns, produced some of the very best looking and fatten-

ing of the short-horn race. A succession of short-horn crosses with the Ayreshire cows, destroyed, indeed, their milking propensities, but gave them beasts of form, and made them better and kindlier feeders.

With sheep, crossing must be still more cautiously adopted. A Leicester will be a very suitable cross for a Bamboroughshire ewe, when a small, compact, speedily-fattening animal is wanted; and when size and fat, the same may be accomplished by a cross between a Leicester ewe and a Cotswold ram.

But second crosses, or breeding from these, will never answer. The cross must be simply continued as between originals, for no intermediate race are at all to be depended upon.

With horses less need be said. The form, the power, the objects of the breeder are best consulted by a judicious selection of a male. A heavy carcass must never be aimed at for a light set of limbs. A cart mare may be crossed with a blood horse, and the produce carried back to the cart breed. This dash of blood will vastly improve the action and spirit of the animals, but they will be less to depend upon for a steady pull. We had a very successful race of draught horses with a single dash of President blood: they were all excellent for spirit, good in action, and great for endurance, but they were not quite to depend upon on a push.

Pigs require even more care in crossing, though they are less distinct in their breeds; and a cross is soon overcome by the rapidity of their breeding. But they must have the same general characteristics, for the pig will bear only small stages of change in his physiological characteristics.

In conclusion, we should bear in mind always to endeavour to breed from the best. Form, feeding or milking quality, or action—no matter: select the best female and put her to the best male, and it is a fault in their pedigree if a good stock is not the result, always barring accidents common to all.

Good breeding is not the work of a day. Disappointments may be expected even with the best—there is no royal road to breeding, any more than there is to geometry; and patience and perseverance with unremitting and undivided attention willbe absolutely necessary to make a man a breeder.

THE MANAGEMENT OF YOUNG WHEAT IN SPRING.

BY AN EX-FARMER.

The population of this country has so grown with its growth and strengthened with its strength, that it has become more wealthy and more powerful than any nation that has ever grown to manhood on the face of this curiously formed planet. The present generation of the people that have inhabited this nation is reaping many advantages from the industrious habits of them which have passed away. Past generations worked together as a whole, although they waged matters against each other after the manner of men; and fostered disputations on such matters as are too extensive in themselves for a great number of persons to agree entirely in opinion upon, when they press themselves forward for consideration. By this working together on general matters, and particularly on matters of great importance, civilization advanced rapidly in times of peace; and even under the excitement of wars, the legitimate offsprings of a civilized and industrious people were not entirely forgotten from not springing into existence. Foremost amongst this issue was the formation of "interests," or divisions of men following different occupations; and this necessity of dividing was direct evidence of that growth of strength mentioned above. And the importance to which these various divisions grew, was further proof of the growth of power that eventually was made apparent to the world; and out of this power sprung such comforts, and such a supply of necessaries for the body, as were never displayed and enjoyed by a people. These interests have now, however, become so powerful, that they imagine that one class can do without the other, even although the power they possess has arisen entirely from the mutual assistance that has been derived from one another. Whence this narrow and inconsistent impression has sprung, it is almost impossible to say, as it takes a course of years to to establish it. And in so advanced and powerful a country as this, with so many interests to be effected and re-effected, it will take another course of years to remove this impression. What will be done to bring about a reconciliation of interests, it is rather difficult just now to judge. What statesmen will scheme it is impossible to anticipate; but it is very clear that unless some of the *un*productive interests are prevented by the legislature from *lawfully* taking possession of those productions of the country, which are required by some *productive* interests to increase productions, there must be a fearful falling off in many instances, and an inadequate increase in a good many more. And if one class of industrious interests is to be allowed to take that required by another class of interests,

and thereby receive an indirect bounty to sell the commodities it produces from that class it takes more than its share from, or in other words, receive a bounty to increase the import and export trade—if these things are to be allowed to continue, it is very certain that a fearful reckoning must soon happen; and when those divisions which are now receiving bounty shall have received as much as can be wrung from them that are now obliged to give this bounty, not directly but indirectly, why then will these prospering interests find that they are left to themselves, and must not only support their own suffering people, but share in the support of those that are now being impoverished by the withdrawal of that which is necessary for the nation to be accumulating in their hands. When statesmen will be able to take that impartial and comprehensive view of the affairs of this now divided nation which is necessary, I cannot, nor can any one, say. But we are running to fearful lengths, and the longer these are stretched out, the more difficult will it be to bring them to that required position which is essential to the success of a people. When will these statesmen live? When will the coming day arrive? Or is the nation to remain divided in itself, and, therefore, retrograde as all nations so circumstanced have done throughout all time.

Whilst, however, we are watching for the arrival of these things, it will be no advantage to us to neglect the cultivation of those crops which are productive of the greater part of our nation's annual wealth: this is, in so far as we can do it without increasing our outlay and general expenses, for if this is done, and we pay for doing it after the rate of present wages and charges, which have not yet found their relative value to that of corn, whilst we are receiving a reduced price for that we increase by this greater outlay, why we carry out those operations which cannot repay the expenditure, much less afford a profit. Money is easily expended, but it does not always return. And many of those persons who are now expending much in "agricultural improvements" will do well to consider whether their *alterations* will afford a profit. It is very unfortunate for all interests that many farmers should have been led to believe that by increasing their "return" they could maintain their position. For nothing is so simple, and therefore easily understood by consideration, as that to apply capital to any branch of trade that does not afford an ordinary profit on stock employed, is to deprive those interests of the means of further developing those productive powers which have been profitable, and for no other reason than because the produce of their industry was required by the people of their country. It is a mistake to suppose that by circulating the balance at the bank in the form of paying wages of labour, good must be done, whether it will afford an ordinary profit on capital or not. If any man employs capital, and he can make only as much interest or profit as a more fortunate tradesman or farmer can afford to give for it to employ in his own occupation or trade, it is very certain that the country must lose that increase which would have been the share of him who employed this capital judiciously, or realized a profit of nine or ten per cent. If one man can make ten per cent., and another can make only five per cent. by the employment of capital, does this want of gain have any effect on the community, or is it confined to the person that employs it? The question answers itself. If, therefore, some of our "sentimental gentlemen" would employ their minds in keeping their own estates together, instead of attempting to sail against the tide, and thereby allow things to run in their legitimate course, men, whose thoughts have been confined to their own business, would not be misled by "local philosophy," and these philosophic-sentimental gentlemen would not have cause to complain because their property is unjustly taxed; inasmuch as the attention they would give their estates under these principles, would enable them to pay that which they say ought to be borne equally by them and the practical farmers. There are more ways than one of employing our humble talents, and we can be sentimental in various ways. With these preliminary remarks we will begin to consider more directly the heading from whence we started.

Fortunately for the present subject, although it is otherwise in many other respects, the coldness of the past month has not permitted the growing crops of wheat to run to that length which would have thrown the subject of "feeding wheat" out of the question. Many farmers never feed off their young wheat, and many farmers always do so when they can. But this is quite inconsistent, as no farmer, or very few farmers, have their various pieces of wheat of that particular condition which would allow it to be proper to feed all, or not feed any. And it is for the want of reflection and information that this inconsistency has existed. Many farmers, however, are more acquainted with the question, and they act skilfully, and it is my intention to show why their practice is so.

In travelling about the country I have perceived that most of the early sown fields of wheat require to be fed, as they have grown to a considerable length during mild days, and have now been checked by frost and the present coldness of the season. These blades are generally diseased, and if they are not, they stand erect, and look anything but likely to spread and increase in that strength which is

necessary for a healthy and productive crop. It generally happens that all such wheat as is growing after beans, peas, and stirred land requires to be fed off in the spring, as it grows too rapidly early in the season; and if left untouched it becomes weak at the top of the plants, and the drills remain open, and can be told at some distance off, till the time of the ears appearing. And just at the time when the corn is nearly full grown, a great quantity of the stems crack at the bottom and drop down, thereby showing that something is wrong within which admits of premature ripeness, that is, the straw begins to ripen before the season has arrived for the general crop to mature. This arises from the circumstance of wheat being a plant that deprives the soil of that acid which has been deposited by the cultivation of green crops, clover, turnips, tares, and so on; and from the acid of land prepared as above being of that character which is readily assimilated by the stems, and, therefore, the plants not only grow too rapidly in the former part of the season to remain healthy, but they often completely deprive the soil of as much of this acid as is possible by the time seed begins to form; and, therefore, the seed has to depend on the plants, which suffer so great a privation, that they are preyed upon by those elements of the air that are the causes of decay; hence the decaying of the stems at the bottom, and the consequent dropping at the roots. On such land, and in such cases, these plants should be fed off by sheep whenever the weather will admit of it, after the end of January; and the stems ought not to be allowed to appear till the end of March at least; and if the land is calculated to force the plants much in April, the feeding should be continued till the middle of that month. This is the great secret of wheat breaking down in June, when a slight wind occurs. I do not say that this will prevent this from happening in all seasons, as nothing in agriculture is patent against extreme droughts and rains; but I do say this, that in nine cases out of ten, and in nine seasons out of ten, if this system is practised, this fatal circumstance to a prolific yield will not happen. This necessity may, in a great measure, be prevented by regulating the time of sowing; but that is out of the question at the present time. All such wheat as stands up, and the lower blades are mildewed, and show it by a rusty appearance—this should be fed off, and it will start anew, spreading upon the ground, and thereby be "promising." If, however, a field should have plants that have begun to make stems, as is the case I perceive in some few instances, why then it is a question whether it would be proper to feed: nevertheless, it is my opinion that less injury will be done by feeding than leaving it to take its chance. This is one of the cases which prejudice positive farmers against feeding at all.

In such cases, however, as those where the preparation for wheat was a clover ley, or a good crop of turnips, and the sowing took place near by the end of the year, and where the crops of any field are generally mildewed, more or less; in all these cases it is decidedly wrong to feed, for the forwarder the plants are on these places the better it is, as they elaborate a part of the acid, the superabundance of acid the soil contains, into healthy stems, and there is no fear that the acid will be exhausted, however strong the crop may become. Indeed, by such plants growing on such soil there is not so much likelihood of their dropping down by winds and rain from being too heavy. Where there is a great amount of acid there is an actual necessity for early sowing, and forward plants in spring, for by these means alone can healthy and strong stems grow; and without this health and strength heavy crops cannot possibly be matured, however well they may promise at the early part of the season. The reasons why feeding should and should not be carried out will be given in the following paragraphs.

Hoeing is practised even in "high places," under principles equally weak, and by ways equally loose. But what is the effect of hoeing soil? Is it a mechanical development of anything? or is any action effected by exposing the surface to the action of the atmosphere? It is very certain that the former is insignificant, and therefore that the latter must be the only one worth consideration. And, therefore, what is this atmospheric action? It is generally understood that when soil contains as great an amount of carbon, in the form of an acid, as land does when properly prepared for wheat, that it cannot absorb more from the atmosphere; and it is also mostly known that when soil is charged of carbon in the form of vegetable matter, the affinity oxygen has for it, causes an union to take place; therefore, the effect is an addition of oxygen, which enables plants in the spring season to assimilate acid more rapidly than they otherwise could do, hence the more rapid growth of plants when hoed at this season. But it does not follow that it is right to hoe in all cases, nevertheless. Indeed, in most cases it is decidedly wrong to hoe wheat at all. To cut up weeds is another thing, when this is done by only touching the surface of the soil. On cold and damp soils it is right to hoe, for the above reasons; but on rich and forcing soils it is the most ridiculous practice that can be carried out. And how it is that men can fancy themselves scientific and experienced, whilst they recommend deep and frequent hand and even horse hoeing, I am at a loss to conceive! Nature has provided that wheat

plants should elaborate in themselves the food they suck up; and to cause that action to take place in the soil, which is required to take place in plants that they may maintain their health, is to expend labour to *decrease* the produce of the earth. I have not the slightest hesitation in saying that if the country be taken throughout, *there is as much injury done by hoeing as there is good.* Hoeing was proper when winters were colder, the fall of rain greater in spring, and our land was less perfectly cultivated; but now that our climate is improved, by being warmer and dryer, we must adapt our labour to these circumstances, and one of those alterations necessary to be made in our management is, *not* to hoe wheat on the generality of land, and only on such soil as is cold and damp, from its situation or condition produced by an unfavourable state of the weather, when it was sown, or subsequently.

Wheat is rolled in the spring to "solid the root," which seems to be the effect, as the plants stand better till matured. But the real effect is, the pressure of the roller excludes the action of the air by preventing its circulation through it; and, therefore, that oxidation which vegetable matter requires, before it can be assimilated by such plants, is left to take place in the plant itself; and if this was not managed, and a part of it occurred in the soil, why premature ripeness would surely take place, and a great portion of the stems would snap partly in two just above the ground; or if they did not, the ears would be withered and the straw of a colour anything but bright, an examination of which would cause the discovery at the bottom of a brittle and decayed-like inch or two.

If rolling wheat is necessary in a general way, what inconsistency it is to break up the surface deeply by hoeing! Where the former is right, the latter must be wrong. Merely cutting up weeds, and un-caping the soil by light harrows, is a practice that neither experience nor science can raise an argument against; but to dig-in the hand hoe, and blunder about with the horse hoe, is to betray as much ignorance of the nature or habits and requirements of plants as it is of incapacity to calculate the effects of these little expenses on the profits, now that the *money returns* must inevitably be small.

The foregoing will undoubtedly cause some of the step-in-advance readers to curl their eyelids, and on recovery from their astonishment, to enter into a course of outward exclamations and inward arguments. However, by the time this has caused them to make necessary reflections and examinations, they will be somewhat less positive in the rightfulness of their past principles, and subsequently be in possession of others that will be not only more convenient tenants, but prove more useful to themselves and the community, as capital will afford a profit by being employed under the force of them, and labour will not be expended merely for the sake of seeming to be "first rate farmers."

HIGHLAND AND AGRICULTURAL SOCIETY.

TURNIP CULTURE.

The Chairman having announced that the subject of the discussion was Turnip Culture,

Mr. M'LAGAN, jun., Pumpherston, Mid Lothian, opened the discussion. After alluding to the importance of the turnip crop, and mentioning that within the last ten or fifteen years the number of acres in turnip in Scotland had been more than doubled, he proceeded—To enable us fully to appreciate the importance of the turnip crop, we should consider it under three aspects—1st, as a cleaning crop, or in the relation it bears to the other crops as a part of a rotation; 2nd, as an alimentary crop, or as valuable for the amount of food it places at the disposal of the farmer for his animals; 3rd, as a manurial crop, or important as the means of increasing the manure on the farm. I shall touch but shortly on the last two of these divisions at present, and in doing so attempt to answer these two questions—What additional number of cattle is a farmer enabled to keep from increasing the growth of his turnips; and what is the value of the manure from an acre of turnips? It is calculated that an acre of turnips of 22 tons will keep two cattle that will feed to 35 stones Dutch for five months. And as it is considered that turnips are more profitable when used in connection with some other substance, an addition of 6 or 8lbs. per day of oilcake, or other auxiliary of equal value, for each animal, will enable the same quantity of turnips to keep three animals. It was found that in the consumption of an acre of turnips the two cattle getting nothing else than turnips and straw, will consume 13 kemples of straw, or 16 stones of 22lbs. each, and that each kemple produces one ton of dung. Hence an acre of turnips produces 13 tons of dung at 5s.—£3 5s. For the proper cultivation of the turnip crop, the soil ought to be thoroughly drained, pulverised, cleaned, and manured. The necessity of drainage will be readily admitted; but in these days of high farming the proper working of the soil is far too often over-

looked. Always taking for granted that the land is either naturally dry, or has being thoroughly drained, the first thing to be done is to give to the stubble in autumn, immediately after the white crop has been removed, a strong furrow, in no case less than nine inches deep, and as narrow as it is possible to make it, consistently with the proper position of the furrow when turned over at nine inches in depth; it should not be wider than 11 inches—theory says 12½ inches. In spring, when the ground is dry enough, the field should be cross ploughed, the furrows being as deep as to bring up all the weeds that were buried in the autumn, but never deeper than the stubble furrow, as the new soil brought up in spring, not being exposed to the mollifying influence of the winter frost, will be apt to cause annoyance in the after working of the land. After the furrows have been levelled down by the harrows, the break harrows drawn by four horses should be put on. The grubbers should then be set to work, and followed by the harrows and rollers, and the weeds gathered by women and carted off; it should be grubbed again the contrary way, and the harrowing, rolling, and gathering of weeds repeated. It should then receive another furrow, and be harrowed, rolled, and gathered, by which time it will probably be found to be clean. If an ordinary quantity of manure is put in the drills, they need not be made wider than 27 inches; but if a large dose is applied, it is better to make them from 27 to 30 inches. Mr. M'Lagan then referred to the manuring of the crop, and expressed his opinion that there was far too high a manurial value put on the substances consumed as food by the cattle, and that as compared with the value of guano and other light manures, it would often be found that the dearest dung put on our fields was that made in our courts, if such a high manurial value was put upon the food consumed by cattle. Mr. M'Lagan next proceeded to consider the subject of the sowing of turnips, and detailed the practice he followed on his own farm.—I commence in the second week of May to sow a few early white turnips. These are lifted soon, before they run to seed, for the use of cattle, which I intend to sell off fat in the beginning of winter; and wheat is sown immediately after, as it would not be advantageous to sow spring wheat in any climate in the present condition of my farm. I sow swedes from the middle of May to the first week of June; yellow turnips from the first week of June to the end of the month; and my whites during the first week of July. Sometimes I sow some white turnips later, which are allowed to remain all winter on the ground to be used by my ewes in the spring when there is a scarcity of grass. The turnip plants are singled out sometimes by the hand, but more frequently by the hand-hoe; if white turnips to the width of 8 or 9 inches, and yellows to the width of ten inches. In low-lying shaded localities, with the soil in high condition or liberally manured, the swedish turnip should never be singled less than 12 inches apart, and generally it will be found advantageous to do it at fifteen inches. In high exposed districts, twelve inches will be found a good width.

Mr. Hope, Fenton Barns, East-Lothian, was the next speaker. The increase in the cultivation of the turnip within the last four years he illustrated by Dirleton parish, in which the increase of butcher meat in fifteen years had been 100 per cent. In 1836 there were 468 cattle and 2000 sheep fed annually—in 1850, 797 cattle and 4070 sheep, This was an increase of about 100 per cent. of butcher meat produced within fifteen years. He reckoned 25 tons per acre an average crop in East-Lothian, or 2½ lb. for each turnip; but he could not help thinking that the weight of their turnips might be at least 4lb. or 5lb. did they properly understand the method of culture. With the exception of very light and warm soils, the land should be ploughed as early in autumn as circumstances will permit, with a furrow in all cases of 10 or 12 inches deep. Care should be taken to plough particularly strong soils only when dry. He urged the importance of thoroughly cleaning turnip land. In regard to manure, he said—I have always found that well-rotted dung was best for turnips when applied in the drill. I have been in the habit of purchasing some hundreds of tons of street manure, &c., to make up these quantities, and to bring up the condition of particular fields, by giving them an additional dose; but I have come to the conclusion, that it is equally beneficial and decidedly cheaper to apply an extra quantity of guano to what I have not got sufficient dung for, the turnip crop being fully as good, if not better, and I am not aware that the after crops are one bit inferior. It is a mistake to imagine that the influence of guano is exhausted with one crop. I believe 7 cwt or 8 cwt. without any thing else, will be found permanently beneficial on poor land, changing as it were its very nature. I must add, however, that I usually consume one half of the turnip crop on the ground with sheep, which at the same time have an allowance of linseed cake. The quantity of farm yard dung I apply is for autumn application from 16 to 18 tons, if applied in spring in the drills 14 tons; I also give in addition five cwt. Peruvian guano per Scotch acre for yellow and white turnips, and 6 cwt. for swedes. At one time I gave rape and bone dust together and separately, then 3 cwt. guano and 1 quarter bone dust, but I find a better return from the outlay for guano alone than for anything else. The ordinary width of turnip drills is 27 inches, but for some years I have made mine

nearly 31 inches, or 7 drills on an 18 feet ridge. It is obvious that making 7 turnip drills in place of 8, saves one-eighth of the time required to draw off the drills, and likewise to apply the guano, to sow the seed, or single the plants, and to hand and horse-hoe the crop. Regarding the periods of sowing, I always, without any loss of time, sow as soon as the land is in proper order; but I am rarely ready to begin before the middle of May. First a field of Skirving's purple top yellow is sown, for early eating; then the swedes are put in, say from the 20th to the end of May, or during the first week of June at the latest? after that we sow again Skirving's purple top yellow, and lastly green top and white globe. I generally sow about one-third swedes, one-third yellow, and one-third white. All the kinds are the better for being early sown. I have never had a very full crop of Skirving's purple top when sown after the middle of June, or of whites put in after the 20th of June. In an experiment made by Mr. Buist, factor at Tynninghame, the greatest crop was when the plants were 20 inches apart; but the crop where they were 30 was greater than when they were only 10 inches apart, in about the same degree that the 20 inches exceeded the 30. Since then, Mr. Buist has tried different widths, and he now singles all Swedish turnips at a distance of from twelve to thirteen inches, having found the greatest weight of bulbs from that width. It has been the subject of controversy for some years whether turnips should be singled by the hand or the hoe. Mr. Brodie, Abbeymains, one of the best managers in Scotland, has done all his by the hand for years, and were we to judge only by the crop produced, it would be decisive in its favour. The disease known as finger-and-toe is happily all but unknown in East-Lothian. I never saw it on my own farm. I believe a good dose of lime is an effectual remedy.

Mr. GLENNIE, Fernieflat, Kincardineshire, then addressed the meeting. He detailed the practice of the northern parts of Scotland, and corroborated the statements of the other speakers as to the great and rapidly increasing extent of turnip cultivation. He found that turnips were raised with Peruvian guano at about half the expense of farm-yard dung, but had doubts of its permanency. The proper period of sowing was about ten days earlier than in East-Lothian. Mr. G. considered it necessary to store turnips before spring, they losing their flavour and nutritive value. He spoke of the disease known as finger-and-toe, which has been extremely prevalent in the north this season, and referred to the results obtained by Capt. Barclay Allardice, of Ury. I have seen this year on the property of Capt. Barclay Allardice, on farms which he has in his own hands, nearly one-hundred acres of very superior turnips, raised with fifteen loads of farm-yard manure, and guano and superposphate in supplement, and no disease has appeared among them. In the vicinity of these, on soils of the same natural constituents, but not treated with the same liberality, the disease prevails to a considerable extent.

Mr. ELLIOT, Hardgrave, Dumfries-shire, said—After the observations made by the different speakers it would ill become me to make any lengthened remarks; but the importance of the subject may excuse me if I make a short statement with the view of showing a plan which we have followed with great success in Annandale for some years. Before doing so, however, allow me to observe that I consider the first, the great, the indispensable preparation for turnips, is to make the land when wet thoroughly dry. This is perhaps now so well known, that it may only be a waste of time alluding to it here; yet, strange to say, large tracts of country are still cultivated wet and undrained. Where such is the case, let not the proprietors of the soil be astonished if they see their tenantry become day by day poorer and poorer, and their land brown, barren, and worthless. The day is past when the excuse of inability can be given. The Legislature has provided for that, and tenants are in general willing to pay the whole amount of interest charged. In the year 1842, Mr. Stewart of Hillside, a gentleman who has done much for Annandale, and whose unwearied exertions in the cause of progress and improvement in agriculture is known to and appreciated by all within that district—Mr. Stewart, in 1842, sent a printed list of queries to a number of the leading farmers of the county, calling their attention to the cultivation of the turnip crop, and asking the kind and description of manures given, the weight of crops, &c., To these queries a number of answers were returned; the general opinion being that thirteen tons per Scotch acre was the average crop at that time in Annandale. Since that time a farmers' club has been established in that district, and with the assistance of Mr. Stewart we have got three and sometimes more of the members annually to inspect, weigh, and report upon the manuring, mode of thinning, and general management of the crop. The consequence of the increased attention bestowed upon the subject has been to raise the average of swedes from 13 tons in 1842, to 21 in 1849, and to 24 in 1850; and in 1851, in spite of a great and general falling off from that destructive disease finger-and-toe, and other causes, the average still stands at nearly 20 tons. Now, what I wish to call to the attention of this meeting, is the table and report which I now hold in my hand, and which we have been in the habit of printing annually, as I am satisfied it has done much good in Annandale, and would do much more if other districts would follow the same plan, and publish a similar table. We have here, 1st, the name of the farm; 2nd, the kind of turnip; 3rd, the width of drill; 4th the number of turnips in ten yards of drill; 5th, the weight per acre; 6th the manures given, stating the quantity and description; 7th, the time of sowing; and 8th, a table showing the monthly register of temperature and rain for three years, from the first June to the 1st December. Now this table, in my opinion, is both valuable and instructive, Every farmer perhaps knows something which his neighbour does not know, and every district knows something which perhaps its neighbouring district does not know. If, therefore, the knowledge of each individual were united, and combined with a district report, and those district reports again combined with a general report, I am satisfied the result would be for the good of the whole. To show this I may

mention that for a number of years I was in the habit of laying upon a few drills of turnips farm-yard dung well rotted, at the rate of twenty cubic yards per imperial acre; upon a few more acres ground bones, at the rate of twenty-four bushels; and upon another portion guano, at the rate of six cwt. At these rates I raised as heavy crops as I found I could raise by doubling the quantity. On trial, however, I found that although I failed in raising heavier crops by increasing the quantity of manure above these rates when given singly, by adding to the dung bones and guano, I at once increased the crop. This led me to try many and repeated experiments, until at last I have come to the conclusion that a considerable mixture of manures gives a heavier crop, at the same expense, than and of the manures when given singly; insomuch that I am convinced that dung, bones, guano, and dissolved bones, when united, will grow an equal, if not a superior crop, at an expense of £4 per acre, to any one of the manures when given singly at an expense of £5 per acre. I have found, after careful attention, that many tons per acre may be often added to a turnip crop, by thinning them at a proper distance apart. I am in the habit of giving fifteen yards of dung, 12 bushels of ground bones, 2½ cwt. of guano, and 1 or 1½ cwt. of dissolved bones per acre. This has, on the average of the last five years, raised from 35 to 40 tons of turnips per Scotch acre, and I find with this manure on my farm, that each turnip requires at least 360 square inches of surface to bring it to its full size; that is, that in drills 30 inches wide they should be hoed 12 inches apart, and in drills 26 inches wide 14 inches asunder, and so so on in proportion. I have merely mentioned these few facts for the purpose of impressing upon you an annual inspection and report in each district, in hopes that some of you may co-operate with us in Annandale in eliciting information, that we may, if possible, assist each other, as, depend upon it, the days are gone by when we can afford to look idly on. It is only by exertion and mutual assistance that we can meet the competition that is now springing up everywhere around us. And especially ought we to turn our attention to the cultivation of green crops. The moist climate and comparatively friable soil of Scotland are particularly adapted for the cultivation of turnips; and with proper care, attention, and knowledge of the subject I firmly believe that the turnip crop of Scotland may be doubled. If such be so, let us all lend a helping hand, and save this discussion from becoming merely an idle waste of words.

Mr. MACLEAN, Braidwood, Mid-Lothian, corroborated what had been said by the previous speakers as to the prevalence of finger-and-toe. He considered that turnips, grown with manure under cover were less liable to the disease than with manure made in open courts, and the withdrawal of the liquid into a manure tank acted injuriously in this respect. He thought that the more profitable form was to have it absorbed by the manure heap.

Mr. HALL MAXWELL remarked that this subject was at present under investigation by Dr. Anderson and Professor Balfour, and it would be esteemed a favour if any farmer, having special information to communicate on the subject, would transmit it to the society. It was also intended that this should form a subject of discussion, at one of the monthly meetings this season.

The CHAIRMAN corroborated what Mr. Elliot had stated as to the advantages which had resulted from the plan adopted in Annandale, and was glad to state that the example had been followed in Nithsdale; he trusted that similar inspections and reports would be generally adopted. As to finger-and-toe, which he was sorry to learn was so prevalent, he might remark, that it was not, as was generally supposed, altogether a new disease; he remembered, when a boy, being in the habit of collecting together, at Bowhill, Selkirkshire, heaps of turnips which had been thrown aside, and which, he remembered, had similar appearances to those presented by this disease.

Mr. CALLANDER, of Prestonhall, proposed a vote of thanks to the Chairman, which was acknowledged by his Grace.

CULTIVATION OF TURNIPS.

There are often great mistakes committed as to the quantity of produce per acre—especially that which is only realized by the judgment. Where there is an absolute test by the bushel and the scale, there is less chance of being deceived, because experience shows how far judgments from the appearance of a crop are sustained by the actual result, and hence opportunities are afforded of correcting the conclusion. But with other crops there is more difficulty. Clover, turnips, cabbages, and a number of similarly circumstanced crops are often sadly miscalculated. Many a crop, spoken of at random as 40 to 45 tons per acre, is really very far short, and the test applied in some parts of the country by the actual *scale* and *weights* have now and then dissipated the delusion. The Lockerbie Farmers' Club have for several years made an inspection, and weighed the crops of the district of Annandale, and placed the *facts* of each crop and cultivation in a tabular form, which is of very great value, and affords a vast mass of information on the subjects of turnip culture.

The crops range from some 29 tons 15 cwt. per acre as the highest, to 9 tons 14 cwt. the lowest, and the averages being as below:—

	Tons.	Cwt.	
Swedes	19	16	per imperial acre.
Yellow	17	0	,,
White	21	1	,,

This is short of either of the two preceding years,

as will be shown by the comparative statement below:—

	1849. Tons.	Cwt.	1850. Tons.	Cwt.	
Swedes..	21	16	24	9	per imp. acre.
Yellow ..	20	2	19	14	,,
White ..	22	7	25	14	,,

Now, while the above table shows the inferiority in weight of yellow turnips, both to the swede and the white, it must be borne in mind that the swedes are much earlier sown, and the whites are admitted to reach maturity at a period much shorter than the yellows, and hence we may expect the yellow to be below both the one and the other.

The practical remarks of the club are of great value. They are founded both on the facts and the inspection; and it is remarkable that the same gentleman, with his peculiarities of turnip sowing, (Mr. Elliott we think, for the name is not given), at Hardgrave, again presents the heaviest crop. They are the purple-top swede; were manured with 15 cubic yards of farm-yard dung, 2½ cwt. of Peruvian guano, 1 cwt. of dissolved bones, and 13 bushels of ground bones, and were sown on the 22nd and 23rd of May. Here, though, the manuring was excessive, the period of sowing was late for Scotland. We say for Scotland, for we well remember the late acute and clever Patrick Stewart expressed his surprise that turnips should not be sown in Yorkshire till the 21st of June; whereas it is pretty well understood that if they are put in much earlier they become prematurely ripe, and often provoke attacks of their natural enemies—the aphides.

But *the* peculiarity of the Hardgrave turnip crop is the distance between the plants. In the very parish were we are now writing—when turnips were first introduced, the late Mr. Cope sent his men from Norfolk to sow and to hoe them. Great was the marvel at the vast quantity of manure they required, and many were the sneers thrown out at the new-fangled crop; but the astonishment waxed into wrath when they saw the same men hoe up four-fifths of the plants they had so carefully cultivated. To take out all but one, every seven or eight inches, seemed utterly barbarous and wantonly destructive.

But in the Hardgrave turnips no such scrupulousness exists: the rows are made 28 *inches apart*, and the plants mercilessly taken out every ten inches and less; for, in ten yards, this heaviest crop in Annandale had *but* 28 *turnips in them!*

We must express our surprise, that the raw bone continues to be used so much in Annandale. We think there are some thirty-eight instances, and yet the use of others seems hardly to answer the purpose.

We give the following particulars of a case in point at Hillside.

	Tons.	Cwt.
20 yards of dung and 2 cwt. guano and 20 bushels raw bones gave ..	15	16
And, in another case, ...	22	6
27 yards of dung and 6⅜ cwt. dissolved bones gave	25	10

And yet there are only some thirteen cases where dissolved bones are used.

But the Scottish farmers seem to appreciate the best Peruvian guano. There seem to be about 107 instances where it is used, and almost always with a greater or less measure of success. But it is remarkable that guano alone does appear to answer. At Haginshaw it is used in quantities of 4 cwt. per acre; but the crop given is in white turnips, 15 tons per acre in both cases, or nearly 30 per cent. below the average produce. But dung alone is in the same predicament; for, at Cleugh-heads, 25 cubic yards of dung gave 16 tons 2 cwt. and 13 tons 13 cwt.; but this was probably inferior land, as 400 cwt. of guano alone gave but 11 tons 5 cwt. and 13 tons 13 cwt. of yellows.

The happy medium seem to be small quantities of as many different kinds of manure as possible. The heaviest turnips had but 15 cubic yards of manure, while a case where double that quantity is used (30 cubic yards) the crop is only about as great—say, 15 tons 2 cwt.

We think these experiments abundantly prove the fact of which we were before persuaded, that it is best to spread over the whole of the land intended for turnips the entire manure of the farm, and to spread small quantities of dissolved bones and Peruvian guano over the same land: thus, nobody need fear a good crop of turnips, who carefully lays on, say—

10 tons of farm-yard dung,
2 cwt. of Peruvian guano, and
4 bushels of dissolved bones per acre.

The practical remarks of the inspectors are full of valuable suggestions. They state that the earlier swedes are sown after the 10th of May the better, and the chances of weight diminish after the 20th. In Scotland they sow white turnips, as we have said, early, and recommend the early part of June for the process. We have, however, this objection, that early in June the fly is often more powerful than at any other period of the year. We close with one of their own sensible paragraphs: "The club at a previous discussion expressed an opinion that 40s. per Scots acre or 32s. per imperial acre might be profitably expended on extra manures where 15 cubic yards of dung only can be applied. The result of the weighings in this as in former years confirms this opinion, even putting the smallest value on turnips, which the present extreme low price of beef warrants." We quite accord with the opinion. — Gardeners' and Farmers' Journal.

AGRICULTURAL EDUCATION.—CIRENCESTER COLLEGE.—VALUE OF CHEMISTRY.

While nearly the entire body of farmers is engaged with the politics of agriculture, vainly seeking for all kinds of relief at the hands of the Government, we still persist in directing attention to the fact, that the most important remedies lie beneath the farmers' own hands, and, indeed, to all intents and purposes, at their own disposal. Moreover, we would show that much of the mischief complained of is caused by the general and culpable neglect of such remedies.

There are, doubtless, a considerable number of our readers who have met our suggestions with the curled lip, or the snort of discontent. This cannot be helped. We have little hope of doing good to any, if we offend not the prejudices of some, and to others appear as the advocate of a principle of rank Quixotism. It is possible to run beyond the sight of a few members of our venerable fraternity, and yet be very safely within the boundaries of the age!

"Education? absurd!" cries some discontented friend. "Tell us how we may dispose of our produce for its money's worth, show us how we can compete with the foreigner, and you'll talk sense." "And these, our friend," we reply, "will be just some of the results of that system of education we propose." We say some of the results, because we hope to obtain many more than these. But we will not admit the absurdity of that education, which, independently of all other advantages, will give to the agriculturists their political and social position in society—a position they have yet failed to acquire from the very want of education, a position at which they never will arrive but by education, and a position the manufacturing and commercial population has attained merely by the means that the rural population has disregarded.

Why, viewing them in a political light, do they hold an inferior rank to any other working class of the community? Because, feeling their practical incompetency to manage their own affairs (an incompetency resulting, we aver, from mental inaptitude), they have trusted them to be mismanaged by others.

Socially, their property merely should entitle them to claim a comparatively high rank in society, yet socially they are below those classes that possess but a moiety of their wealth. And why? We wish not to exaggerate; and the general estimate formed of the farmers as a body will prove that our statements are correct.

How, for instance, does a father with three sons variously endowed reason with himself as to their settlement? "Wilfred is a shrewd lad, with a strong love of self-appropriation: he is fitted for the legal profession. Herbert is a dreamy, sedentary fellow: a good curacy will suit him. As for Henry, he displays no faculty for anything—has abused the advantages of education—is boorish and rude in his manners: I must give him the benefit of my interest with Sir John for a farm." And is it not one article of the universal belief, that the only requisites to success in the cultivation of the land is the lowest possible form of common sense, combined with remarkable gastronomic development? False as this may be in its full import, as applied to the present race of farmers, and the present requirements to success, there is yet too much truth in it for our liking.

We will not venture to say how much of the distress with which the agriculturists have of late years become acquainted is the result of unfair ministerial measures. Certain it is that they possessed neither—1st, that political weight in the country, by the judicious and intelligent exercise of which they might have made their own terms in the late event of the repeal of the corn laws; nor, 2ndly, the ability or foresight to adapt themselves in any way to their altered circumstances.

These two simple qualifications would have averted much evil, and considerably mitigated the force of that complete disastrous ruin that has overtaken so many families.

We complain of the inability of farmers, or their children, to turn their attention, when circumstances demand it, to other pursuits. Is this the case? What is the quality of the training in our farm houses? Let us take, for instance, a man with a large family of sons. He brings them up much after the old fashion—*i. e.*, the fashion in which he himself was educated; developing their physical, and suppressing their mental faculties. Suppose him thus fitting them to hold farms, when, by one of those sudden freaks of fortune, he finds himself on his *back*, with his pockets turned inside out.

What is to be done? Neither he himself nor his sons have any notion of striking into a new path; they have been bred on the land, and to the land, till they know nothing but the common routine of farm work, and are fitted for nothing, as they cannot be masters, but to be daily labourers.

Our cheaper education of the present day has rendered this kind of training less general than it was formerly. Still, so strong is the inherited prejudice in the rural districts against mental cultivation, that such cases as the one we have mentioned are anything but rare. Writing in the midst of an agricultural province, we can readily point to many families whose "bringing up" is precisely similar to the above; we can point to many more, hopelessly sunk in poverty—ay! and gone to swell the ranks of that pauperism

which so fatally trammels the free movements of industry.

We are quite aware with what fierce jealousy of innovation on established customs we have to deal. So deeply-rooted, indeed, is the conviction of the incompatibility of intellectual refinement and literary taste with an intimate acquaintance with the details of business, that we find intelligent men even giving it as their opinion that the one cannot be encouraged except at the direct expense of the other. Hence a race of Visigoths, opposing the spirit of advancement with systematic animosity. We can scarcely stop to pity those that are suffering from the effects of this perversity. That we do not usually find these accomplishments combined, is true; but that such combination is unfeasible, dangerous, or impossible, is false, and proved to be so.

True education, as we take it, by giving to man the perfect control of his faculties, by enabling him *to apply* his knowledge, observation, and judgment upon the combination and arrangement of the materials around him in the readiest, cheapest, and best manner, thus fits him to occupy his present position to the greatest possible advantage, and gives him the power of adapting himself to any or all of the varying circumstances in which Providence may place him.

Apropos of this, let us just run our eye over the examination papers of the Cirencester College; and, keeping in view the foregoing remarks, endeavour to form a candid judgment of the quality of the instruction there given. It will be well, however, to confine our observations to the Sessional Examination in such matters of practical agriculture as have been brought before the attention of the students since the middle of August.

Question 1 is "Describe the acts of husbandry during the present session in Nos. 1, 8, 9, 12, 27, 29" (The fields are numbered)—

The second question is "Give a statement of the present condition of each field on the farm," &c. The answers cannot be here given at length. Those of our readers who cannot rely on our report must obtain them for their own perusal; and indeed, we would advise all to do so. The replies to the above questions are given in a manner that proves the writer to have possessed no slight or superficial acquaintance with the different operations he describes.

From the answers before us to the third question, we can candidly say that the requirements contained in this question are most creditably complied with. The question runs thus: "Take any field on the farm, and make a two years Dr. and Cr. account of it." An average turnip crop, followed by a white crop, is chosen. On one side is placed all that has been, or that will have to be expended upon it. Going through many calculations, the result is that the total crop o the turnip crop is £5 12s. 7d. On the other hand is placed all that has been or will be realized from it, and the balance is struck. The worth of the turnip crop is then estimated at £4 per acre. The same series of calculations are threaded with reference to the barley crop. The cost of it will be £4 0s. 5½d. per acre. £5 18s. 9d. would be realized by the sale of it, and, omitting the straw, the apparent gain would be £1 18s. 4½d. But as there was a loss of £1 12s. 7d. per acre on the turnips, the difference in favour of the two crops amounts to but 5s. 9½d. Correctness cannot be expected, but merely an approximation to what is probable. The world desire to see all young farmers, and all old ones too, sit down, and, without reference to day-book or ledger, give as free and fair an explanation of a similar question, having all the advantage of personal interest in their favour.

Question 4 respects the mechanism, varieties, and uses of the plough.

Question 5 respects the cultivation, harvesting, &c., of wheat, together with the enumeration of the distinctive peculiarities of its varieties.

Question 6 inquires the desirability of manuring stubbles before winter.

Question 7 desires an explanation of the advantages of drainage.

Now there is no guess-work in the replies to these questions. They are not diffident and rambling, but terse and confident, displaying a full knowledge of the subjects under review. Some errors are apparent, but only such as we expected to find.

The 8th question refers to liming, and the soils that require it. Was there more knowledge of the properties of soil amongst us, and of the adaptation of manures to it, we should not be such frequent witnesses of ill-advised application, and consequent failure. We remember to have known of one man who expended £150 in artificial manure, and lost his whole crop as the encouraging result! Such an one would be the most likely man we know to spit at what he would call "science," relying henceforth on that untutored sense which his fathers from time immemorial deemed their sufficient guide.

The questions 9, 10, 11, respecting subsoiling, winter beans, the methods of cutting corn, and their respective advantages, the uses of carts, build of ricks, and thrashing, &c., are important in themselves, and very well answered.

The questions 12, 13, 14 refer to the treatment of cattle in the college-yard, their breeds, the method of feeding them, system of box-feeding, the management of the calf from its earliest stage, until it is three years old, ready for the knife.

Question 15: "How would you feed dairy cows through the year on an arable farm?"

The 16th and 17th questions relate to the treatment of the breeding ewes, fatting sheep and lambs on the College Farm particularly, and elsewhere generally.

Such, with some few exceptions, are the contents of

the paper on practical agriculture. The questions imply a minuteness of observation, and a ready knowledge of farming matters, fully demonstrated in the replies. And we are the more surprised at this, since the students, with very few exceptions, have gone to the institution from the towns, and with therefore no previous acquaintance with the farm processes there conducted. A few words on the daily and weekly routine observed at the College:—About six hours per diem are allotted to lectures and classes. There are two lectures of an hour's length each per day; one from 9 till 10, the other from 2 till 3. The remaining four hours are devoted to classes, which consist either of practical chemistry in the laboratory; geology and botany in the fields; surveying and levelling out of doors; or practical instruction and agriculture on the farm. The five first week-days are thus spent. On Saturday morning there is an agricultural examination; recapitulation takes place, and future operations are thoroughly canvassed. Besides this, one professor examines every Saturday on his own lectures during the last month, so that (their being four) each professor's turn comes round every fourth week. The students are then classed in order of merit. Besides the opportunity of daily ranging the farm, it is so arranged that the farm-manager goes round with small parties of the students at fixed periods. Those who are on the farm, but not with him, are occupied in such observations of what is proceeding as may serve them to enter all particulars in their labour-journal, in which they insert the occupation of each man and horse per day, and the estimated cost of their labour. The fatting cattle are also periodically weighed, and their weight, with a memorandum of what food they are receiving, is carefully noted. In short, every means is taken for bringing every operation on the farm before the eyes of the students.

One who has visited the College writes thus: "The College is presided over by a gentleman admirably qualified for the superintendence of an educational institution; the several departments are in the hands of the most excellent teachers; Professor Welcker is well known as a chemist, and especially as an agricultural chemist, by his performances in the laboratory of Professor Johnston, and by his late contributions to agricultural literature. The several branches of natural history are efficiently taught; the different departments of agricultural engineering form the subject of special instruction; lectures on veterinary science are delivered by a gentleman to whose skill in this department the admirable condition of the museum bears testimony; and that the province of agriculture is well taught, the present condition of the farm under Mr. Vallentine's skilful and energetic management, is ample proof."

Well, of course the farmers, with their accustomed strong common sense, have shown their appreciation of this effort to bring about a better state of things, and have flocked to give their support to an institution presenting such advantage to their sons. How stands the case? "We shall number this session"—our authority is good—"from 50 to 60: our students are chiefly sons of lawyers, bankers, clergy, officers, and landowners: of the sons of farmers, renters of of 500 acres and thereabouts, we have *none*." This looks encouraging. But protection or nothing is the farmers' cry. "Indeed," they say, "we must allow nothing to distract attention from protection: what you advise may be very good; but then, if it mitigates our sufferings, the government will laugh, and shut up their bowels of compassion from us." Verily we do believe that the farmers would prefer stagnation with protection to prosperity without it.

The great Burke has somewhere remarked that if a falsehood should be repeated to a man every day for a twelvemonth he would come at last to believe it. This observation is precisely conformable with what we know of human nature, and finds a striking illustration in the facts we have already adduced. The falsehood promulgated from age to age, and now held as one essential article of the agricultural belief, is this: that the cultivation of the mental faculties is incompatible with the efficient practice of good husbandry. We wonder not at the slow progress, the inert habits, the almost polypous existence of any class of men holding with strange tenacity to such a creed, and conducting the training of its children with imperative reference to its tenets. There is the root at which the axe must be laid. The winds of the nineteenth century have considerably loosened its hold—one decisive blow, and down comes the old tree that has impoverished the soil and obstructed for so long a time the access of both sun and air. Let there be no conservation in this respect; and we advise that the day on which it falls be henceforth a red letter day in the farmer's calendar.

We remember to have seen it stated that there is less of positive error than is supposed, and that every error has its origin in truth. We may suppose that the error with which we have now to do took its rise from the deplorable condition of the serfs, the farmers of the days of the feudal system. Themselves in bondage, the country in commotion, and all classes escaping from the age of barbarism by a most uncertain and dim light—ignorance, the lot of all either by inclination or circumstance, was forced upon the unhappy swains, and regarded by their lords and by themselves as one of the conditions of their servile state. But are we to take this dire necessity, occurring to our ancestors 800 years ago—a necessity they doubtless bitterly resented, and from which we may fancy they longed to effect their liberation—as a precedent on which to construct the rule that is to govern our present course? No indeed! The notion is a dishonour to our times. The babbling of the idiot is pitiable—the words of the wise is strength. The

contemners of popular education flourished under those who subscribed to the divine right of kings. The latter race became extinct long since; should there chance to be one of the former yet astir, we advise that he is carefully looked after by his friends.

It will be well to come henceforth to the investigation of this subject free from hostile prejudice. We find not only that error springs from truth, but that it takes its rise from partial truths also, or facts partially detailed. So many meanings has the term education received that some degree of confusion is caused amongst those using it; and we cannot wonder if, for want of discrimination, many should run away with a modified and necessarily an imperfect sense, and so abuse *in toto* what they know only in part. A farmer will say, for instance—"That boy, sir, can read and write and say his catechism as well as our parson; but he is not half the use to me that that other little fellow is, who never was at school in his life, and knows as much of A B C as my horses—I don't see what is the use of education!" Mr. E. C. Tuffnell, Assistant Poor Law Commissioner, in his report on the Training of Pauper Children, makes the following observation:—"I invariably find that the hostility which some persons profess to education resolves itself, on explanation, into hostility to half education or mis-education. They seize hold perhaps on the case of a boy who has been only half educated, and an essential part of what a youth so situated ought to have been taught, viz., some industrial pursuit, omitted, and triumphantly ask whether his education, *i. e.* really his mis-education, has fitted him for his station. Of course it has not, since he has not been educated but mis-educated. Education, if it means anything, must mean that which fits a child for its future station and prospects." That which imparts the power derivable from knowledge, and teaches the art of applying it, is education—nothing else has any title to the name, or any fair construction of the term; and to talk of an education that unfits children for the lot they are to occupy, and renders them dissatisfied with it, is manifestly absurd.

But to return to agricultural colleges. Is it not a disgrace to the farming community—that fact, that out of the 50 or 60 resident students at Cirencester not one comes from a farm house? Be it remembered that we are not speaking of a mere luxury, of which it may be asked, can we or can we not afford it? It is as much a part of good economy for farmers to give their sons such an education as we are discussing, as it is to farm highest in the worst times. But there is many a practical cultivator who does not yet see how science is to lessen his labour and anxiety, to enlighten his path, and to increase his profits, and who may say, "You have as yet given us but a faint idea of the nature of the scientific knowledge which is to be brought to bear upon the general improvements of agriculture. Of what real value is it likely to prove to the practical man—of what benefit to the country at large?"

A satisfactory reply to such a question will occupy some considerable space, dispose of it as briefly as we may; but as we deem it necessary for our argument to be explicit on this point, we beg of our readers to follow us in the examination. It will be best to begin with the relation of chemistry to agriculture.

The husbandman works upon the soil. To till, weed, and tend this, is his duty. The plants are his reward; they grow upon the soil, their kind and quality are regulated by it—the nature of the soil and the growth of the plant are therefore intimately connected. Again, the plant feeds the animal. On vegetable food ultimately all animal life appears to depend. The animal, therefore, is inseparable from the plant. The soil might exist without the vegetable, and the latter might live and die though there were no animals to feed upon it; but the animal is the creature as it were and the consequence of both. The dead earth, the living plant, and the moving animal, are thus intimately connected.

There is not only this mutual dependence, but a striking resemblance between these elements. Take a certain weight of soil, of vegetable, and of animal matter, expose them to the strongest heat, and there will be found to remain from each a portion that defies the action of fire. Thus the soil, the plant, and the animal each consists of two kinds of matter, one that will, and one that will not, burn away; the first being termed *organic* and the last *inorganic*. In the soil the inorganic matter preponderates, the organic being less than one-tenth; while in the plant and the animal the organic is usually more than nine-tenths of the whole.

The general knowledge of the origin and agricultural value of different soils afforded by geology, and to which we shall soon call attention, is not sufficient to guide the practical man in his economical operations. It is true that the soils differ according to the rocks they overlie; but then in what respects do they differ? Chemical analysis is alone able to solve this question, laying a foundation for that distinct perception we now possess of the properties and capacities of soils, and of the means by which they may be severally improved.

The inorganic part of every soil, that will afford a long succession of crops without any application of manure, is proved to contain in different quantities ten or eleven chemical substances, namely, potash, soda, lime, magnesia, silica, iron, manganese, sulphur, phosphorus, and chlorine. All virgin soils, come from where they may, are found to possess these constituents in sensible quantity. Here is the normal condition. As we proceed from this first class downwards to those soils that require to be manured, naturally being unable to grow good crops, or crops at all, we shall see that the defect arises either from

the absence of one or more of the eleven substances—the possession of them in small proportion, or from their excess. The secret of their chemical and practical difference being known, the rest is easy. For by re-establishing the chemical equilibrium they are physically alike, and agriculturally equal.

The farmer has long acted on these principles, although ignorant of their bearing. If in its natural state a soil was not remunerative, and yet by the application of manure gave abundant return, it was simply because in that manure was added that element, or those elements, in which the soil was deficient; or if the application of one substance, such as gypsum, or lime, or marl, and the like, was sufficient to give to the field productiveness without other manure, it shows that the absence of only one of the ten ingredients of a fertile soil could render the land unproductive.

All soils change their character however. The rotation of crops alters them, and they gradually, under continued culture—the richest even—decline to the level of those that depend on artificial supply. "What is the cause of this? Does the soil gradually lose some of its constituents? Does the manure constantly restore them? If so, which of its constituents had the soil lost during the degenerating process? What had carried them off? Can they be recovered? How, and in what form did the manure restore them? It is discovered that the most fertile soils always do contain these substances; but must they of necessity contain them all? If so, why are they necessary—what purpose do they serve?"

The careful study of the plant will afford a ready and satisfactory reply to all these questions.

We shall remember that all vegetables consist of combustible matter (*i.e.*, that which burns away) and that which does not yield to the action of fire. The incombustible portion we have seen forms but a small proportion of their weight; so much so, that when we are told that 100 lbs. of dry oak wood leaves only six ounces of ash when burned, and 100 lbs. of wheat leaves only 2 lbs. of ash when burned, we are apt to doubt whether the presence of the substance can be of any essential moment to the existence of either the tree or the plant. But as this ash is never absent, it must be in some way of vital importance.

A series of chemical experiments has established one important fact that has thrown a bright light athwart agricultural practice and experience. It is this: their inorganic parts plants draw solely from the soil—their organic elements they derive chiefly from the air. Professor Fownes says, in an article which on account of its clear arrangement we intend to follow pretty closely, "Some plants leave more ash than others, and in some parts of the plant it is more abundant than in other parts. A ton of leaves, for example, often contains ten times as much as the wood of the same tree; and a ton of straw contains five or six times as much as a ton of grain." In case of it never being returned to the soil it is pretty evident that that plant which possesses most commits the greatest theft. Practical men have long noticed this process, and this gradual exhaustion, without being able to account for it—their endeavours to obviate it have therefore been variously and accidentally successful.

The question put by observant, thoughtful people, to each other and to the scientific, concerning this *ash*, suggested to the analytical chemist two inquiries, first, "What is the general composition of the ash?" and, second, "What special differences exist among the ashes of different plants, and of different parts of the same plant?" We will endeavour to answer these in order.

First, then, *the nature of the ash*. It will be remembered that in our former paper we said that the inorganic part of well-constituted soils consists of 10 or 11 different substances, namely, potash, soda, lime, magnesia, silica, iron, manganese, sulphur, phosphorus, and chlorine. This fact alone is comparatively uninteresting, because of itself it is not significant. When, however, we learn that upon analysis the ash of all our cultivated plants yields these same substances in greater or less proportion, the solution instantly flashes across our minds, and our reason brings us at once to the conclusion, that as these substances are *necessary* to the plant, *and can only be obtained from the soil*, the soil *must* contain them in the proportion necessary to the vitality or health of the plant.

Second, With regard to the *special differences in the quality of the ash*, we remark that though these elements are all present in our cultivated plants, the ash of different plants, and of different parts of the same plant, exhibit them in very different proportions.

It has been proved that the *quantities* of ash left by the leaves and stem, the straw and the grain of different plants, vary considerably; and it is also proved the ash left by these various parts varies not more in *quantity* than it does in nature. From an analysis given by Professor Fownes, of the Hopetoun oat, we shall see this to be the case.

"One hundred pounds of the Hopetoun oat contained of sulphuric acid and of alkaline matter respectively the following very different proportions:—

	Potash and Soda.	Sulphuric Acid.
Grain	31·15	2·54
Straw	18·24	23·00
Leaf	15·68	15 23
Chaff	4·36	6·51

And not only are the proportions of the several substances unlike, but in certain parts of the plant some of them are almost entirely absent. Thus, the grain and the straw of wheat have an ash which contains phosphoric acid and silica respectively:—

	Phosphoric Acid.	Silica.
Grain	50 per cent. ..	None.
Straw	1 to 3 ..	30 to 60 per cent.

The presence of phosphoric acid in large proportion characterises the grain, while that of silica in large proportion characterises the straw."

The analysis of the ash of different plants gives precisely similar results. And we infer, from the results of chemical research and from the intelligent observation of the growth and habits of plants, that one kind of crop under the same circumstances will take from the soil more of one kind of inorganic matter, another crop more of another.

Let no one be sceptical of the value of chemistry to the farmer, if in its relation to practical agriculture such experiments as we have adduced involve conclusions like the following:—

First, "As different parts of the same plant require different proportions of these inorganic substances, they must, at different seasons of their growth, draw these substances from the soil, more of one thing at one time, more of another thing at another. They may flourish, therefore, on a given soil at one period of their growth, and not at another. That sod which clothes the tree with luxuriant verdure, may yet not be able to ripen its fruit; that which causes the straw to rush up to early maturity, may refuse to fill the ear.

2ndly. "As different plants also draw from the soil the same substances in unlike proportions, they will grow with unlike vigour in different soils. Hence that which bears a profitable crop of one kind is often unable to yield a good return of another; hence, also, the varied flowers and herbage which diversify the surface of all our fields."

"Well," some market-table gentlemen may say, "you have done nothing but to throw into two conclusions all the facts that have led the farmer to the system of rotation of crops: our observation and experience have taught us as much as your chemistry." "Truly, the observation and experience of *centuries*," we reply, "have given you as a great barren fact what chemistry the moment it was applied to agriculture gave as a fact, and with this difference, that it gave it as an intelligent fact accompanied by its proper solution. The elucidation of one fact like this is invaluable, throwing, as it does, a broad glare of light upon others, as in the case of the principle involved in the above conclusions, which furnishes a key to so many practical points of husbandry long known, though never understood. It may be as well to stop, and view the principal of these points that have thus suddenly fallen under illumination.

Repeated observation and long experience both upon the naturally poor, the impoverished, and the virgin soils, taught the lesson that there was a process of exhaustion at work when continued cropping was resorted to, and to some extent enabled the farmer to counteract its operation. Now with respect to exhaustion the principle in question affords a definite notion of that process; and, furthermore, divides it into two kinds. Not only may there be a general exhaustion, *i. e.*, as under a systematic rotation, where the soil may be impoverished in all its ten or eleven elements, but there may be likewise the special exhaustion springing from the abstraction of one or more of those substances, as in the case of the continuous growth of any particular plant. These exhaustive processes are both fatal to the fertility of the soil. It will be remembered what we said above of the constituents that characterized the grain and the straw respectively. Supposing that corn is grown, therefore, and both straw and grain taken to market year by year, *general* exhaustion is produced; *i. e.*, the soil is robbed of those substances that go to form both ear and straw. Return the straw to the land in the shape of manure, but still dispose of the grain at market, and you only abstract to any extent one substance; it is that one which feeds the ear, however, and without which there will grow only straw. In England the high price of wheat has tempted our farmers thus to exhibit in a striking manner the evil of this system. No country, however fertile, with a flourishing commerce, which for centuries exports its produce in the shape of grain and cattle, can retain its fertility unless the same commerce makes restitution to the soil in some sort. We see the disastrous effects of this policy in the present exhausted state of the originally-finest soil in the world, that of Virginia, which can now no longer furnish its staple productions—wheat and tobacco. From such a discovery as this springs, of course, the theory of manuring, or, as it may be called, the theory of renovation, which shows the importance of returning to the soil the essential substances that have been taken from it. Hence the increasing attention paid by men of sense to artificial manures; hence the immense sums of money expended in the same (in 1827 40,000 tons of bones were imported into this country, valued from £100,000 to £200,000 sterling); and hence the repeated discussions taking place at club dinners and elsewhere, as to the comparative merits of the various families of the phosphates, sulphates, nitrates, muriates, and carbonates, in all their natural or affianced relationships. The sheer nonsense that is talked on the majority of such occasions, together with the ignorance and carelessness so frequently displayed in application, or rather misapplication of these substitutes, proves plainly how little this theory even yet is understood. The knowledge of the composition of the ash—a knowledge which science only can give—aided by a calculation of the exact quantity of the component parts of the soil that are exported from our land in the shape of beef, mutton, or grain, teaches us that in certain cases a small supply of lime or phosphorus or silica would do more to restore lost fertility than a large supply of farm-yard manure. We heard of a farmer, not two days ago, who, determined on a very heavy crop of turnips, manured his land twice—in October, and again in May—applying twenty-five loads per acre each time. The result was a surpassing crop of chickweed. Supposing that he had not done enough, the next spring for oats, he added a third dressing of twenty-five loads. The result was an im-

mense bulk of straw, but not one oat. Of all bad farming this is the worst; and verily, when we think of it, our crops of wheat, &c., of which we are most sanguine, frequently, from the very same reason, disappoint us.

For judiciously regulating the application of power and the expenditure of capital, we must depend upon an intimate acquaintance with the theory of the restitution of a disturbed equilibrium, involving a close investigation of the constituents of soils and plants.

The principle in question throws light on the rotation of crops. It is a system that may well claim the dignity of a natural law. A writer of considerable talent observes of forest trees, "In the wide forest many generations of broad-leaved trees live and die, and succeed each other; but the time comes at last when a general pestilence seems to assail them all—their tops droop and wither, their branches fall off, their trunks rot. They die out, and a narrow-leaved race succeeds them. This race again has its life of centuries perhaps, but death seizes it too, and the expanded leaf of the beech, the ash, and the oak, again cheers the eye." Just so do the grasses of our meadows succeed each other, and we are wise in imitating this beautiful arrangement.

It is from the fact that different plants carry off different substances (those cultivated for their grain taking phosphorus, and those grown for their straw and their bulbs extracting respectively silica and alkaline matter), and not from the notion that one crop takes more in *quantity* than another of *all* those things that our crops derive from the soil, upon which the intelligent practice of rotation is founded. But by no system of this kind, however skilfully worked, can we avoid the ultimate exhaustion of the soil. The direct restitution of its abstracted constituents is the only means by which we can economically re-establish the equilibrium that has been disturbed. We are aware, on the one hand, that it is easy to de-fertilize a soil by the repeated growth of any one plant; while, on the other, the facts already adduced assure us that we may distance this undesirable result by a judicious alternation of crops, and thus work up all the available materials of the soil to advantage, and by a very slow process. How frequently is it the case that some farms get a bad name, and are abandoned again and again, being regarded as bottomless pits to the investment of capital, until some cunning fellow astonishes the neighbourhood by the unexpected development of hitherto latent resources! It has been the fate of some men to dig and delve, their lives long, a few feet above a silver vein. The gift of the divining rod is not made to every one. The successful man of business owes his profits, perhaps mainly, to the inaptitude, ignorance, or carelessness, of his fellows. From what to many an unthinking person would appear a heap of worthless cinder rubbish, the scavenger speedily riddles an ample fortune, and trundles a carriage; and in the universal and toilsome search for gold, our successors will extract wealth out of the very refuse rejected by ourselves as valueless.

Our principle may find an illustration in the manner in which some few of the elements of the soil have been directly supplied. In some parts of England the effect of lime is very marked in the improved tone it gives to the soil.* Yet many of our readers will have seen the truth of the old proverb exemplified—"Lime enriches the father and impoverishes the son"—*i. e.*, they will have witnessed from the application of lime a temporary fertility, followed by a sterility the more obstinate (past a certain point), in proportion to the frequency of the dressing. This has been the experience also of those who have applied gypsum, nitrate of soda, bone dust, &c.† For a certain number of years their effect was good; beyond this they were thrown away, and were even found to be injurious. An abused stimulus in time ceases to act. This is the case in the human subject with opium; and it may be remembered that water will hold a definite quantity of salt in solution, and no more. In the smelting of iron also, lime in certain quantity is invaluable to produce a running of metal: beyond that it is valueless. No farming can succeed that acts upon the principle of restoring periodically one or two substances, while nine or ten others are being ruthlessly reduced year by year; and success will become but the more speedy and entire as we bend our practical investigations to this subject. Under the combined influence of atmosphere, rain, mineral springs, and vegetable decay, an exhausted soil may be repaired in the course of years; but then a man who pays 30*s.* or 40*s.* an acre rent, cannot afford to give his land such respite; and there are comparatively few men that keep up the old practice of dead fallowing.

In the commencement of our preceding paper we noticed the mutual dependence subsisting between the soil, the plant, and the animal, and the close resemblance actually to be traced between them. It will suit our purpose to bear out this analogy yet further.

The inorganic part of the soil, or the ash, yields eleven certain substances; the ash of the plant likewise yields the same; and upon analyzing the ash that remains from the burning of both flesh and bone, the same are again discovered. As in the plant, to confirm the analogy, the proportion of this ash varies in different parts of the animal—"The fresh bone leaves one-half of its weight when burned, the fresh muscle not more than one hundredth part;" yet the proportion present in the muscle is as essential to its healthy existence as the larger quantity to the bone. Mr. Fownes remarks—"There is a striking difference among the three in respect to their inorganic part. Thus it may be given as a general cha-

* Its principal use we conceive to lie in the power it possesses to dissolve those components of the soil that are not soluble in water, and thus to present them to the roots of plants in an appreciable form.

† The expenditure in such manures as the latter two is not sufficiently great to show the effect we describe; and even in the case of lime, when we know that the addition of 400 bushels per acre to a soil 12 inches deep will only add 1 per cent., the farmer may find benefit for a very long time.

racteristic of each, that the *soil* contains silica and alumina—the *plant* contains silica, and no alumina—the *animal* contains neither silica nor alumina.

The alumina gives consistence and tenacity to the soil; the silica gives strength and firmness to the stem of the plant. For such purposes the animal does not require their aid, and is therefore destitute of them. The question, Why must the soil contain these certain substances? meets, then, with the following reply, which goes yet further to establish the analogy we are considering, by showing that the animal organism is only a *higher kind of vegetable*, as Liebig expresses it, the development of which begins with those substances, with the production of which vegetable life usually terminates. The soil *must* contain them because they are essential to the vitality of the plant; and the plant *must* contain them because they are essential to the animal life which it is its function to support. There are then certain given substances, necessary to the structure and support of bone and muscle, to be found in the soil. How can the animal obtain them? It cannot eat earth; if it did, its digestive apparatus is not fitted to disintegrate nor assimilate the specific ingredients. There must then be a medium. That medium is given in the plant, whose roots penetrate into the earth, and diligently collect and present to the animal certain principles identical with the chief constituents of blood! The life of the plant is therefore subsidiary to the life of the animal.

And it is also imperative that the substances of which bone and muscle are composed are yielded to the young animal in the milk of its mother. The processes of combustion and transformation demand in the case of the adult animal very large supplies. In the young animal, however, these processes are far more energetic. Notwithstanding that the metamorphosis of organized parts goes on more slowly than in the adult, there is a more active respiration and a rapid growth that claim an incessant and increased supply, and a supply also that shall be concentrated: this claim is recognized in the nature of the mother's milk. Nor is this demand by any means relinquished, although materially reduced, after the structure is matured; for in the lowest as well as in the highest class of the animal kingdom there is a constant change, a decay and renewal, or as we have before termed it, a metamorphosis of organized tissues going on. So much so is this the case with man that he is supposed at the end of every seven years to bear no very unfair resemblance to poor Pat's stockings, which was so darned and redarned "that sure not a thread of the original remained." It is impossible to conceive what some rogues might not make of this in a court of law, where the identity of their persons were concerned! Surely it is the fear that such fact as this shall get abroad, and enter into silly people's heads, to the subversion of all order and constitutional security, that leads certain personages to talk about the danger of educating the "dangerous classes!" Silly people.

It is then evident that the animal is bound by an indissoluble bond to the earth—a bond which, if broken, death will ensue. A hazardous experiment is tried whenever an attempt is made to loosen this bond; and this is virtually done when the animal is ill supplied, through the soil or plant, with those principles on which it depends. What is the meaning of distinguishing certain grass lands as breeding, suckling, and feeding lands, if it is not that experience teaches that the peculiarity of one is to rear fine lambs, &c.—of the other to produce fat beasts, &c.? This right and judicious discrimination is a main secret of successful grazing; but it is only gained after a series of losses when gained only by natural observation, totally unaided by scientific investigation. How so? Why, owing to the constant consumption of those substances that characterize these different pastures, the fact of this year may be untrue ten years hence; and ten to one that extensive loss has supervened between the change and the discovery of it. All farmers are aware of this, and hundreds, for want of the aid that chemistry could render them (and in numerous instances common sense only), are floundering about in uncertainty with a radically diseased flock, and a stunted herd, cursing free trade instead of their own ignorance.

We veritably believe that much of what is called "local disease" may be traced to the exhaustion that has taken place in one or more of the substances so often mentioned. Some farms are known to have had names because of the peculiar maladies that attack, at certain stages of their growth, the stock reared or fed upon them. And at different stages of growth we know that different elements are assimilated.

Suppose, now, that a tenant has exhausted the land of its phosphates by the growth of wheat year after year, but with little intermission, and, determined upon affording it relief, he lays it down with grass. As phosphorus cannot be restored by the atmosphere, we know that unless it is restored by some other means, no plants, none at least that require it, will grow where it is not. A cow turned upon the pasture such a course would insure, might possibly keep herself alive; but should she have to support a calf she would do so, so long as she was able, from her own system (Is this not a beautiful provision?), and then death to both would ensue. "The animal," says Fownes, "cannot long be independent of the quality of the dead earth on which it treads." The cheapest and most expeditious mode of restoring the used-up phosphates to the land is to dress with bone-dust. Phosphates enter largely into, and indeed are the chief constituents of bone; therefore, curious as the fact may seem, it is still true, that by supplying bone-dust to the soil you give bone to the animal.

Nothing has yet been said concerning the *organic* parts of soils, plants, and animals. For the most part, these subserve the purposes of *respiration*, and are obtained from the *atmosphere*. They have little to do with the formation of blood, and, being of minor importance, we will leave the consideration of them for another oc-

casion, and return to the solution of the agricultural problem, viz., *How can those substances be replaced which have been taken from the soil, and which cannot be furnished by the atmosphere?* In farm-yard manure? No; because a very small proportion of the elements necessary to the vitality of the animal will be thus returned: they are assimilated by the animal, and exported from the farm at some time. To arrive at any valuable reply to the question there are many things to be ascertained. We will mention three:

First, we must ascertain definitely what substances are abstracted from the soil by different plants. Thanks to chemistry, we have pretty correct information on this subject; and our information teaches us to divide vegetables into three or more classes: 1st, *potash plants*, which includes the best mangold-wurtzel, turnips, and maize; 2nd, *lime plants*, comprehending clover, beans, peas, &c.; 3rd, *siliceous plants*, including wheat, oats, rye, and barley—*i. e.*, silica goes principally to form the straw of these.

Secondly, we must know in what quantity or proportion these substances are abstracted from the soil by different plants. The results of many experiments are before us. The celebrated chemist Liebig gives us, in the matter of *phosphates* removed from a surface of land equal to four acres, the following data: Peas 117lbs., wheat 112·43lbs., rye 77·05lbs., turnips 37·84 lbs.

Thirdly, we must arrive at some approximate proportion of the ingredients returned to the soil in the animal manure. Chemistry a third time lends us its effective aid, and the researches of Dr. Liebig prove how fully he has overcome this difficulty. So much so is this the case, in each of the three requisites to a successful practice of agriculture just mentioned, that he (Dr. Liebig) anticipates the time when the farmer may be able to keep an exact record of the produce of his fields; the waste that has taken place in certain substances, and in the measure in which they may be supplied, will then be a matter only of easy calculation.

None of these questions—the practical comprehension of which is so essential to success in the economic cultivation of the soil—can be answered by art.

In all experiments made by men who are not guided by scientific principles the chance of success is very small; and just because they are usually failures, they are seldom tried. The ground indicated by science, and which exposes us to no danger of falling, is the only safe footing; and in bringing this interesting inquiry to a close, we would advise all who have their own interest at heart to effect some stand upon it. Liebig concludes one of his chapters with these words, "It is confidently looked for that, by the united efforts of the chemists of all countries, we shall arrive at a *rational system* of gardening, horticulture, and agriculture, applicable to every country, and to all kinds of soil; and which will be based upon the immutable foundation of *observed facts and philosophical induction*." So be it. F. R. S.

AGRICULTURAL EDUCATION.

TO THE EDITOR OF THE MARK-LANE EXPRESS.

SIR,—I have read with considerable interest the remarks of "F. R. S." on this subject; and although agreeing in general with his opinions, must think that in his anxiety to ride his own hobby, he has rather too roughly trampled on the toes of other people.

"F. R. S." says—"Education, independently of all other advantages, will give to agriculturists their political and social position in society—a position they have yet failed to acquire from the very want of education—a position at which they never will arrive but by education—and a position the manufacturing and commercial population has attained merely by the means that the rural population have disregarded."

Education alone will do no such thing; and to say that without it farmers will never arrive at their proper political position, and that they are not yet educated, is as much as to tell them—"You are not fit for political privileges; leave such to the next generation—nay, even the next generation will not be fit for them; for they do not attend Agricultural Colleges, and your political privileges must be in abeyance, until the Utopian time arrives when every farm is held by a college student, and colleges in every hundred are crowded with farmers' sons."

Now, I affirm: 1st, That the present race of farmers are as fit for political privileges, from county M.P.'s downwards, as any other in the kingdom, nay more so than most classes; 2nd, That they could obtain the power instantaneously if they would use their plain common sense, and see that a subserviency to the landowner is detrimental to them, even in a worldly point of view. Landlords always prefer to vote for one of their own class, even if an ignorant "dummy," saturated with prejudices, conceit, and family pride. Let farmers who form the majority of electors in counties vote for tenant farmer candidates; they could return such easily in a combined movement, and we should then behold a phalanx of business men, who could see the object of the tangled absurdities of a Quarter Session Chairman, and detect the absurdities of a propounder of Arian mysteries.

There are in every county tenant farmers superior even in speech making to the majority of squires, and far beyond them in business habits; not sham sympathizers, like the pretended farmers' friends, but real ones, because, as farmers, the cause and interest are their own. It is probable that "F. R. S." can call to mind one even in the neighbourhood of the R. A. College, whose

sharp trenchant sentences have often demolished a fallacy, startled a company of squires, and even dumbfounded an "intelligent commercial" gent.

3rd, I affirm that the education of farmers is as sound and suitable for their calling as that of any other class in the community. They attend the very same schools as the commercial and manufacturing classes, and have therefore just the same opportunities for learning. Is not the plain sound English education taught there better suited for working men than the Greek and Latin forced upon the tender minds and bodies of the aristocracy at schools like Eton and Rugby, and colleges of Oxford and Cambridge? Would not an intelligent farmer's son, after half a dozen years at his country school, be far more fit for his pursuit in after-life than the best Latin versifier or even pure mathematician that ever left the banks of the Isis or Cam?

By its results on our squires it appears that the forcibly driving in descriptions of Mythology, and Greek and Roman freedom, so disgusts the learners that they hate the very name of "Liberty" afterwards, and consider it just as delusive and fabulous as the improving and moral tales of the gods and goddesses.

No doubt there are many, too many, ignorant and prejudiced farmers, who know and care nothing of geology, botany, chemistry, and vegetable and animal physiology; but are there not a still greater proportion of equally ignorant and still more prejudiced squires? If farmers are subservient to their landlords, are not the commercial retail dealers of towns still more subservient? If manufacturers have greater political power than farmers, it is not because they are better educated, for they are not. The greatest man among them, Cobden, was a poor farmer's son; and even his "unadorned eloquence" has almost passed into a proverbial sarcasm. It is because in towns manufacturers stand in the position of landlords; they possess property, and have almost unlimited control over large bodies of dependants; just as in small towns and in nomination boroughs some neighbouring lord bears sway and governs the electors, so in these large towns rival manufacturers have taken the place of the single landowner; but the majority of the voters are hardly more independent of their employers than the farmers are of their landlords.

Agreeing with F. R. S. in his remarks on the R. A. College, I think I can give him the reasons why it is not encouraged by farmers. 1st. The terms are even now too high; when lower, as originally, they had many farmers' sons. Free trade, so depressing to farmers, so much a benefit (as yet) to all other classes, prevents tenants sending their sons, and encourages others in so doing. Farmers say other classes have been enriched from their poverty, are fed at the cost of their starvation; they may add, and taught at the expense of their compulsory ignorance. 2nd. Success at the College leads to nothing. What member of the middle class would struggle with the expenses of an Oxford or Cambridge education did it not lead to fat rectories, good living, and at worst curacies, and the way well strewed with scholarships, fellowships, &c., &c.? The R. A. College certificate is a mere honorary distinction, which, when gained, does not materially assist the bearer in obtaining a situation. The rich shareholders do not select their stewards, or even lower subordinates from the first collegians. Travelling fellowships for one year would be far more useful in an agricultural than in a classical college; as the person obtaining it might thus learn much useful matter concerning the agriculture and domestic economy of foreign countries. 3rd. The want of previous training in the students themselves, renders the best tuition less efficient: there is a rather stale proverb, "One may take a horse to water, but cannot force him to drink," and in like manner one may lead a person to the fountains of knowledge, but cannot force him to imbibe thereof. In all other collegiate establishments the students have been previously educated in a similar manner at large schools, and undergo besides preliminary examinations. At Cirencester the students, as coming from towns, are frequently entirely ignorant of farming, even to the names of the implements used. What is wanted is four great collegiate establishments, an eastern, northern, and southern, as well as a western, with numerous district farm schools, from which the best scholars might be grafted to complete their education.

F. R. S. asks again, "Why, viewing them in a political light, do farmers hold an inferior rank to any other working class of the community? Because, feeling their practical incompetency to manage their own affairs (an incompetency resulting, we aver, from mental inaptitude), they have trusted them to be mismanaged by others."

Sharp words Mr. F. R. S., yet not exactly true. It was not incompetence and want of education on the part of the tenantry, or the scientific knowledge and aptitude for business on the part of landlords, that made the former to be merely "political capital" to the latter; but it is simply the result of the laws of "supply and demand." The farming class has an equal tendency to increase as other classes; but this, which gives greater employment to all others, diminishes that of the farmer, as with the increasing wealth and population farms increase in size and diminish in number, and competitors come in from other classes. The "ignorant and incompetent" farmer might object to hiring land at a tenancy at will, and to signing covenants which made him a complete serf to the landowner; but the latter's scientific, and brilliant, and conclusive answer—"If you won't sign 'em there's plenty as will"—would prove a complete poser even to the "intelligent" commercial gentlemen who would probably be his competitors; and if one of these commercials hired the farm, he would soon find that, even if he attained the wisdom and knowledge of Solomon, he would be no match for the densest of squires, after signing conditions, that might lead, on his showing an independent spirit, or even a conscience, not only to a compelled relinquishment of a farm, but to the forfeiture of much expended, or rather "sunk" capital. "Sunk," I say; for in many instances it might as well have been thrown into the Thames. But free trade, by decreasing this competition, and thus alter-

ing the proportion in the "supply and demand," has in a great measure changed this. Landlords begin to know the value of a good tenant; farmers to see the folly of both losing money by their farms and yet implicitly obeying the dictates of a landlord.

April 8th. A FARMER.

THE LIABILITY OF THE POTATO PLANT TO THE RAVAGES OF THE WIREWORM.

Though there is not a greater insect enemy to the farmer than the wireworm, there is not one which is blamed more for injury which it never commits. If a wheat plant is turned out by the frosts of winter—if the same cause thins the clover plant in the spring—if the barley turns yellow three weeks after sowing—if the oats look sickly and die—nay, if the turnips, rape, or mangolds are at all disposed to be sickly, "it is the wireworm" settles the whole matter, and the farmer resorts to his thousand-and-one nostrums—some of which do good, some do harm, and some do simply neither.

It is to this moment unsettled whether it is destructive to or destroyed by the potato. Sir Joseph Banks long ago recommended slices of potatoes to be stuck on sticks and buried in the ground in order to attract them, and so on being taken up act as traps to secure them; while in the early numbers of the *Yorkshire Agricultural Society's Transactions* a writer recommended a clean crop of potatoes as a remedy for their ravages. In this state the matter stood until Mr. Curtis, in one of his able papers in the *Journal of the Royal Agricultural Society* strongly asserted their destructibility to potatoes. Now, though it is always admitted that they will really injure a potato crop, while this was never deemed that they would bore through potatoes as they would do through a clod of earth, and so damage the tuber; still this might easily comport with the idea that a crop of potatoes might free the land from their ravages. A writer sets his face against Sir Joseph Banks, that he confined several wireworms in an earthenware jar with soil and potatoes, and they all died, and the potatoes were unmolested. To this Mr. Curtis makes rejoinder, and details his experiments tending to show that wireworms placed in pots with wheat and potato plants growing died when not kept moist, but lived when the pot was placed in water.

Now this simply proves either that in the first instance there might not have been moisture sufficient, or that in the second the wireworm had lived on the wheat plant; for though Mr. Curtis says the earth was full of their burrows, he does not say anything of the injury they did either to the wheat or the potato.

It must, however, be clear, that though a crop of potatoes may not be a remedy for the attacks of wireworm; yet if that insect will really eat the potato it will go far to show that they really are not so. Mr. Curtis endeavours to make out that they will devour potatoes, at least in some districts, and so infers they cannot be inimical to the insect. Still even this does not follow: for it may be as with some other substances, that, though eaten voraciously, they act as a certain destruction to them. He says: "Potatoes suffer greatly in some counties from the wireworm; whilst in others, where that animal equally abounds amongst the turnips, the potato crops escape." He goes on to detail his experience in Dorsetshire, from the wireworm infesting the potato-land—some eaten into the hearts of the potatoes; gives Mr. Hope's experience of their adhering to the slices of the planted potatoes—some partially eaten, some all gone; and the latter gentleman says: "They first attack the potato when the slices are first committed to the earth:" and to this Mr. Curtis remarks that "Mr. Knight's plan of planting whole potatoes instead of slices would at once remedy the evil." This does not appear to be, however, by any means clear. If the wireworm can injure a crop of potatoes, we do not see why it should not also injure whole sets newly put in; and, if they are a luxury to it, it is only giving it more food by planting whole potatoes—but by no means necessarily remedying the evil. It is somewhat remarkable, however, that in several of the instances Mr. Curtis cites, no injury is done to potatoes by the insect. Mr. Porter, of Cenerhithe, who seems to have been an accurate observer, says —"Potatoes never suffer on his farm." Mr. Bates, another of his correspondents, says—"No potato crop is destroyed by them." Mr. Salisbury says —"Turnips or potatoes are not so liable to injury from this insect; and, he further states, that "If land be planted or sown two years in succession with the same crop, it is sure to be well stocked with them—at least it is so with the potato." To prove further that they will live upon potatoes, he says—"I have fed them on nothing else for many weeks together." But this is a very indifferent proof—for, Breckander says—"They can fast for a long period;" nor has, that we can see, Mr. Curtis

anywhere said that they actually eat the potatoes where there was nothing else for them.

He goes on to cite the evidence of a writer in a weekly paper, who signs himself Adan (Adam ?), who alleges that they injure his Sweet Williams, lettuces, &c., by "boring, running up, and eating the hearts out." And these he catches, he says, by setting potato traps with the eyes bored out, and staked down with a stick near those plants: and he will pull out fifteen to twenty of them from one piece of potato." Now, this is quite ample evidence that the writer was speaking of some other insect altogether, and not the wireworm: probably, a maggot, a caterpillar, or a millipede; for, it is quite contrary to the habits of the wireworm to bore into the hearts of either lettuces or Sweet Williams; and this we apprehend is one of the many delusions which often take possession of farmers and gardeners on the subject of natural defects, placing cause for effect, and *vice versâ*, with the most pertinacious obstinacy.

Some weeks ago, we communicated with some of the most intelligent agriculturists in the kingdom on this very subject. We inquired several particulars as to their experience on the natural history and ravages of the wireworm, and incidentally on the liability of the potato plant to be attacked by them. Out of one hundred selected, we received sixty-six replies, and the tendency of these replies was as follows:—Of these four only said they injured potatoes; eight replied that potatoes destroyed them; and two said that a crop of potatoes had no effect. Into these details we shall afterwards enter; enough will appear to show that Mr. Curtis decided somewhat hastily, when he said that the potato crop was one which supplied a food for the wireworm; and was also rather inconsiderate to at once put down a writer who asserted it to be so found in some localities.

Mr. Curtis, however, admits that the eggs are not *deposited* in turnips or potato fields probably. Now, as the insect in its larvæ state does not live probably more than three years, and, if its eggs are not deposited in potato fields, it would seem that this crop would, at any rate for one year, free a field from their depredation, as the third year after potatoes it would be extinct, if no other crop induced the deposit of its eggs. For instance, if land were seeded with potatoes, then barley, then seeds, and the fourth year wheat, it is probable that the wheat—the crop which most suffers—would escape, for it is hardly likely to deposit eggs in the barley or the seeds.

The question whether the potato crop is food for the wireworm, or its poison—whether it is obnoxious or favourable to that insect—whether, in short, we may expect our planting our land with potatoes to encourage that insect, or eradicate it—is as yet almost unsettled. There is, we must confess, evidence on both sides: which preponderates ?

First, we have the admitted fact that, year after year, land subject to wireworm was, by the introduction of a potato crop instead of turnips, freed from its ravages. In the first year, a line was drawn as straight as the plough went, between the plants infested with wireworm and the plants free from it. The one side had been potatoes, the other not. Next course, the potatoes were at the opposite side of the field. Then the middle only was injured; and lastly, when the whole field had been cropped with potatoes, the headland, which is generally unplanted, and was so in this case, alone was damaged. Nay, more—it was proved that, while a bad, foul, indifferent crop of potatoes, when the land had other matter on which the insect fed, was not freed from the ravages of the insects, a second and clean crop effected a cure. And insects confined in soil with potato-tubers died, either from inanition or from some poisonous influence.

Now, what is set against this? Mr. Curtis says potatoes are injured by them—that he has kept them alive for months, in pots in which potatoes *and corn* were growing. The first, as a fact, proves nothing. A troop of horses might trample down a whin cover, and destroy it, but could not eat it; and so a wireworm might bore through a potato, and so injure the crop. And may not the second fact relied on by Mr. Curtis, of a wireworm living in a pot with potato and wheat plants, be referred to the same cause as the instance above alluded to, of the foul potato-field—viz., that the wireworm found other food, and therefore would be quite sufficient to account for the whole of the facts instanced by Mr. Curtis?

Now this was some years ago. A very short time ago, we made the inquiry alluded to before, and the following is one of the answers received to our inquiries as to the effect of potatoes. Our correspondent says: "After taking two crops of oats in succession, I had the piece planted with potatoes, and never suffered from that cause afterwards; but whether the potatoes destroyed the insects, or whether they were carried away by them when dry, I cannot say."

Now this breaks open a new view of the whole question, reconciling Sir Walsh Bankes, Mr. Curtis, and the writers on the potato theory. If the potatoes act as a trap, they may easily serve the purpose of freeing a field from their ravages.

Another of our correspondents says that some kinds of potatoes act in this favourable manner. In answer to the inquiry if potatoes were found to

eradicate the wireworm, he says: "Some kinds of potatoes, the Hampshire red particularly."

A third correspondent says: "Potatoes will to some extent clear the land." A fourth correspondent says: "In my opinion, potatoes have a favourable tendency." Another still says: "Potatoes will clear the land of the wireworm in heavy soils."

Mr. Charnock, of Holmfirth, has recommended, as we before said, another class of remedies. If the potato will be injurious to the wireworm, notwithstanding its boring through and eating them, Mr. Charnock's facts are still more remarkable. Small pieces of rape-cake are certainly proved by him to be a remedy, and what is more remarkable the same rape-cake if powdered small will have no influence whatever. Mr. Charnock found small pieces of rape-cake of the size of peas to free a field of the wireworm; they clustered round the cake, devoured it with avidity, and died—burst or poisoned—most probably the former by the rape cake, when it was presented to them in sufficient quantities. And is it not true, also, that the mere dilute powder of *rape-dust* being unefficacious is a confirmatory proof of the necessity of supplying enough of the material at the point required to allow the wireworm to burst itself or to eat to such repletion as to cause death to ensue?

Mr. Charnock, by garden experiments, made out the accuracy of those made in the field. He had some carnations sadly hampered and nearly devoured by the wireworm. He placed the peppercorn pieces of rape-dust near these infested roots, and the field experiment was realized—the wireworms all died, and the plants revived.

In reply to our queries, however, the bulk of the correspondents recommend *consolidation* in various forms. Folding mustard—eating on turnips—and Crosskill's clod-crusher, were the most generally recommended.

Now what is the *rationale* of all this? No amount of ordinary consolidation from the surface of a yielding body like soil, and especially light stringy soil, often the most infested, can we think destroy almost a single wireworm even by accident. We suppose there are few clod-crushers which will weigh a ton. There are several parts on which the whole weight is resting, so that no one point can at any time be acting with a direct pressure of more than 3 or 4 cwt. Now we will venture to say that four times that weight will do more injury to the wireworm in the cases in which it ordinarily exists in the soil than as many pounds. It seems naturally calculated to resist pressure; its scaly tubular body will resist almost as much weight as can be applied to the soil externally, and will, even if laid on the surface, be almost unimpaired by a direct pressure of any amount if a yielding soil was under it.

Yet, though our opinion is that no surface consolidation will influence it, it may alleviate the effects the wireworm produces. Stopping its burrows, pressure may retard the facility its movements would otherwise possess; and if a sickly plant be once embedded in the soil it will have another chance of striking fresh fibres out, and thus have a second opportunity of securing its growth. And we can, moreover, easily conceive that a parent insect will be more likely to deposit its ova in a solid consistent soil than in one that is friable and open. Here, amongst other things, consolidation is by no means to be despised, but potatoes and pieces of rape-cake will doubtless destroy them.—Gardeners' and Farmers' Journal.

THE ARTIFICIAL GRASSES: THEIR SPRING SOWING AND CULTURE.

BY A PRACTICAL FARMER.

"He causeth the grass to grow for the cattle and herb for the service of man: that he may bring forth food out of the earth."—PSALM civ., 14.

The artificial grasses most commonly adopted to carry out the best systems of rotation usually practised in British husdandry are the following:—Broad red clover, perennial red clover (cow-grass), white clover, or Dutch clover, or suckling (rib-grass), trefoil, cinquefoil, or sainfoin, rye or rye-grass, timothy-grass, and occasionally lucerne and tares. Of these, the broad red clover is in most general use, and is so well-known to every farmer as to render any description of it superfluous: the amount of valuable produce it yields both for green fodder and clover hay causes it to be universally grown upon all soils suited to its culture, and in all climates congenial to its growth. It will grow luxuriantly on any soil capable of affording nutriment or food to tap-rooted plants; but, good loams or loamy clays are most favourable to its habits; and on them the crops in moist warm seasons are astonishing; and on any soil of moderate depth and fertility its produce is highly satisfactory—often of great bulk and excellent quality, particularly if sown upon a first crop after fallow, highly manured, and being fed off on the land. It prefers an equable climate, neither too hot nor too cold; but, under culture and proper selection of seed, the climate of Great Britain has been long known as highly favourable to its culture as an intermediate crop between two corn crops: and it

is occasionally sown mixed with either rye-grass or timothy-grass upon fallow for its pasturage. In this way it will yield a great produce, and carry much stock, but not sufficiently valuable to compensate for the loss of a corn crop.

The soil should be in "good heart," and clean from weeds. The clover should be sown either upon barley, oats, or wheat, coming immediately after the turnip, rape, mangold, or other green crop; but it may be sometimes advantageously sown with these crops in the next stage—as oats, wheat, clover; and may thus have the advantage of a further remove from the last sowing—it being certain to fail, if coming too near in the course of cropping: the land is said to be "clover sick."

The selection of the Seed.—This should be attended to with great caution. The seeds of the dock, sorrel, chick-weed, butter-cup, daisy, wild geranium, wild parsley, willow-weed, cockle, and many other small seeds of weeds, abound in clovers generally, and more particularly in red clover. The *price* of clean new seed must on no account interfere with the selection: good clean seed is almost beyond price. Another point worthy consideration is, to select from a hardy stock. We object to sowing seed the produce of southern France or southern Europe in any of the cold districts, or cold lands or situations of this kingdom. We have often seen failures in the clover plant during a severe winter, and we think from this cause. Clovers from the north of Europe we do not object to; indeed, from their cleanliness we prefer them. We most strenuously commend this part of our subject to the *British grower*. It is unpardonable to allow clovers full of docks or other weeds to stand for seed. We urge our buyers to discard such "*dock*" samples as much as possible, and to give a much higher price for clean ones. It is one of the greatest evils the improving farmer has to contend with, and has led many to abandon seeds altogether, and adopt other more cleanly, but less profitable courses. We again urge the most unremitting attention to this subject on both grower and customer. This unscrupulous production of foul seed is a dark blot upon British agriculture, and which it must be at once rid of. As the pest of the farm, it must no longer be endured; a combined effort must be made; the grower of foul seed must be stigmatized as an enemy to good husbandry, as a propagator of a farming pestilence; the seedsman must be abandoned who continues to deal in such abominable mixture. We fearlessly assert that the expense of cleaning a foul clover crop will be double or treble the cost of the seed.

The quantity of seed: the mode and time of sowing.—This will greatly depend upon the season, state of the soil, and quality of the seed. All being satisfactory in this respect, we think ten pounds per acre of good seed a sufficient quantity; but, if aught is doubtful as to the state and condition of the soil, or seed defective, we recommend fourteen pounds per acre, a trifle more or less, according to circumstances. The mode of sowing is very various. Our practice is to sow upon either oats, barley, or wheat. When these have been hand-hoed, we drill with a common corn drill, with seed barrels, taking care to guide the coulters between the rows of corn, and harrow in with light seed harrows. We roll before we hoe, and drill immediately and as early in the season as the corn is ready for hoeing. The more general practice is to sow the seed broad-cast, immediately after sowing the spring corn, and either roll or harrow it in. In all cases where seeds are to be sown along with a spring crop, the soil must be well pulverized and worked down to a fine tilth; otherwise, a thin plant or total failure will result; and, as the time of sowing may extend from February to May, ample time is given to effect such purpose. The seed must not be buried too deep: if it is but just covered, in a fine season, it will suffice; but, in a dry season, it should be put in by drill at least 1½ inch deep. We occasionally take out our coulters, and allow the spouts to scatter the seed over the whole interval between the rows of corn. It is thus distributed more evenly, and a better plant is gained if the land is fine and open. If the clover is sown on a crop of winter wheat, and the condition of the soil is good, the crop should be fed off with sheep, and the clover sown so as to be trampled in by them. The same general directions that we have given for the management of red clover will nearly suffice for the other seeds usually sown in the spring. The perennial red clover or cow-grass is to be put in precisely the same—the only difference being in its duration. It is often sown instead of the broad clover as a change to prevent a too near approach in the rotation. It does not yield a crop of so great bulk as the red or broad clover, but the hay is more lasting—the stalks of the cow-grass being filled with pith; the red clover is hollow, and therefore shrinks in making into hay. The white clover (Dutch clover) is sown almost invariably broad-cast, and the soil must be made fine, or much of it is buried: it is seldom sown alone. Our practice is to mix with it perennial red clover, trefoil, rib-grass, and timothy-grass, *i. e.*, 7 lbs. white clover, 4 lbs. red clover, and 2 lbs. each of rib-grass, trefoil, and timothy-grass. This for an acre; if for one year only, we add 2 pecks rye-grass; and for permanent pasture we add 2 bushels. The same attention is required in the selection of the seeds, more particularly in the rye-grass, which generally abounds in the seeds of twitch and brome-grass seeds; the latter is a common grass seed, and not of much consequence; but not equal to rye-grass in value. We know some farmers who will sow four bushels of rye-grass per acre upon bare fallows with similar mixtures, and with very satisfactory results. In the next year, fields thus treated have been known to graze or feed from twelve to sixteen young half-bred sheep per acre, most of which have been made fat. On many light soils both the white clover and trefoil abound. Where this is the case, we need not recommend sowing sparingly. We have seen a beautiful plant on light gravel, on stone-brash soils, and light sandy land. The timothy-grass is one of the earliest in the spring, and also grows a large amount of valuable produce. The seed is generally clean; indeed, it is one of those seeds that may be

dressed to cleanliness: clovers, cannot; and ought to be grown free from weeds. The rib-grass or lamb-tongue is a very valuable grass; on most soils or loams and peaty soils it grows luxuriantly, and it is a grass much relished by stock. This seed, like clover, is often foul. The docks may readily be detected, or can be separated in dressing, if done with care. The common trefoil is a very useful appendage to good pasture seed, but we do not advocate its being sown alone for pasturage: it requires a light soil of moderate depth, and will grow well on most soils; but it is not sufficiently productive in herbage to justify its being sown alone as a seed crop for grazing purposes.

We must reserve our remarks upon Sainfoin, Lucerne, Tares, Burnet, Trifolium incarnatum, &c., for another paper.

The subsequent management of the seed crop will depend much upon the requirements of the grower. If intended for grazing purposes, we think stocking should be deferred till the following spring. We prefer mowing all corn land sown with seeds, and then to let the plant have free course for improvement in the autumn. In the early winter give it a slight dressing of dung, or even straw manure, as a preservative from injury from the winter's vicissitudes, as well as to add virtue to the soil. In the early spring the crop should be lightly stocked, and great care taken that it should be kept in a growing, thriving state; and, as it increases in herbage, additional stock may be placed upon it, but never in such numbers as to prevent its fair progress. Seeds should not be grazed too closely, or the summer's drought will spoil the crop. If carefully and judiciously grazed, the seed crop will yield a very large amount of valuable food; but, if "mobbed up," *i. e.*, very barely eaten up, it is (comparatively) a wasted crop. The roots of those recently sown artificial grasses have not the safe hold of the soil that the natural grasses on pasture lands obtain, and therefore must be treated more attentively: they must be constantly watched, and the stock upon them must be decreased or increased as the best judgment of the occupier dictates.

If the seed crop is merely intended as a fodder crop, we also think that it is best to be left unstocked: the mowing will take place much earlier, and the crop be much heavier in bulk. Many farmers mow their clovers twice for hay: this is not good practice, but if not sold from the farm, and the fodder is absolutely required, we cannot say much against it; but, at all events, we would not eat them off in the autumn for such course. We much prefer early mowing, and then to feed off the clover eddish with lambs, taking care to let it attain a moderate growth before stocking, or it may be too luxuriant, and thus injurious to them. When old, and the stalks become tough, we put in our breeding ewes or other stock.

LAMENESS IN THE HORSE.

BY WM. PERCIVALL, M.R.C.S.

(*London: Longman and Co., Paternoster Row.*)

This is a work of great value, and will be perused with interest and advantage by the farmer, as well as by all other persons who for purposes of pleasure or business employ that most invaluable animal, the horse. In "General Remarks on the Diseases of the Foot," Mr. Percivall says—

"While we hear but little complaint about diseases of the feet in other animals, we are constantly reminded of horses being 'lame in their *feet*.' How is this? It is readily to be accounted for, when we come to consider the habits, or rather the usages, of one domesticated animal as compared with those of another, and estimate the facts elicited from them by the ascertained laws of physiology. * * * The horse being an animal of action, of labour, of speed, and yet one that is in the habit of lying down less probably than almost any other, puts his feet to great and continued trials. He trots hard, and for long together, as a hackney; he gallops hard, and for long together, and takes high and precipitous leaps, as a hunter; while he strains every nerve and sinew as a racer. And these feats of labour and speed he very commonly performs either upon hard and rough ground, or upon artificial roads and pavements of too unyielding a description to make any return, save that of concussion, to the continual battering of the animals' hoofs."

On the disease *windgall*, he says—

"Such an appellation naturally leads any one to suppose that wind must constitute the swelling known as *windgall*, whereas in point of fact it is a bursa filled to distention (not with *wind*, but) with the same kind of synovial fluid of which it contains! for the due performance of its function, but a comparatively small proportion in a state of health. The windgall of the fetlock constitutes one of the most ordinary forms in which we meet the disease; and the everyday aspect of it, combined with the innocuousness of it in a general way, furnishes us with the reason of its being a disease, concerning which we are less consulted than about almost any other. Bog-spavins and thorough-pins create occasional uneasiness in the minds of possessors of horses, while windgalls of the fetlock are as it were altogether overlooked."

But then he says—

"Between the pathology of bog-spavin and windgall there is this important difference, that,

while windgall has a bursa for its seat, bog-spavin consists in enlargement and saccular dilatation of the capsule of the joint itself, viz., the joint of the hock."

He describes how windgall and bog-spavin should be treated, and defines thorough-pin as a windgall *running*, from side to side, *through* the upper and back part of the hock.

"The cite of thorough-pin is notorious enough. It occupies the floor of the hollow interval at the superio-posterior part of the hock, between the joint in front and the tendo Achilles behind, reposing, as it were, after the manner of a cushion placed tranversely upon the joint beneath."

He then points out the causes of this disease; shows the description of hock predisposed to it, and gives its pathology; but he says, "of lameness from pure thorough-pin we know of no example on record."

In his remarks on *curb*, he observes—

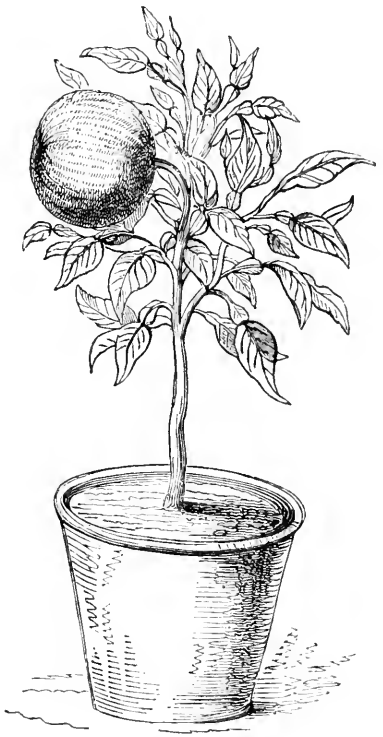
"To detect a curb, the observer should stand *alongside* of the horse's quarter, and not behind him. The eye in this position, running from the point of the hock downwards, readily discovers the irregularity or prominence in the posterior line of the limb; whereas, had the view been taken from behind, no swelling would have become visible."

He gives a coloured engraving of this disease as it appears, with the hind leg dissected, and then says, in remarks on its cure—

"A speedy and very effective mode of treatment for what is called by farriers 'taking off a curb' is, with the employment of the high shoe, after well fomenting the swollen part, to apply *immediately* to it the *acetum cantharidum* (which has the same effect as what goes under the name of 'Leman's Essence'). Simply wetting the hair with it by means of a painter's brush, and afterwards tying the horse's head up for the night, is all that is required. In the morning, the discharge caused by the vesicatory may be sponged off by renewed fomentation, and this ought to be regeated day by day afterwards for a few days; at the expiration of which, the physic having worked well in the interval, it mostly happens that the horse will be found fit to resume his work."

For *stringhalt*, Mr. Percivall says, there is no cure; "once stringhalt for ever stringhalt;" nevertheless, the article on this extraordinary disease is most interesting. We strongly recommend those of our readers, to whom the diseases of the horse and their cure are of importance, to procure a copy of this work.

CURIOUS ORANGE.—In the spring of 1849 I had a small packet of seeds given me, labelled "Shaddock Seeds," which I immediately sowed, and in due time they germinated. A few of them were potted singly into 4-inch pots, and placed in the front of a vinery. The same season one of them produced a single bloom at the extremity of its only shoot, about six inches from the surface of the pot; and, contrary to expectation, that bloom has produced a perfect and apparently thoroughly ripened fruit, 7½ inches in circumference, of a lighter colour and smoother skin than



the common imported orange. Its appearance during the year 1850 was exceedingly curious—the fruit being nearly as large as the pot in which the plant grew. And many have smiled at the supposed conceit, fancying it to have been stuck on artificially, until a close examination convinced them to the contrary. In the spring of 1851 it was shifted into a 5-inch pot: it then threw out a few lateral branches below the level of the fruit. And it is now (January, 1852,) a healthy little bush, with the single fruit still remaining in the centre of it. Can any of your readers inform me if they have known similar instances of precocity in the citron family. The sketch I send is precisely one-fourth the natural size, and the fruit is produced at six inches above the surface of the pot.—ZEPHYRUS.

ON ARTIFICIAL MANURES IN GENERAL, AND BONE MANURE IN PARTICULAR.

BY DR. AUGUSTUS VOELCKER,
PROFESSOR OF CHEMISTRY IN THE ROYAL AGRICULTURAL COLLEGE, CIRENCESTER.

Scarcely anything has accelerated the progress of agriculture so much as the introduction of artificial manures. Their more extended application, indeed, is an improvement in agriculture which has changed the usual routine of farming in no small measure, and which, therefore, may be regarded as the beginning of a new epoch.

By means of artificial manures the produce of this country has been considerably augmented; new crops have been introduced into the usual rotation, and land so sterile that it would not repay the costs of cultivation in the usual way has been forced to yield at once remunerative crops. Before the introduction of bones, superphosphate of lime, and guano, the culture of the turnip crop in its present extended state was unknown. At the present time, green crops, except under particular circumstances, cannot be raised economically without some addition of one kind or other to the ordinary manure produced on the farm.

There are few farms in this country on which home-manure is produced annually, and in sufficiently large quantities to bring the land to its maximum state of fertility: some of the land, consequently, must remain in a condition in which it cannot possibly yield a quick and fair profit to its occupier, unless he has recourse to some kind of artificial manure.

Even supposing the land to be in such a condition as to yield the maximum return which the usual rotation of crops is capable of furnishing, the extra command of artificial manures would still materially increase the profits of the farmer, as it would enable him to dispense with those crops which are less remunerative, and to replace them by others which require a larger dose of manure, but which also yield a larger profit.

On large farms the carting and distribution of dung is attended with much expense, and a considerable saving can be effected by supplying the fields nearest to the homestead with farmyard dung, and those in more remote situations with guano or any other concentrated manure, which admits of a ready distribution.

All means which enable the farmer to supply his fields with a larger quantum of manure than could be the case if entirely dependent on the farmyard, must therefore be regarded as valuable; and the attempts to convert refuse-matters from chemical and other works into fertilizers, for the same reasons deserve much encouragement.

Under the name of artificial manures, however, substances or mixtures of refuse-matters of the most worthless description are often sold by certain unprincipled dealers at high prices.

These useless compounds are puffed up by such parties with fictitious analyses, testimonials, and high-coloured descriptions of their superior fertilizing properties; and the confiding farmer is not only cheated out of the money he pays for such stuffs, but runs likewise the risk of losing part at least of the crop to which he applies them. We cannot wonder, therefore, that many regard artificial manures with a suspicious eye, and must regret that thus the honest manufacturer does not find so ready a market for his products as their value deserves.

Now the only effective means of checking fraud and imposition—of protecting the honest and fair dealer, and guarding against loss and disappointment—is "chemical analysis." Intelligent farmers know this full well, and avail themselves consequently of the advantages which chemistry is capable of conferring. The number of intelligent economical farmers in Scotland, when compared with those of other countries, explains perhaps the fact that in Scotland cases of adulteration and imposition are of rarer occurrence than in the colonies, and even in England.

A single example, which some time ago was brought under my notice, will show to what extent fraud is practised by unprincipled dealers. On examining an artificial manure of a whitish-grey colour, which was offered for sale at £8 per ton, I found no ammonia whatever, and mere traces of phosphoric acid and alkalies; and instead of these more valuable fertilizers, large quantities of carbonate of lime, sand, brick-dust, and a little charcoal. The manure, in fact, I have strong reason to believe, was nothing else than a mixture of dried road-scraping and charred spent bark.

The determination of the composition of the manure thus becomes the first and chief point to which the chemist directs his attention.

It is clear, however, that a farmer will derive little benefit from the figures in a calculated list of

analytical results, if he does not know at the same time how the different constituents act on different crops, and on which of these the chief fertilising properties of the manure depend; how long its beneficial effects are likely to last; and last, though not least, if the actual cost-price of the manure corresponds to its real fertilizing value.

Excellent hints on these and other topics are contained in a work, which has lately appeared in Germany, entitled *Chemische Feldprediglen* (Chemical Field-Sermons), by Dr. Stöckhard, of the Agricultural College of Tharand in Saxony. As this truly practical and useful book is not likely to be read by many farmers in this country, I have thought it advisable to introduce the special examination of bone manure in its various forms by a short exposition of Dr. Stöckhard's views on artificial manures in general. The merit which attaches to the first part of this paper thus does not belong to me, but to my friend and countryman, Dr. Stöckhard.

Before we can possibly answer any of the practical questions which the subject suggests, it is essential to have a clear idea of the composition of the manures, and the relative value of their constituents.

As the most important constituents of artificial manures, we may regard—

1. *Nitrogen*, in the form of ammonia or nitric acid. Nitrogen, without doubt, is the most valuable of all fertilizing substances, as it is the so-called stimulating or forcing property of manures. All cultivated plants are much benefited when richly supplied with it in a proper form, particularly at an early stage of their growth: at a later period of their development its application appears much less effective.

Nitrogen in a free state, however, is not assimilated by plants to any extent, and it is only when the nitrogen of nitrogenized organic matters has become changed by fermentation or putrefaction into ammonia (or nitric acid), that this elementary substance acts as a powerful fertilizer. It is for this reason that fresh bones, unfermented urine, long dung, &c., are much slower in their action than the same materials after having undergone fermentation or putrefaction. In the latter state they contain ammonia ready formed, which the plants can assimilate at once; but, in the first case, the decomposition of the nitrogenized matters proceeds slowly in the ground, particularly when ploughed in deep; and the plants are thus necessitated to wait a long time before they can absorb the ammonia which is generated during the decomposition of the nitrogenized organic matter. In stiff soils, and in dry seasons, the formation of ammonia proceeds so slowly that the beneficial action of manuring substances is often lost in the first year; because, if plants have passed the period of the most vigorous growth, they derive little advantage from the ammonia. On the other hand, manuring substances, such as guano, soot, refuse-water of gas-manufactories, sal-ammoniac, sulphate of ammonia, putrefied liquid manure, which all contain large quantities of ready-formed ammonia, exercise a most surprisingly quick forcing power on grass-land, and on wheat, and all plants at an early stage of their growth.

The effects of ammonia have been so well ascertained by numerous practical experiments, in which it has been applied with the exclusion of all other substances, that few practical men at the present time will hesitate to ascribe the rapid forcing effects of guano, of the ammoniacal liquor of gas-works, &c., to the ammonia which they contain.

In the form of nitric acid, nitrogen becomes also a most valuable manure, and in this state it closely resembles in its action ammonia. The effects of nitrate of soda, for instance, on grass land, are strikingly exhibited by the succulent luxuriant appearance and the deep-green colour which the grass assumes shortly after the application of even small quantities of it.

Nitrates thus appear to exercise the same forcing power on plants as ammoniacal salts. It is indeed doubtful whether nitrogen, in the form of ammonia or nitric acid, is most beneficial to vegetation; and as the determination of this point has a direct bearing on the management of farmyard manure, I would suggest to practical men, who may be inclined to confer some good on the agricultural community, the propriety of determining the relative effects of nitrates and ammoniacal salts by a series of comparative field experiments.

2. *Phosphoric acid.*—Next to ammonia, phosphoric acid must be regarded as the most valuable compound in artificial manures. It occurs in soils but in small quantities, and as it is an essential constituent of all cultivated plants, and particularly required for the perfection of grain, its deficiency in the soil is at once indicated by the poor small ears of wheat, oats, or barley. Phosphoric acid exists generally in artificial manures in the form of bone-earth or phosphate of lime.

3. *Alkalies, potash and soda.*—Other valuable fertilizers are potash and soda, or rather salts of potash or soda, particularly the first. In their chemical relations, potash and soda resemble ammonia; and this similarity is also shown in their action, which, like that of ammonia, is forcing or stimulating.

All cultivated plants, particularly root-crops and herbaceous plants, require potash as a necessary article of food, for they show in their ashes large

quantities of it. It is for this reason that turnips, carrots, and other green crops, are much benefited by the application of burnt clay, in which, as I have shown in this Journal some time ago, a much larger quantity of soluble potash exists than in natural clay. For the same reasons these crops are much benefited by wood-ashes and liquid manure, which both contain considerable quantities of salts of potash.

The salts of soda are of less importance in a manure. Most soils in this country will be found to contain a sufficient quantity of soda, chiefly in the form of common salt, for supplying plants with this ingredient, which, though it preponderates usually in the soil over potash, is nevertheless found in the ashes of plants in much smaller quantities than potash.

4. *Lime and magnesia.*—Lime and magnesia are indispensable for the healthy growth of plants; but as both belong to the most generally distributed mineral substances on the earth, the farmer can easily supply a deficiency of lime or magnesia in his soil, by the application of quicklime, marl, gypsum, chalk, or similar substances containing lime, which may now be obtained almost anywhere in this country at moderate prices.

5. *Organic substances, humus.*—Although the decayed organic matters or the humus of a soil play an important part in relation to the growth of plants, the farmer need not care to supply his land directly with humus, as, under good management, Nature herself provides for the necessary quantity of humus in a soil. Organic matters, consisting of carbon, hydrogen, and oxygen only, are of far less importance than the nitrogenized matters. The latter, we have seen, furnish on their decay ammonia; whilst the former, or humus substances, furnish, on gradual decomposition, carbonic acid and water only, which the atmosphere supplies abundantly to plants. In artificial manures, organic matters, consisting of carbon, hydrogen, and oxygen only, are not very valuable substances.

6. *Silica, oxide of iron, sulphuric acid, chlorine,* enter likewise into the composition of the ashes of all cultivated plants, and are therefore essential articles of food for them. But as there are few soils which do not contain these substances abundantly, the farmer has no need to buy them.

It will thus appear that nitrogen (or rather ammonia and nitric acid) is the most valuable ingredient of artificial manures, because our fields are generally deficient in it, and because farmyard manure does not contain a quantity sufficiently large to bring the land to its maximum state of fertility. Another reason for the value of nitrogenized matters (or ammonia) is their costliness, and the fact, confirmed by numerous practical experiments, that the mineral matters of manure only show their full fertilizing effects when decaying nitrogenized matters, or salts of ammonia, are present at the same time.

Next in value follow phosphoric acid and potash, as both belong to the rarest of the mineral matters which serve as food to plants, and as both are required for their healthy growth in larger quantities than any of the other constituents which are usually found in the ashes of plants.

How soon does an artificial manure act?—Chemical analysis, in many instances, is capable of satisfactorily answering this question. Those constituents of an artificial manure which are soluble in water, or which are easily rendered so by a rapid decomposition, benefit plants in the first year; those which are soluble in acids, or which decompose more slowly in the ground, exercise the chief fertilizing action on plants in the second or third year; those, finally, which are insoluble in acids, or which decompose still more slowly, can only benefit vegetation at a still more remote period.

It is well, therefore, to arrange the constituents of an artificial manure under three heads:—

1. Substances soluble in water.
2. Ditto in acids.
3. Substances insoluble in water and acids.

Such an arrangement of the analytical results will frequently enable the farmer to form an idea of the probable action and duration of the manure. Exceptions to this general rule are presented to us by all those matters which consist entirely of undecomposed animal or vegetable matters, and which are rendered soluble, or available to the use of plants, by previous decay or putrefaction. Rape-cake, bones, and woollen rags, for instance, contain scarcely any soluble matter, and nevertheless it would be very erroneous to consider them as slow-acting manures. In all such cases practical experiment alone can decide the question. Experience, then, proves that rape-cake is readily decomposed, bones more slowly, and woollen rags still slower.

By dissolving bones in sulphuric acid, their full action, which in unprepared bones is confined principally to the second or third year of their application to the land, is obtained in the first year.

How are artificial manures best applied to the land? In what state? At what time? In what quantities?—Practice alone can give correct answers to these questions. Theory in many instances may throw out some valuable hints, but can never give special directions, as the nature of the soil, the position of the land, the climate, and numerous other local influences, necessarily must greatly alter the mode of application of artificial

manures. The best mode of application is entirely dependent on circumstances, and can only be established in every separate instance by practical experience.

What is the value of an artificial manure?—This question, undoubtedly, is the most important to the farmer, and happily one the solution of which chemistry will greatly facilitate.

The external characters are insufficient indications of the real value of an artificial manure: a much better guide to the correct estimation of its value is chemical analysis. The farmer, however, will derive benefit from analysis only, when he can calculate from the analytical data the money-value in an easy manner. In order to enable him to do so, he requires to know the market price of each of the constituents of the manure. By a simple rule of three he can then ascertain the value of the whole manure.

Calculations of this description, however, are not so simple as they might appear to be, and often present insuperable difficulties, arising from the want of a standard price of several of the constituents of artificial manures. Many of them are not found in trade at all; others, like potash, soda, sulphuric acid, &c., which are articles of commerce, are always sold in a more or less purified state; but it is clear that the commercial value of such materials cannot be accepted as the standard price, because the value of an artificial manure, in which the same substances occur in an impure state, would be estimated far too high. A third difficulty in ascertaining the commercial value of manuring substances arises from the circumstance that two, three, or four simple substances occur together, in the fertilizers of commerce, which renders it very difficult to assign to each its proper value.

It would lead me too far to enumerate all the reasons which could be assigned for fixing the price of some of the more frequently occurring manuring substances which follow. However useful the subjoined table may be to the practical man, considerable latitude must be allowed in estimating the real commercial value of an artificial manure; and as all articles of commerce are subject to considerable fluctuations, it follows, necessarily, that the price-list subjoined can have no permanent value.

TABLE FOR DETERMINING THE VALUE OF ARTIFICIAL MANURES.

	d.
1. Every lb. of nitrogen, in the form of ammonia, or nitric acid, may be estimated at ..	9
2. 1 lb. of nitrogen, in the form of nitrogenized matters, at	6
3. Organic matters, free from nitrogen, (humus,) 18 lbs., at	1
4. Salts of potash, 1 lb., at	1
Or potash separately, 1 lb., at	1½
5. Salts of soda, 9 lbs., at	1d.
6. Phosphate of lime, 1 lb., at	½
Or phosphoric acid, separately, 1 lb., at ..	1½
7. Gypsum, 6 lbs., at	1
8. Lime, 12 lbs., at	1

For all practical purposes, the determination of the value of the remainder of the substances, which are usually indicated in the analyses of artificial manures, such as oxide of iron, alumina, silica, &c., may be entirely neglected.

The chief questions which the farmer requires to have answered by the chemist, are—

a. How much, in 100 lbs., does the artificial manure contain of—1. Nitrogen; 2. Organized substances; 3. Salts of potash; 4. Salts of soda; 5. Phosphate of lime; 6 Gypsum; 7. Carbonate of lime, or of magnesia?

b. In what combination does the nitrogen exist? In the form of ammoniacal salts? Or in the form of nitrates? Or in the form of nitrogenized organic matters? Do the latter enter easily into putrefaction, or do they decompose with difficulty?

The answer to the first question *a*, including the above-mentioned seven points, will enable the farmer to calculate the commercial value of the manure. The answers to the other questions, *b*, will teach him aproximately whether the manure is likely to act quickly, or whether it belongs to those the full fertilizing effects of which are brought out only in the second or third year.

Before I proceed to the second part of this paper, which refers to the composition of bone-manure, I shall give the following list of the more generally occurring artificial manures, taken from page 59 of the work above mentioned.

In this list the artificial manuring substances are arranged according to their action and composition, in an order which begins with the most powerful, and ends with the weakest manure. Some of the materials occur under several heads, which is an indication that they contain more than one chemical compound, and therefore act in more than one way.

TABLE OF ARTIFICIAL MANURES,

Arranged according to their Action and Chemical Composition.

1. *Nitrogenized manures.* (*Forcing manures.*)
   - *a.* Substances containing ammonia. (Very quick-acting manures.)
     - Ammoniacal salts.
     - Peruvian guano; soot.
     - Putrid animal substances—for instance, blood, flesh, wool.
     - Ammoniacal water of gas-works.
     - Putrid urine; putrid liquid manure.
     - Short dung—particularly sheep and horse-dung.
   - *b.* Nitrogenized matters, which pass easily in

putrefaction. (Tolerably quick in their action.)
Horn-shavings; glue.
Bones—dissolved, steamed, or finely powdered.
Oilcakes of all kinds; malt-dust.
Fresh urine, fresh liquid manure.

c. Nitrogenized matters, which decompose with difficulty. (Slowly-acting forcing manures.)
Half-inch bones.
Woollen rags.
Long dung.

d. Substances containing nitric acid. (Quick-acting forcing manures.)
Saltpetre.
Chili saltpetre. (nitrate of soda.)
Nitre—earth.

2. *Carbonaceous manures.* (*Humus forcing manures.*)
Common farmyard dung; straw, leaves, of trees, &c.
Sawdust; green manures.
Peat, or vegetable remains of all kinds.

3. *Manures containing much potash.* (*Strongly-forcing manures.*)
Potash, nitre, malt-dust.
Urine, wood-ashes.
Leaves and green manures.
Road-scrapings, compost.
Burnt clay; some kinds of marl.

4. *Manures containing principally soda.* (*Less effective manures.*)
Common salt.
Nitrate of soda, urine.
Several minerals.
Soap-boilers' refuse.

5. *Phosphatic manures.* (*Grain or seed-forcing manures.*)
Burnt bones, animal black, refuse of sugar manufactories.
Phosphorite, apatite, coprolites.
Saldanha Bay guano.
Fresh bones, bone-dust.
All sorts of guano.
Animal matters of all descriptions.
Oilcakes; malt-refuse.
Human excrements, farmyard manure.
Urine of carnivorous animals.
Wood-ashes, straw, leaves, &c.

6. *Manuring matters containing sulphuric acid.* (*Partly manures themselves, partly fixers of ammonia.*)
Gypsum, sulphuric acid.
Green vitriol.
Coal-ashes, peat-ashes.

7. *Calcareous manures.*
Burnt lime, chalk, marl.
Gypsum, coal and peat ashes.
Road-scrapings, gas-lime.

8. *Siliceous manures.*
Coal-ashes, peat-ashes.
Farmyard manure, sand, straw, &c.

After these general remarks on artificial manures, I shall now proceed to state the results of analyses of the several forms in which bones are usually applied as manure, and shall make, at the same time, a few observations respecting the most profitable manner of applying this valuable manure to the land.

The forms in which bones are usually applied to the land are, ½ and ¼ inch bones, bone-dust, fermented bones, boiled bones, steamed bones, (Blackhall's process,) dissolved bones (superphosphate.)

Although bones of different animals have been repeatedly analyzed, we do not possess a sufficient number of analyses of ½ and ¼ inch bones and bone-dust to determine what the average composition of commercial bone-dust ought to be. I procured, therefore, bone-dust from different localities, and subjected it to chemical analysis.

The first specimens analyzed were obtained from Mr. Slater's bone-mill, Cirencester. The following are the analytical results:—

	No. I. ½-inch bones.	No. II. ¼-inch bones.
Moisture	18·12	13·59
Organic matters, gelatine and fat	29·29	33·69
Phosphate of lime and magnesia, bone-earth	44·22	42·77
Carbonate of lime	5·49	7·04
Alkaline salts, chiefly common salt	1·49	2.00
Sand	1·39	0·92
	100·00	100·00

15·27 grs. of bones No. II., dried at 220° F., burned with soda-lime, gave 12·06 of bi-chloride of platinum and ammonium; or 100 lbs. of dried bones contain nitrogen 4·96, which is equal to 6 02 of ammonia. 100 lbs. of these bones, in their natural state, consequently contain nitrogen 4·28=5·23 of ammonia. The price of these bones was 18s. per quarter. The weight per bushel, on an average, was 42 lb.

Previous to crushing they had undergone no preparation whatever. How nearly the real commercial value of these bones corresponds with the theoretical value, which by means of the above table can be easily calculated, will be seen by the following statement, which we give as an example:

	In 100 lbs.	s.	d.
Nitrogen, 6d. per lb.	4·28	2	1½
Organic matter, 1d. per lb.	33·50	0	1½
Phosphates, ¾d. per lb.	42·75	2	8
Alkaline salts and lime		0	1

Price per 100 lbs., calculated 5s. actual price per 100 lbs., 5s. 4d.

Quarter and half-inch bones, from another bone-mill in the neighbourhood of Cirencester.

	No. I. ¼-inch.	No. II. ½-inch.
Moisture	17·00	16·42
Organic matters, gelatine and fat	30·54	26·61
Phosphate of lime and magnesia, bone-earth	34·41	49·78
Carbonate of lime	8·56	6·51
Alkaline salts	2·56	1·17
Sand and earth	6·98	
	100·05	100·52

20 grs. of bones, No. II., dried at 220° F., burned with soda-lime, gave 13·52 grains of bi-chloride of platinum and ammonium; or, 100 parts contained nitrogen 4·12, equal to 5·0 of ammonia. These bones, in their natural state, accordingly contain nitrogen 3·43, equal to 4·18 of ammonia.

Before crushing, they had been boiled in an open boiler for a short time, for the purpose of extracting the fat. Along with the fat the gelatine appears to have been partially dissolved, which accounts for the lower per centage of nitrogen which these bones contain. A comparison with the preceding will show that they are of a much inferior quality. No. I. evidently is adulterated with sand and earth.

Half-inch bones from Magee's bone-works at Runcorn near Liverpool.

Moisture	9·46
Organic matters, gelatine and fat	29·20
Phosphate of lime and magnesia, bone-earth	52·06
Carbonate of lime	6·11
Alkaline salts	2·88
Sand	0·17
	99·88

20·96 grs., dried at 230° F., gave 5·94 grs. of metallic platinum, or 100 parts contained nitrogen 4·0, equal to 4·85 of ammonia; 100 lbs. of natural bones thus contained nitrogen 3·62 or 4·39 of ammonia.

It will be observed that the proportion of moisture is considerably less than in the preceding samples, and the proportion of bone-phosphate higher, which renders them more valuable in as far as the bone-phosphate is concerned. The actual price at Liverpool is £6 in quantities, and £6 10s. for small orders per ton.

Commercial half-inch bones, obtained from Charles Lawrence, Esq., Cirencester.

	No. I.	No. II.
Moisture	13·18	13·36
Organic matter (gelatine and fat)	27·92	28·32
Phosphate of lime and magnesia (bone-earth)	48·24	48·49
Carbonate of lime	9.66	8·10
Alkaline salts	1·62	2·18
	100·62	100·45

(1.) 13.35 grs. of No. I., dried at 220 degs. F., gave 7·81 bi-chloride of platinum and ammonium; or, 100 parts of dried bones contained nitrogen 3·70 = 4·49 of ammonia. 100 lbs. in the natural state thus contain nitrogen 3·21 = 3·89 of ammonia.

(2.) 16·62 grs. of No. II., dried at 220 degs. F., gave 10·54 of bi-chloride of platinum and ammonium; or, 100 lbs. of dried bones contained nitrogen 3·98 = 4·83 of ammonia. 100 lbs. of natural bones accordingly contain nitrogen 3·45 = 4.18 of ammonia.

The composition of these two samples of bones, it thus appears, is nearly identical; but as one of the samples was considerably heavier than the other, a material saving would be realized by buying it by measure, and not by weight, supposing the price per bushel to be the same for each.

Quarter and half-inch bones from Leith.

	No. I. ¼ inch.	No. II. ½ inch.
Moisture	9·82	11·17
Organic matter (gelatine and fat)	37·50	34·95
Phosphate of lime and magnesia (bone earth)	45·66	47·50
Carbonate of lime	5·23	4·53
Alkaline salts	1·96	1·61
	100·17	99·76

(1.) 17·35 grs. of No. I., dried at 220 degs. F., gave 12·71 grs. of bi-chloride of platinum and ammonium; or, 100 lbs. gave nitrogen 4·60 = 5·58 of ammonia. 100 lbs. of natural bones thus contain nitrogen 4·15 = 5·03 of ammonia.

(2.) 19·89 grs. of No. II., dried at 220 degs. F., gave 14·95 of bi-chloride of platinum and ammonium; or, 100 lbs. of dried bones contain nitrogen 4·72 = 5·73 of ammonia. 100 lbs. of bones in their natural state thus contain nitrogen 4·18 = 5·08 of ammonia.

These two samples of bones likewise resemble each other closely in composition. They contain nearly one per cent. of nitrogen more than the preceding samples, and are, therefore, superior in quality.

The actual price at Leith of No. I. is 16s. 9d. per quarter; of No. II., 16s. 6d. per quarter.

It will appear from these analyses that commercial bone-dust differs considerably in composition; that in some bone-mills the raw bones are boiled previous to crushing, for the purpose of extracting the fat; and, lastly, that bone-dust is occasionally adulterated with sand and earthy matters. The practice of extracting the fat has the disadvantage that some of the valuable gelatine is extracted as well, which appears clearly from the smaller proportion of nitrogen which some of the above analyses exhibit.

The fertilizing properties of bones depend on the amount of gelatine (nitrogen) and of bone-earth (phosphoric acid and lime) which they contain. Both the organic portion (gelatine) and the inorganic part (bone-earth) are valuable fertilizers, and it is, therefore, an unpardonable waste to destroy the gelatine by burning. This practice, which has been recommended for the purpose of reducing the bones more easily to powder, deserves to be condemned unconditionally, because there are other means of reducing bones effectually to powder without destroying so valuable a material as gelatine undoubtedly is.

Bone dust resembles, in its chief constituents, the solid excrements of animals, and straw, and differs from them chiefly by being much richer, as will be seen by the following comparison:—

Constituents.	1,000 lbs. of bone-dust	1,000 lbs. of fresh cow or horse dung.	1,000 lbs. of dry straw.
Nitrogen	50	4	4
Phosph. acid	240	3	2
Lime	330	4	4

Bone-dust thus contains about twelve times more forcing substances, and eighty to a hundred times more grain-forming materials, than dry straw or the solid excrements of animals.

With regard to the application of bone-dust, I would observe, that the usual practice of applying bones, as ½ inch or ¼ inch bones, cannot be recommended. In this state they decompose very slowly in the ground—so slowly, indeed, that ten or twenty years may be required to dissolve them entirely.

Although gelatine enters very rapidly into putrefaction when exposed to the influences of the atmosphere and water, in the intimate combination in which it exists in bones, gelatine is destroyed very slowly, because phosphate of lime, being almost insoluble in water, protects the interior of the larger pieces of bone from further decomposition, by excluding the air and moisture. How exceedingly slowly the gelatine of bones is destroyed, will become apparent from the subjoined analyses of Roman bones recently found at Cirencester—

ROMAN BONES FOUND AT CIRENCESTER.

(*a*) *Lower jaw of an ox, dried at* 212 *degs. F.*

Organic matter (gelatine)	11·77
Inorganic matters (bone-earth)..	88·23
	100·00

(*b*) *Molar tooth of an ox.*

Organic matters	8·41
Inorganic matters (bone-earth) ..	91·59
	100·00

(*c*) *Tusk of a boar.*

Organic matters	18·12
Inorganic matters	81·88
	100·00

(*d*) *Thigh-bone of a man.*

Organic matters	13·62
Inorganic matters	86·38
	100·00

22·8 grs. of *a*, burnt with soda-lime, gave 3.3 of bi-chloride of platinum and ammonium. 100 parts, therefore, contained nitrogen 0·909.

27·66 of *d* gave 5·53 of bi-chloride of platinum and ammonium. 100 parts, therefore, contained nitrogen 1·255.

These bones, probably, have been buried in the ground for a period of one thousand five hundred years, and yet they still contain about one per cent. of nitrogen, corresponding to about six per cent. of gelatine. They clearly show how slowly bones are decomposed in the soil, and we need not, therefore, be astonished to see sometimes no good result from the application of ½-inch bones, whilst finely-powdered bones act very well. Particularly in heavy clay soils, bones decompose slowly, because the air does not find so ready access as in a more porous soil.

Bone-sawings from Magee's Bone-works, at Runcorn, near Liverpool.

Moisture	14·12
Organic matters (gelatine and fat)....	25·12
Phosphate of lime and magnesia (bone-earth)	53·74
Carbonate of lime	5·39
Alkaline salts	0·78
Sand.....	0·83
	99·98

29·65 grs., dried at 220 degs. F., burnt with soda-lime, gave 8·69 of bi-chloride of platinum and ammonium; or, 100 parts contained nitrogen 3·82 = 4·64 of ammonia. In their natural state, consequently, 100 lbs. contained nitrogen 3·28 = 3·98 of ammonia.

These sawings constituted a very fine powder, which is sold at Liverpool at the rate of £7 to £7 10s. per ton. Being prepared, in all likelihood, from the more solid bones, which always contain less organic matter than the more cartilaginous ones, we find the per-centage of nitrogen rather lower, and the proportion of phosphates rather higher, than in average samples of half-inch bones.

If bones are to be used by themselves, they ought always to be applied in the state of a fine powder, because in this state they are more easily and uniformly distributed on the land, and rendered much more readily available for the use of

plants than half-inch bones. There can be little doubt that it will be more advantageous to pay £1 or even £2 more per ton for finely-powdered bones, than to apply half-inch bones at a lower price.

According to the experience of good farmers in Saxony, the total action of 1 cwt. of finely-powdered bones is estimated to be equivalent to 25 to 30 cwt. of farmyard manure. But even in this finely divided state, the full benefit which they are capable of affording is not realized in the first year. Experience has shown that the action of such bones, in a soil which is neither too retentive nor too loose, lasts for about four years, and amounts in the

1st year,	to	25	to	30	per cent.
2nd year,	„	25	„	30	„
3rd year,	„	20	„	25	„
4th year,	„	10	„	15	„

Boiled bones from Magee's Bone-Works, at Runcorn, near Liverpool.

Moisture	8·06
Organic matters	25·45
Phosphates of lime and magnesia (bone-earth)	60·48
Carbonate of lime	3·25
Alkaline salts	0·43
Sand	2·56
	100·23

29·41 grs., dried at 220 degs. F., burnt with soda-lime, gave 9·59 grains of bi-chloride of platinum and ammonium; or, 100 parts contain nitrogen 2·004 = 2·433 of ammonia. 100 lbs. of the commercial boiled bones, accordingly, contain nitrogen 1·842 = 2·236 of ammonia.

The price of boiled bones at Liverpool is £4 per ton. In the preparation of glue from bones, the latter are boiled with high-pressure steam, which penetrates them, and dissolves all the fat, and the greater part of the gelatine or glue. The bones, after cooling, are so brittle that they can be reduced with great facility to the finest powder.

Practical experience has shown that in this form bones act much more rapidly; boiled bones, for this reason, are generally preferred to fresh ones by the farmers of Cheshire, who apply them largely to grass-land with the best results.

It is true, their fertilizing effects are not so lasting as those of fresh bones; but they are nevertheless more valuable, as the farmer can do with a smaller quantity, and realizes an immediate return for the outlay of capital.

Whilst practice points out boiled bones as the more valuable, theory would seem to mark fresh bones as the more valuable, because the latter contain at least double the quantity of nitrogen, which substance we have described as the most valuable of all fertilizers. But facts are not easily made of no avail by theories; and it remains, therefore, for science to explain this unexpected higher fertilizing action of boiled bones.

A little consideration will show that fresh bones can only be acted upon by the atmosphere and water very superficially. On the decomposition of the gelatine of the surface of pieces of bones, the greater part of the phosphate of lime remains behind, which being a substance almost insoluble in water, prevents both the air and the water from acting on the interior. The further decomposition of the bones thus can proceed but very slowly. By boiling bones with high-pressure steam, which thoroughly penetrates the whole mass, all the fat, and the greater part of the gelatine, which separate the particles of bone-earth from each other, are extracted. The whole substance of the bones is thus rendered very porous, and, on account of this porosity, air and water can penetrate the interior of the bones. In consequence of the free access of water and air, a rapid decomposition ensues, whereby much ammonia is formed, which facilitates also the solution of the bone-earth. In an intelligible manner we can thus explain the superior action of boiled bones, and reconcile an apparent contradiction between practice and science.

Steamed bones.—(Steamed by Mr. T. Blackhall's process.)

I.		Calculated dry.
Water	7·32	—
Organic matters	26·77	28.88
Inorganic matters	65·91	71·12
	100·00	100·00

II.		Calculated dry.
Water	6·91	—
Organic matters (gelatine)	26·70	28·68
Phosphate of lime and magnesia (bone-earth)	53·74	57·73
Carbonate of lime	8·65	9·30
Alkaline salts and sand	4·00	4·29
	100·00	100·00

27·84 grs., dried at 220 degs. F., burnt with soda-lime, gave 13·93 of bi-chloride of platinum and ammonium. 100 lbs. of dry steamed bones accordingly contain nitrogen 3·12 = 3·79 of ammonia; or 100 lbs. of bones, in a moist state, contain nitrogen 2·90 = 3·54 of ammonia.

Mr. Blackhall's process of steaming bones for agricultural purposes is described in the Highland and Agricultural Society's Transactions for January, 1850.

It will be observed that these bones contain more nitrogen than the commercial boiled bones. They differ in composition but slightly from fresh

bones; and, as they are much quicker in their action, and easily reduced to a fine powder, Mr. Blackall's process cannot be too strongly recommended to farmers.

Having witnessed myself the decided superiority of steamed bones, and being convinced of the great economical value of the process, I have little doubt Mr. Blackhall's method of reducing bones will be soon adopted in practice on many farms, as soon as the merits of this process shall be known more generally, and appreciated more fully.

Fossil bones, or pseudo-coprolites, from Walton, in Suffolk.

Hygroscopic water	1·20	
Water of combination, and trace of organic matter	3·20	
Oxides of iron and alumina	4·84	
Lime.....	39·81	
Magnesia	5·68	
Phosphoric acid	23·48	equal to 47·82 of bone-earth.
Carbonic acid	5·82	
Insoluble siliceous matter	12·56	
Alkalies, sulphuric acid, and loss	2·41	
	99·00	

These fossil bones, or coprolites, as they are falsely called, sometimes are the fossil remains of cetaceous animals. They are very hard, and their reduction to powder, therefore, is rather expensive. The specimens analyzed by me are sold on the spot where they are found, at the rate of 28s. per ton. With the expenses for carriage to Cirencester, and crushing, one ton of the finely-powdered material cost about £2 10s.

That the composition of these fossils is tolerably uniform will appear from the subjoined partial analysis of a sample taken from several tons of the ground material :—

Hygroscopic water	2·18	
Water of combination, and a little organic matter ..	5·28	
Phosphoric acid	24·26	equal to 49·42 of bone-earth.
Insoluble siliceous matter	11·05	

It will be observed that these pseudo-coprolites contain mere traces of organic matters. It is for this reason that this manure, when applied alone, does not act as a farming manure like bones. This substance, further, being insoluble in water, ought not to be applied in an unprepared state, but should first be rendered more soluble, and thus rendered available to plants by digestion with sulphuric acid. The want of nitrogen may then be supplied by guano, or any other artificial manure rich in ammonia.

During 1851, Mr. Valentine, the manager of the college farm here, has used a mixture of dissolved coprolites and guano; and as this compound fully realized his expectations, and can be easily prepared on the farm, I would strongly recommend it to those farmers who can procure ground coprolites at a moderate price. The mixture to which I refer is best prepared in the following manner :—

Eight cwt. of ground coprolites are placed in a wooden tub capable of holding at least five times this quantity of the powdered material. The dry powder next is moistened with twenty-four gallons of water, and, after the water has thoroughly moistened every particle of the substance, 160 lbs. of concentrated oil of vitriol are added gradually. On the addition of the acid, strong effervescence takes place, in consequence of which the mixture swells very much, and is liable to be thrown out of the tub. It is for this reason that a capacious vat is required for dissolving the substance. When the action of the acid on the powder has ceased, the pasty mass is shovelled out and kept in a heap for a couple of days. After that time it has become much drier, and can now readily be mixed with guano. By mixing two parts of the dissolved coprolites with one part of Peruvian guano, an almost dry powder is obtained, which can easily be sown broadcast or with the manure drill. In point of cost, this mixture is much less expensive than commercial superphosphate of lime; and in point of effect, it is even superior to dissolved bones.

Dissolved bones.—A great many analyses of commercial dissolved bones, or superphosphate of lime, having been published lately by Dr. Anderson and Professor Way, it is not necessary for me to cite many analyses of commercial superphosphate. I shall, therefore, merely give the examination of one sample of superphosphate, as it affords an additional proof of Dr. Anderson's observation, that this commercial article is frequently of a very inferior quality.

SUPERPHOSPHATE OF LIME.

Water	6·30
Organic matters.....	9·32
Phosphate of lime.....	34·25
Phosphate of iron.....	6·57
Sulphate of lime	28·31
Sulphate of magnesia	2·42
Sulphate of soda, with a little sulphate of potash	6·38
Siliceous insoluble matters	6·45
	100·00

This article, which in reality did not contain any soluble phosphate of lime at all, was offered for sale at £7 10s. per ton.—Highland Society's Journal.

REPORT OF MESSRS. JOHN ARMSTRONG AND J. J. ROWLEY,

The Examiners of the Turnip Crop in Competition for Premiums offered by the Bolsover Agricultural Society, November, 1851.

SWEDES.—SIX COMPETITORS.

Competitors.	Weight of one perch in bulbs and tops.	Weight per acre in bulbs and tops.	Ridges Distance apart.	Time of Sowing.	Number of bulbs per perch.	Tillages applied per acre.	Cost of tillage per acre, exclusive of labour.
	lbs.	Tns. cwts. qrs. lbs.	Inches.				£ s. d.
Thos. Hallowes, Esq., Glapwell Hall	309 51	22 1 1 20 3 12 3 12	27	May 27 and 28		10 loads manure, 3 qrs. bones.	5 4 0
Mr. T. Bailey, North Lodge	320 59	22 17 0 16 4 4 1 4	24	June 4 and 5		12 loads manure, 6 bushels dissolved bones.	3 18 0
							5 17 6
Mr. Jarvis, Scarcliffe Mill	317 86	22 12 3 12 6 2 3 12	28	May 24 and 25		10 loads manure, 36 bushels bones.	
Mr. Taylor, South Car	268 73	19 2 3 12 5 4 1 4	24	June 13 and 14	135	4 cwt. guano, sown broadcast.	2 0 0
Capt. Welfitt, Langwith Lodge	280 63	20 0 0 0 4 10 0 0	26	May 28 and 29	125	10 loads manure, 3½ qrs. bones.	5 13 0
Mr. Crawshaw, The Hagg	293 41	20 18 2 8 2 18 2 8	27	May 29 and 30	116	20 loads manure, no bones.	5 0 0

SWEDES.—NOT LESS THAN ONE ACRE.—TWO COMPETITORS.

Mr. G. Beeley, Langwith	256 37	18 5 2 24 2 12 3 12	28	June 1	127	12 loads manure, 3½ qrs. bones, 1 cwt. guano.	6 13 0
Mr. Bond, Bolsover	280 43	20 0 0 0 3 1 1 2	26	June 2 and 3	138	15 loads manure, 6 qrs. bones, 3 cwt. guano.	10 13 0

COMMON TURNIPS.—ONE COMPETITOR.

Mr. Bailey, North Lodge	321 59	22 18 2 8 4 4 1 4	24	June		Same as for swedes.	3 18 0

The examiners desire to call the attention of the society to the great difference in the cost of growing turnips, as given in by the different competitors. Mr. Taylor's were grown at a cost of only £2 per acre in guano, and though the lightest in the first class, approach near to the general average. And if the reduced cost of labour be taken into account in the use of guano sown broadcast (as compared with the application of farmyard manure in quantities ranging from 10 to 20 loads per acre), it is evident Mr. Taylor's turnips have been grown at much less cost than any of the other competitors. And it is probable that if they had been sown a fortnight earlier, they would have taken the premium. Next in order of reduced cost is Mr. Bailey's, of North Lodge; and though grown at nearly double the cost of Mr. Taylor's, are not so heavy in the top, yet somewhat heavier in the bulb.

It is evident from this inquiry, that tillages which act quickly, and nearly in a state of solution, are more conducive to the turnip crop than the heavier and more expensive manures; while the difference in the labour attending one manure, as compared with the other, at a busy time of year, might lead the farmer to inquire, whether his farmyard manure could not be better and more profitably applied to clovers or old grass land instead of the turnip crop.

The nature of the soil, the climate, the time of sowing, the hoeing and thinning, and general management, exert great influence over the crop; but

the difference in the cost of production does not appear to have any influence in the amount of produce. The maximum cost is five times greater than the minimum, while both are below the general average of 25 tons (nearly) per acre. It may be asked—which is the best and cheapest mode of growing turnips? To answer this question without any reference to the future condition of the land, might lead to erroneous results. Perhaps the lighter dressings might not leave the land in the same high condition as the heavier; while the latter, in a wet season, would damage the crop of barley and clover, and both end in loss and disappointment. And it must not be forgotten, in considering this question, that the difference in the cost of production, as shown in the table, would enable the farmer to purchase and consume on the land, or in the stall, a considerable quantity of artificial food, and thereby increase the wool, mutton, manure, beef, or pork, &c., to be manufactured on the farm. The examiners feel it their duty to make these remarks, for future inquiry.

LEASES AND TENANT-RIGHT.

Sir,—Many of your agricultural readers may consider that the recent opinions of the *Times'* Commissioner on the subject of tenant-right will act as a heavy blow to the resolution which was carried at the last meeting of the Trafalgar Society on this important matter, and that the opinions there expressed will be completely extinguished beneath such overpowering authority. Thus shut up to the alternative of vigorous defence or honourable capitulation, and seeing that the enemy, while he has abandoned the ground on his own account, has entrenched himself behind the *Times'* Commissioner, where he fancies he is safe and secure, it is simply in the nature of things that "Trafalgar," not being convinced by the article in the *Times*, but rather inspired with a greater confidence in the opinions formerly expressed, is quite prepared for resistance and attack.

Every one knows who the *Times'* Commissioner is. He is no other than Mr. Caird, author of "High Farming under Liberal Covenants." The elegant and graphic manner in which he has pourtrayed the farming over Merry England, whether in its advanced or primitive condition, is beyond all praise. He is one of the most popular writers our agricultural literature can command, but I have never looked upon him as a profound one. His whole writings are characterised by the adoption of immature views, views hastily taken up, and as speedily thrown aside. Were I asked to give an example of this feature in his writings, I could not appeal to a better than his letter of 23rd December last, whether viewed by itself or in connexion with his former writings. He has shown the white feather on the subject of Tenant-right, and has written in direct contradiction to what he formerly blazed off in large capitals to command attention and regard. But, so far as the testimony of this latest production can go, the reasons which he has there given for his change of sentiment are as frail and unsatisfactory to my mind as the surface and exaggerated views which he once entertained on this question now appear to himself.

The Commissioner, in his rapid flight over the wide field of agriculture in the south, had no time to examine into the true bearings of the case. He has dwelt on the abuses of the system, but could not comprehend how the line of demarcation can be drawn between its legitimate use in Lincolnshire and its abominations in Surrey and Yorkshire. The customs of the latter in its worst features have been long before now exposed by far abler and more experienced agriculturists, who are the uncompromising advocates of a reasonable and well-defined tenant-right. Is the opinion of Mr. Caird on this question to outweigh those of Mr. Pusey, and a host of English agriculturists, who are far more competent judges of the requirements of modern agriculture? There is little danger of that. It was noticed at the time that the Commissioner skipped the greater part of the best farmed districts in Lincolnshire. He wrote—"In Lincolnshire and North Notts we found the great improvement of agriculture *of late years* attributed to the system of compensation to outgoing tenants; yet, on examining the state of agriculture itself, it seemed to us, if not inferior, certainly in no respect superior to the proficiency of the same class of farmers in West Norfolk, whose capital is not protected by any compensation agreements, but by 21 years lease.

It was certainly a very high standard by which the Lincoln and Notts farming was compared, when West Norfolk had to be taken, and when the farming of the Holkham estate was in his eye, for in the winding up of the article in question he says—"The system of yearly tenure has proved itself, in practice as in theory, inferior to that of leases with liberal covenants when fairly and judiciously tried, as in the examples of Holkham and Woburn."

The Woburn estate is the property of the Duke of Bedford. Every encouragement is given to the tenantry by an enlightened and generous landlord. This answers all the ends of tenant-right, and effects through mere confidence what Lord Yarborough, in Lincolnshire, does by an equally generous and enlightened system of giving liberal allowances to his tenantry in the shape of tenant-rights—this is, no doubt, doing it more upon the commercial principle—in either case, confidence is secured between landlord and tenant. The Holkham

estates are almost too well-known to require notice. The improvements were begun on that estate upwards of 70 years ago by Mr. Coke, afterwards Lord Leicester, the efforts of one generation have been nobly seconded by another, and there is no doubt that the Holkham property is at the present moment the best farmed estate in Britain. This is ascribed to what Mr. Caird has long talked and raved about but never defined, viz., *liberal covenants*, which will be shortly matter for consideration, as we are very glad to have it in our power to show what he means by the term. He further states—"That tenants do in many instances invest their capital largely with no other security than their landlord's character, we most willingly testify. In no country, perhaps, in the world does the character of any class of men, for fair and generous dealing, stand higher than that of the great body of English landlords; yet, there are exceptions, and they are unfortunately becoming more numerous."

It would plainly appear that it does not matter what sort of tenure is in use, so long as this "generous and honourable" feeling is maintained, and when "fairly and judiciously tried." I have seen as much capital invested by tenants without leases as ever I have seen with them; but remove this feeling, and it matters as little for agriculture what is the nature of the tenure, as it will assuredly suffer in the long run. It is generally admitted that there is as much capital invested by the tenantry in Lincoln as there is in Norfolk or in East Lothian; and it speaks well for the system which can cope with the best examples under the most favourable circumstances. The Commissioner further says that "frauds were beginning to creep into the system" in Lincoln; but I maintain that the tendency is for the frauds to creep out. It is not of "late years" that the customs have arisen; but let us hear those who are on the spot, and have had ample opportunities of learning how the system works. I shall avoid quoting the opinions of farmers, lest I should run the risk of being accused of one-sidedness, and select as witnesses only those who are on the other side of the question, and know their true interests. Major Francis Brown, an extensive proprietor, in his evidence before the Select Committee in the House of Commons, on agricultural customs, in 1848, stated, "I have held property in Lincolnshire, and have managed it, in a great measure myself, for upwards of 53 years. Lincolnshire was in a very bad state of cultivation in my early period; in short, one third of the whole county was uncultivated entirely, or very wretchedly and badly cultivated. After a lapse of time, when tenants had to quit their farms, valuers began to make allowances to them. It was a gradual thing in its early progress—it was fought very stoutly against; but it is now, I believe, universal. I think that the present system of valuation works well, and adapts itself to all the new improvements—gradually, I admit, but ultimately. Lincolnshire is probably as well cultivated a county as any in the kingdom; and those counties that are badly cultivated will, no doubt, gradually assume the very system of valuation that we adopt in Lincolnshire, as it answers so well there. I have no doubt other counties that are backward in cultivation will, as cultivation improves, adopt the same rule."

Next hear the testimony of Mr. Smith, in Lincolnshire, who has had the care of many estates in that county, and has watched the customs during 30 years, but who, like the former witness, was not in favour of any legal enactment:

"The Lincolnshire tenants have no difficulty in recovering compensation, since the customs have been more defined and recognised. Some difficulty was experienced during its formation and progress. *The great difficulty was with regard to fixtures and buildings*, not manures. The generality of the farmers are content with the custom as it now exists. There may be a few that do not, but certainly not those with whom I am acquainted."

Notwithstanding Mr. Caird's *ipse dixit*, we are entitled to a view of the sunny side of the question, even in Sussex; and for this purpose I shall now quote the opinion of one who has a stake on both sides of the question. Mr. Jeremiah Smith, of Springfield Lodge, Rye, Sussex, who owns upwards of thirteen thousand acres, and holds in occupation over six thousand acres. That gentleman says—"The system of giving compensation for various manures has had a good effect on the farming of my neighbourhood; on those estates where it has been encouraged they have improved much faster than others whose landlords have held aloof from the matter. When the right is admitted by the landlord, the settlement between the outgoing and the incoming tenant is perfectly easy; there is not the slightest difficulty. The rents have improved very considerably too, in some instances almost double, and the tenant thriving too. Whenever the tenant does well, the landlord does well. When the landlord is disposed to grind, the tenant does not do well, nor the landlord. I have never heard landlords complaining that their tenants would put too much manure in their lands, and saddle their properties with high and speculative charges, but I have heard complaints on the other side a thousand times. If any tenant takes a farm out of condition, it would take him four or five years to bring it round to a paying condition at all with us; in the hop district it would take even longer. I am convinced that it is the interest of the tenant to pay a fair compensation for what is in the soil, to be adjusted by responsible gentlemen; it is the greatest benefit to the landlords themselves, who are the most interested, and their estates would improve, and nothing would prevent it."

I could quote the evidence from a dozen of other witnesses, who have the management of English properties, all to the same effect; and surely their opinions are worth a great deal more than those who have not given any symptoms of having studied the matter further than in their flight across the country. But why did Mr. Caird compare the Norfolk leases with Notts

and Lincoln? The most neglected tract of country which he passed through was in Northumberland, where, I imagine, they have leases. Why not place Lincoln and Northumberland together for comparison? Take the agriculture in Lincoln and North Notts as a whole at the present moment, and what a happy state of matters when contrasted with Northumberland, where leases have entirely lost their virtue—but what is the cause of this? Simply, that "there are instances in many counties, and particularly in the north and west, of the tenants' unassisted improvements during a lease having been taken very unfair advantage of at its conclusion."—*Times.* In fact, the system of leases has been so much be-praised, that landlords have thought that the adoption of leases absolves them from any further trouble in the matter. The *commercial* system has been fairly tried in Northumberland, and its agriculture is prostrate under the billows of the new order of things. Matters are now reduced to that state in which they are ripe for tenant-right; here the force of circumstance will

"Make lairds grant what love did seek."

What is Mr. Caird's cure? Why, the old story, "liberal covenants," such as at Holkham. The experience of Northumberland tenants would deter them from signing such leases as at Holkham. The success of agriculture at Holkham cannot be ascribed to its "liberal covenants," as I shall soon show to the satisfaction of every one. It is entirely to be ascribed to a steady perseverance of a system of honourable and fair dealing to the tenantry. On this question the Commissioner writes like a school-boy. I shall allow, however, a man of sense to speak to all whom it may concern. Hear Mr. Neville's opinions on the matter, who has a large property in the county of Nottingham, who has found it to his advantage to encourage his tenantry, and who has made the tenant-right question his special study:—

"I conceive that the custom of Lincolnshire must spread now rapidly. My own feeling is that the occupiers will not be able to farm the land, except they get liberal agreements; that the landlords will be obliged to give such agreements as will enable them to farm as well as they can, or otherwise they must let the land at a low rent, or not to have it farmed at all. What I mean is, that I ought to be able to give the tenant every advantage by an agreement that does not injure me. I believe that what has grown up from the liberality of the land-owner, they will be obliged to do from necessity what they have in many cases done from liberality and the spirit of improvement, and I assume that the custom will extend, as it has been found beneficial both to the land-owner and the tenant. The more rapidly agriculture improves, the more rapidly will the custom extend in other counties."

Are we to throw aside this common-sense view of the relative position of landlord and tenant, and substitute the undefined and unmeaning cry of "liberal covenants?" "In Northumberland," says Mr. Caird, "we have given examples, which prove in the strongest manner that the injury sustained by the tenants by being induced through unfair competition to offer exorbitant rents," &c. Why are they induced to give exorbitant rents? What good does it do to talk about "unfair competition," which is just as incapable of being defined as "liberal covenants." This system of ungenerous dealing is going on increasing, according to this authority, and yet look at the remedies which he has provided. If the case was so desperate as he is making it, I should look upon the whole system of large farms as doomed to destruction. It is lucky that we have such substantial men to appeal to as Mr. Neville, and a whole host of others.

What is the nature of the "liberal covenants" at Holkham which are now given forth as the great panacea for all the difficulties of our agriculture? Most fortunately, I have lying before me the forms of leases which are adopted on that estate, and I am enabled to speak with well-grounded assurance on that matter. If Mr. Landale had had Lord Leicester's mode of dealing with his tenantry in his eye when he drew up the first resolution to submit to the meeting at Trafalgar, he could not have more truthfully described the system which has been followed on the Holkham estate for the last seventy years; and as this resolution has been so much sneered at by some parties, I shall repeat it for their good, and hope they will soon be in the position to appreciate its force and truth:—"It is of the utmost importance to the progress of agriculture that an intelligent and friendly relation should subsist between landlord and tenant, whereby confidence should be secured between the parties, so that their interests should harmonize, and every means should be taken by the principal contracting party to establish and consolidate that system which is best suited to the respective districts."

It cannot be said that the covenants are liberal on the Holkham estates according to the meaning which Mr. Caird would lead us to attach to the term from his former writings, which, by and by, I will give for the amusement of your readers. These "covenants" of Holkham estate are as stringent in their terms towards the tenant as any that ever I saw. Leases not half so illiberal have ruined or prostrated the agriculture of Northumberland. But "an intelligent and friendly relation" between landlord and tenant overlies the stringency of the clauses, and is the whole secret of the success of leases in this instance. The splendid specimens of farming at Castleacre are due to this feeling of security and confidence. Mr. Hudson has no other hold than this for the immense investment of capital in a soil which is not his own. It *might* be taken advantage of, and we should soon have Northumberland's miseries enacted on that field where Mr. Coke assisted in rearing the agriculture of Norfolk, both by precept and example, to its present height and perfection. Just snap one link which con-

nects the one with the other, and down the whole will tumble. The leases of Holkham, I have said, are most stringent in regard to cropping; none could be more so. I will give one clause which is strictly an agricultural one, as distinguished from the private, or what some would call the feudal; it will show the farsighted character of Lord Leicester, although it may shock Mr. Caird, and amaze some nearer home, as it may jar with their own notion:—"And the tenant shall not, and will not, during the last four years of this demise, sow, or cause or permit to be sown, upon the demised farm and premises, any more oats than shall be sufficient for feeding the horses usually kept and used on the said farm, at the ordinary rate of allowance of oats given to such horses, and shall not, during such last four years, sow, or permit to be sown, on the demised premises, any oats for sale or to be sold or carried away from the farm and premises hereby demised."

The Commissioner could not have appealed to a more unfortunate instance for himself than the "liberal covenants" at Holkham. Where in all the earth could we have got anything more opposed to what he once tried to gull us with, and excuse himself for writing his pamphlet on "High Farming under Liberal Covenants?" It affords an excellent instance of what Carlyle, in his "Stump Orator," calls speaking to *Bunkum*. In "High Farming Vindicated" Caird says: "The slavish adoption of fixed rules of rotation are suited only to a comparatively low state of agriculture. Nature has no rotations of crops. A fixed rotation is but a rude substitute for skill; and it is only when skill or capital are wanting that stringent regulations for cropping are necessary to guide the tenant or protect the interests of the landlord. I know that this doctrine will be accounted heretical in the eyes of such a 'perfect' agriculturist as Mr. Stephens; but entertaining an humbler notion of the existing attainments of our agriculture, and hoping to see a broader development of national energy directed to the important task of producing the people's food, I confess I look forward to a time when, with some legislative or conventional provision for unexhausted improvements, it will be alike safe for the landlord and profitable for the tenant to rely more on the cultivator's skill than on the stringency of his lease. And *this was one reason why I selected Mr. M'Culloch's case* (Auchness) *rather than others for an example of high farming.*"

Of course this is now acknowledged nonsense, and it is a good thing the acknowledgment has come of himself. The depth and research of Mr. Caird, however, are as apparent in this extract as they are in the confused article on the subject in the *Times*, which we have just reviewed. Yet we (the Trafalgars) have been told that we must yield to his authority, and that we had a shocking bad case on hand when we passed the following resolution, which, however, cannot be overthrown so easily: "That remuneration to the tenant for unexhausted improvements, at the end of his lease, is quite indispensable to maintain the soil in a fertile condition at its termination."

But, on the other hand, we have heard a great deal about the interest which the outgoing tenant has in keeping his land in the highest state of cultivation at the termination of his lease. It is said that here virtue is its own reward. Supposing this was the case, which may be so, the facts are against us on both sides of the Tweed; but mere ignorance being the cause, knowledge should be the cure—and therefore agricultural societies should engage in the Quixotic mission of imparting information on this subject. Those who urge such pleas show their superficial knowledge of human nature, and the *modus operandi* of a want of security and good-feeling between landlord and tenant. Surely the advancement of agriculture is a secondary consideration with such. They have not studied the simple elements which lie on the surface of the question, and are patent to every one.

It is surely unnecessary for me to guard any one from supposing that the question has been argued on any other grounds than those of its agricultural merits. I have sedulously endeavoured to avoid either the private or political, as I conceive agricultural societies are on forbidden ground if they put a foot on either. But so long as they keep on their own territory, no one is entitled to complain.

To conclude, I believe in truth and honesty, that the times demand more enlarged terms of agreement, and that it would be for the interest of landlords, rather to anticipate the developement of agriculture like the Lincolnshire proprietors, for, as Sir James Graham said the other day to his tenantry—"Generally speaking, it is the duty of proprietors to lead the way." I must now, however, leave the matter entirely in the hands of others. I am, &c.

A MEMBER OF THE TRAFALGAR AGRIC. SOC.

January 23rd, 1852.

—Fife Herald.

An agricultural operation on a gigantic scale has just been completed in the department of the Aude. In order to effect the irrigation of a tract of land of 2,000 hectares (nearly 5,000 acres English), the water has been brought from the river Aude by a tunnel about 2,150 yards long. This land is situated at Marseillette, a village about twelve miles from Carcassonne. About 50 years since it was a marsh, and was purchased by a Madame Lawless, a rich Irish lady, who had it thoroughly drained, and it has since been cultivated with great success, although at times the crops have suffered considerably for want of water. The land now belongs to the *Caisse Hypothecaire*, by which this tunnel has been constructed. It is 2 metres 10 centimetres in height under the arch, and 1 metre 60 centimetres wide. The supply of water will be abundant at all seasons of the year.

CHICHESTER FARMERS' CLUB.

The half-yearly dinner of the club was held on Wednesday, March 3rd, at the Anchor Inn, the usual place of its assembly. It was well worthy the deserved reputation of the house. The liberality in which the table was supplied, and the excellent style in which everything was served up, was a matter of general encomium. The price, too, to speak in the set phrase of the day, was "adapted to the times," so that even the depressed farmer might safely go home without the self-reproach of extravagance. The wines and spirits, also, were of the best quality, and fully sustained Mr. Coombe's reputation as a wine and spirit merchant. Amongst the company present were—Mr. H. Duke (in the chair), Mr. E. Wyatt (vice-chairman), Mr. W. Duke (secretary), Messrs. Geo. Rusbridger, A. Cheesman, A. Farndell, Edw. Duke, William Coombes, George Smith, R. Wakford, Thos. Purchase, Thos. Harris, Charles Hobgen, Edw. Habin, Thos. Habin, John Ewins, Edw. Coombes, C. Chitty, Walter Boniface, Wm. Kennet, Thos. Maden, G. T. Bailey, Wm. Field, F. Randall, Henry Cousens, A. Field (Dumford Park), Richard Cousens, Geo. Duke, Geo. Holloway, and John Wyatt.

On the removal of the cloth, the Chairman gave the usual loyal and patriotic toasts, which were cordially received.

The CHAIRMAN then said, that having disposed of the usual routine of toasts, and as there was not much time to be lost, he would call upon Mr. Rusbridger to introduce the subject of which notice had been given for discussion.

Mr. RUSBRIDGER accordingly rose and said, the subject he had to propose for discussion was one of vital importance to them as agriculturists, namely, "The utility and necessity of farmers' clubs." It was one which was intimately connected with their prosperity. He, for one, was satisfied that their welfare did not depend on this or that set of men being in power or out of power; they must not look to one minister or another, but depend upon themselves; it was therefore incumbent on every one to put his shoulder to the wheel, and and to endeavour to do all he could for the general good. He did not, by that remark, wish it to be understood that individual exertion could not effect any amount of good; but union was strength, and they could only hope to better their condition by uniting together for one general object. The ship which traversed the mighty deep, exposed to all the perils of storm and tempest, was only enabled to resist the violence of wind and wave by the compactness of the timbers of which it was built (cheers). So it was with them; isolated and disunited they were, as weak as one of the threads of a cable; but united, they became as powerful as the cable in its perfect strength, thread was interwoven with thread, till it became sufficient for the purpose for which it was intended; and the anchor once dropped into the oozy bottom of the deep, the sailor rested securely in his hammock, amid the tossing of the ever-moving sea, and the winds singing his lullaby (cheers). If they acted at all, they must act together, for there only rested their strength (applause). The farmers had kept apart too long, and the consequence was their present position. All the other classes of the community appeared to have understood the importance of combination with the exception of the farmers (Hear). The aristocracy had their clubs: the manufacturers had their appointed places of meeting to discuss their mutual interests; and labourers and artizans were associated together for promoting the general weal. Why then should not farmers associate together for a similar purpose? (Hear, hear). Perhaps he might be told that a large proportion of the associations amongst the labouring classes were simply benefit societies. He believed it was so; and would be very glad to adopt the term, for were they not engaged in a similar work—to endeavour to benefit the condition of the tenant farmers? (cheers). Could any one tell him why the farmers should not have the same facilities for bettering their condition as any other class of the community? Had they not been injured by unjust legislation, and were not those clubs called for to enable them to maintain their rights, and to stand up in defence of themselves and their families? (Hear, hear, hear, and applause). Experience had shown that those who had formerly given them support, were betraying them and their interests: the metropolitan press was writing them down every day, and endeavouring to show that agricultural distress was only imaginary; he would therefore ask, would they lie down and be trampled under foot, or stand up like men and defend their rights? (loud cheers). The cultivators of the soil had hitherto been regarded as England's strength and England's glory; and he believed their cause was inseparably connected with the country's weal: the cause of the tenant farmer was equally that of the labourer, and under existing circumstances both were involved in one common calamity. It was their duty to do all they could to ward off the threatened ruin.

How? By united exertions, by being true to one another (cheers). They must all pull the same way, their interests were identical, and all minor differences must be thrown overboard and forgotten (applause). He knew no way so effectually to accomplish that object as through the instrumentality of farmers' clubs, where they learned each other's opinions, and were enabled, without asperity of feeling, to respect each other's prejudices—the surest and safest way of removing them (cheers). Farmers' clubs were not confined, as some people might suppose, to a consideration of the best means of cultivating swedes, beet root, or mangold wurzel, nor yet to the breeding of sheep (laughter). It would be well, perhaps, in one sense, if it were so; but they had been compelled to think and speak upon different points. In that respect they had learned a lesson from the free traders; and though they might be at present in a minority, he would say, Do not despair, but bear in mind that the pass of Thermopylæ was only defended by three hundred men (cheers). Unity of purpose would accomplish great things; it was by that the free traders gained their victory; and if they, as farmers, had depended on themselves instead of others, as they had too frequently done, and in the power of their own arms, he ventured to assert, that instead of being in the present position, they would still have had something like protection (loud cheers). The free traders had done their work of mischief, and done it well; but what had they, the farmers, done? They had seen the foundation of their interests undermined by statesmen who had pretended to be their best friends: they were as a vessel tossed and tempest driven, with its canvass torn by the fierce war of the elements, its deck covered with the raging waves, and without the friendly aid of a pilot to bring it to the desired refuge, until at length they were wrecked (Hear, hear). If they had relied upon themselves, they would not thus have been deceived by false friends; they would have known when to take in canvass, and by sailing in smooth water, they might have gone quietly on their course. He hoped the bitter consequences of their past conduct would be the greatest incentive to future exertion and increased watchfulness (Hear). They could not, however, have taken a better step than in the establishment of a farmers' club (cheers); and having established it, let them stand by it as a stanch true-hearted captain would by his ship, while a single plank remained on which he could set his foot (cheers). There were men who pretended to sneer at farmers' clubs; but it was only pretence, they sneered at what they dreaded: they read the reports of their meetings, and they saw that they were constantly increasing in strength, that they were becoming a phalanx which could not be disorganized. Those who pretended to sneer, feared the most; and they might depend that under the curled lip, there was the coward's heart (cheers). That they might further see the necessity of looking to themselves, he would ask them to look at the tradesmen. What had they done for the farmer? Why, they had sent free trade members to Parliament to vote away the farmers' rights (Hear, hear), though a great number of them mainly depended on the farmers for their prosperity (cheers). Some time ago, there was a motion to remove the cattle market to the outskirts of that city: the tradesmen said that such a removal would be their ruin, and the market was allowed to remain as before. How had they repaid the consideration given to their interests? Why, as soon as an election came, their cry was free trade for ever (Hear). These men might try to annihilate them, but he would say, never let them, the farmers, commit suicide, which was not only contrary to the laws of reason, but opposed to the spirit of christianity (cheers). He believed their periodical meetings for discussion to be of the greatest importance to the interests of the tenant farmer; and his advice was, that that club should be their armoury, in which to lay up, and he would also add, to keep in repair their weapons of defence; so that being always prepared, they might go forth to conquer or die (loud cheers).

Two new members were then proposed and admitted, namely, Mr. Henry Wright, and Mr. Walter Wood.

Mr. W. Duke begged to propose the next toast. The question for discussion that day had been brought forward in a most efficient and skilful way; and on an occasion of that nature, the half-yearly dinner, he thought they could not do less than drink the health of Mr. Rusbridger with three times three. The cheers were heartily given.

Mr. Rusbridger, in responding, said, he was sincerely obliged for the kind manner in which they had drunk his health, and he could assure them that he should be ready at all times to do all in his power to promote the welfare of that club (applause). They had now a new government, and many persons, in consequence, were hoping for better times; but he would remind them there were men in the House of Commons who were always adverse to the agricultural interest, men who took a delight in scattering the elements of discord amongst all classes; who set the manufacturer against the agriculturist, and the agriculturist against the manufacturer, the master against the labourer, and the labourer against his employer, town against country, and the country against the town. It therefore behoved the farmers to look to themselves, and having once made a move in the way of

progression, they must ultimately succeed in bettering their condition, if they were only true to themselves (cheers). If at the next general election the voice of the country was for free trade, he hoped the principle would be fairly and fully carried out by a free trade in everything.

Mr. GEORGE HOLLOWAY proposed "Prosperity to the Farmer's Club" (cheers).

Mr. A. CHEESMAN said, they had had various toasts proposed, but he was sure they would join him heartily in giving the next one, which was the "Health of the chairman" (applause). Brevity was said to be the soul of wit; the remark was exemplified in the speeches of their chairman, for, though generally short, they were always to the point (cheers).

The CHAIRMAN, in responding, said, that public speaking was quite out of his line, but he could not but venture a few observations on the prospects of agriculture at the present time. He thought the period had arrived when they might at least look forward with hope (Hear). He hoped when the period for a general election arrived, the inhabitants of the city of Chichester would not be so blind as they had been to their own interests, but would see that their welfare was bound up with the prosperity of agriculture. It was really astonishing that towns dependent on an agricultural community should send one free trader to one protectionist, or, which was worse still, sometimes two, as was the case at Lewes, for instance. If they, the farmers, were to withdraw from the Chichester market, the tradesmen would be ruined; and he was convinced the farmer could do better without the shopkeeper, than the shopkeeper could do without him (hear). He hoped the shopkeeper, however, would begin to see things differently, and give the matter a serious and fair consideration (cheers). He gave "The Visitors," coupled with the name of Mr. Cousens (cheers),

Mr. COUSENS responded. He should, indeed, be ungrateful if he did not immediately arise at such a call, and return thanks for that further proof of their good-will towards him. In doing so, however, he wished to be understood as returning thanks only for himself, leaving other visitors to do the same (laughter). On the main question which had occupied their attention that evening, he was too much interested in agriculture not to feel and appreciate the value of farmers' clubs. Without such associations the farmers would be a completely isolated, and he might say, a helpless body of men; but by unity, by pulling together in one boat, they would be enabled to make progress, and to contend, with what appeared to be, conflicting interests. By meeting together in their several districts, they gained strength, and with that strength they gained respect (cheers). After the excellent speeches they had heard from Mr. Rusbridger, he had no idea of entering into the subject in all its bearings, as he must necessarily tread, in some respects, on the same ground; but as that was a business as well as a convivial meeting, he would make a few observations on the necessity of maintaining their rights and obtaining justice for themselves, in his opinion, the most injured class of the community (Hear). He complained that they did not pay that attention to business matters which their opponents did: he had no objection to conviviality in its proper place; but under the existcircumstances of the farmer, he was decidedly of opinion that business should have the precedence (Hear, hear). With reference to the utility of farmers' clubs, he thought they might be rendered much more so—that they were capable of great expansion; they must take their political affairs into their own hands, the same as they did the management of their own farms, instead of leaving them to others—to men, ndeed, whose interests were not identified with their own. He was even inclined to doubt whether the interests of landlord and tenant were strictly identical. The tenant farmer had every day to contend with the elements: he might sow, but he never knew when he might reap; and if he did reap, he was still left in doubt as to the disposal of his crops (Hear, hear)—whether he would be remunerated or not for the outlay of his capital, his anxiety and daily toil (Hear). The men they sent to represent them in parliament, generally, did not understand these things, and therefore could not sympathise with the farmer's difficulties. In making that observation, he wished to be understood as speaking with all due deference in respect to their present county members, who, he believed, acted to the best of their abilities (Hear), and with a view to promote their interests. But the farmers themselves had not that independence they ought to have, their vote might be considered a portion of their agreement in entering on the farm (Hear, hear); but if they were more united, if farmers' clubs were more prevalent, they might soon bid defiance to the Manchester school and all those machinations by which they had been so much injured (cheers). He hoped better times were coming; but as Mr. Rusbridger had justly observed, if they wished to place themselves in a more prosperous position, they must take the management of affairs into their own hands, whoever might be at the head of the ministry (Hear). The question of free trade and protection would be decided by the majority at the next general election. If it was that free trade was to continue the law of the land, all he had to was, let it not be a bastard free trade, but one alike beneficial to the farmer

and manufacturer—the principle of the present system had something of Dick Turpinism about it. That notorious highwayman was frequently known to have given to the poor what he took from the rich; and the system of free trade was somewhat similar, with the difference that it robbed the farmer to enrich the capitalist manufacturer (cheers). If free trade was right with regard to food, it was equally so with reference to articles of clothing and every description of manufactured articles, on most of which there still remained a duty of 10 per cent. If, therefore, they were to be subject to foreign competition, let it extend to manufactures as much as to the produce of the soil, and then they, the farmers, might derive some advantage from it. He really could not see why they should not have the benefit of a cheap market for what they wore as well as for what they eat (cheers). Let them make out a fair case as to the injustice of the present system, and he had no doubt as to the result. Relief must come in some shape or other. With all the disadvantages of diminished profits, they were borne down with a tremendous burthen of taxation, partly sustained, he admitted, by the landlord as well as the tenant, but principally by the latter. Take for instance that great local burthen, the poors' rate, which he regarded peculiarly as a tenant's tax, and for this reason, the landlord was not liable for the poor tax till his land was put in a state of cultivation, and for that reason it fell upon the tenant instead of the landlord. If free trade continued, there must be an adjustment of taxation so as to relieve the land from a portion of its burthens. To obtain that, they must keep up their clubs, for they would have need of all their united strength to obtain even simple justice. Mr. Cousens then alluded to the petitions for a different method of taking the corn averages, and for the repeal of the malt and hop duties, originated by the Arundel Farmers' Club. He stated that a deputation from that club had waited upon Mr. Prime, who had received them in the most courteous manner, and promised them his support. On those questions he invited their co-operation, and hoped they would sign the petitions alluded to (cheers).

Mr. Harris, with the permission of the Chairman, begged to propose a toast. It was the health of a gentleman long known to them, and a kind friend to the tenant farmer. Placed in the unpleasant position the farmers were, their object should be to seek a speedy and effectual remedy for their grievances. One of the best means of accomplishing that object was to place themselves in a proper position with regard to public opinion. The free traders asserted that the country generally was in a prosperous condition, and that agricultural labourers were never better off than at that time, notwithstanding they had been subjected to a reduction in their wages. Supposing such to be the case, what was the reason? Why, that the farmers were paying them more than they could afford, because they were too open-hearted, and too well disposed to oppress them (Hear, hear). In that respect they acted widely different from the manufacturers, who, in periods of even the slightest depression, left their workmen to shift for themselves as best they could (Hear). If the present system was to continue, the farmers must seek to be relieved from the burden of poor-rates and the rent-charge on tithes, which was above one-fourth of the actual value of their produce. Twenty-five per cent., he considered, might be taken off that charge, and the support of the poor ought to be taken from the general taxation of the country. That would be one source of relief, and, in his opinion, it was a relief to which they were justly entitled (cheers). He proposed the health of "Mr. Edward Wyatt." Three times three.

Mr. Wyatt, in responding, after thanking the company for the kind manner in which they had drunk his health, said, that it was not his intention to occupy much of their time on the subject more immediately before them, especially after it had been so ably and largely entered upon by other speakers. He would, however, venture upon a few observations, and in doing so, he should follow the words of the notice—by first speaking of the necessity for farmers' clubs, and then of their utility. As to their necessity: he thought they would agree with him that the extraordinary circumstances of the times called for a system of organization. There appeared to be a clashing of interests, and each class of society was endeavouring to promote its own interests, irrespective of the rights of others. A glance at recent events showed them what could be effected by organization; and though he was decidedly of opinion, speaking nationally, that what was for the benefit of one interest was for the benefit of all, he yet held it to be possible, indeed they had felt it to be true, that a system of legislation might be adopted by which the interests of one portion of the community came into antagonism with the interests of another. They must, therefore, endeavour to obtain a course of legislation founded on justice to all. To obtain such an object, they must be united. So much for the necessity of farmers' clubs. Now as to their utility. Isolated, they were without strength, and might be made the sport of every faction. Other classes of the community had experienced the advantages of association, and if the farmers wished to put themselves on an equality, they must adopt similar means. If they did not, they might depend upon it they would be left in the back ground, while

other interests were advancing. That was the only way of placing their position fairly before the public. After urging the necessity of taking safe ground in the advocacy of their rights, which he considered could best be accomplished by avoiding ultra opinions either on one side or the other, he concluded by proposing, in complimentary terms, the health of Mr. W. Duke, the Secretary (loud cheers).

Mr. Duke was exceedingly obliged to the company present for the kind manner in which his name had been received, and to Mr. Wyatt in particular for the credit which he had given him. But though he appreciated the motives by which they had been influenced, he was quite aware that he had not been so efficient in the performance of his duties as he could have wished, having been placed in circumstances which prevented him giving to them that attention which he otherwise would have done. He concluded with proposing the health of Mr. John Wyatt, and the gentlemen who had favoured the club by bringing forward subjects.

Mr. Edward Wyatt said, there appeared to be some hesitation amongst the gentlemen named; but as he was amongst them, he would reply on his own behalf. His object in doing so was to induce other parties to come forward in the same way: he was convinced that many of them were quite capable of bringing forward subjects, if they would only lay aside their diffidence; if they did so he was convinced they would neither want ideas, or language in which to express them. He suggested it would be an advantage if gentlemen would put down their names who were willing to bring forward subjects for discussion, so that they might be provided beforehand with questions for the whole year, of course allowing every one the choice of his own subject; but making it imperative to publish it some time previously to the discussion being introduced.

Mr. Harris expressed his concurrence, and was willing to enter into such an arrangement.

Mr. John Wyatt thought that questions relating to practical farming might be discussed to much advantage.

Mr. Cousens thought that in the present position of the farmers, they could not do better than adhere to those political topics in which their interests were involved.

A desultory conversation followed, in the course of which several members volunteered their services to bring forward subjects for discussion.

The health of the chairman, Mr. Habin, and the city of Chichester, with other toasts, were also given and appropriately responded to.

The following resolution was afterwards put from the chair and carried unanimously:—"That it is the opinion of the club, that under the existing state of society it is important and incumbent upon the farmers that they should combine together, not only for their own advancement, but also for the salvation of their own interest."

THE MECHANICAL AND PRACTICAL EFFECTS OF WARPING.

There is not a more interesting nor more neglected agricultural subject than that of warping. Confined necessarily to the bounds of some tidal rivers, and hence circumscribed in their utility, these wonderful adaptations of natural processes are scarcely known on a scale sufficiently extensive to ensure that degree of interest which they deserve. Hitherto their operations have almost been confined to the counties of York and Lincoln; and to the first county they at any rate owed their origin so late as the year 1743, scarcely a century ago, though there can be little doubt that warping was first taught by nature in the Nile overflows of the country of Egypt.

The peculiarities of the counties referred to are such as quite to suggest, if not to isolate the operation; the land being below the level of the high tide, having been recovered from the overflow, and the rivers carrying a great amount of detrital, or at any rate sedimentary matter, which forms a soil on their low-lying lands of the greatest possible degree of fertility.

The improvements of the Dutch adventurers in the reign of Charles I., founded on the reclamation, embankment, and drainage of land in the fens, and the recovery of some 75,000 acres of land south of Thorne, in Yorkshire, by their practically taught energies, laid doubtless the foundation of warping, said to have been first practised by Mr. Richard Jennings, of Armin, near Howden; but this appeared to attract little notice until the enquiries of the Board of Agriculture brought it to light some fifty years afterwards.

The mechanical principles of warping appear to be these:—Supposing the tidal river to be embanked above its high tide mark, and a proper sluice or clough provided with carrying drains to the land proposed to be warped, into which other smaller branches or arteries are cut, so as speedily and readily to carry the water from the river to the

point where the deposit is proposed to be made, this is confined in that situation so as to be *still*, and to clear of its sediment, when it is let off into the river again at low water by another and lower drain. A thin coat of fine silt is deposited about an eighth to a tenth of an inch in thickness; so that by perseverance all the year round, or nearly so, three feet of completely new soil will be deposited, neither tenacious nor yet exactly porous, but calculated to grow crops almost illimitable for a succession of years.

The kind of soil makes certainly some difference. It seems to be the least beneficial on very porous sands or very tenacious clays; the drainage of these being more difficult to effect in this low-lying district, from the impossibility of cutting drains deep enough to tap the land-springs. The best substratum for warping is the peat soil. This seems to be a subsoil most favourable to the after-development of crops; and though two or three feet depth of soil may be added, the level of the land is seldom or never increased. The peat is compressed by the superincumbent mass, so as to fall to the previous level of its surface even with the addition.

The principle of the deposit appears to be this: In the mouths of these sluggishly flowing tidal rivers, there is a great quantity of suspended matter. The rolling river brings down matters both in solution and suspension, from the constant abrasion of the soils through which it passes. The sea intersperses with this a vast mass of chloritic matter—possibly, also, the washings of the basins of the estuaries and the chalk—the aluminous matters of the coasts, as well as its decayed vegetable and decomposed animal matter; not to mention a most important element in the whole, the sewage of our large towns on the banks of the river. This by the constant *agitation* of the two opposing elements, the tide and the river's flow, keeps a vast amount of matter in suspension; but once let out and *at rest*, it begins to subside; and hence a great outlet of water makes a large deposit of the peculiar matter of the warp.

There is another peculiarity of the warp which is very material. It is best at the greatest distance, or at the extremity of the flow. Near the sluice though the stratum may be thicker, it is by no means so valuable and fertilizing: at the very extremity of the flow, though thinner, the deposit is much more fertile and valuable as soil. Nay, more wonderful still, the more fresh water there is in the warping current—the more muddy and thick the waters are from the influx of water in a rainy season, the less valuable is the warp.

The cost of warping will vary in almost every case. It will run within a margin of £10 and £20 per acre: contingent on the safety, and success, or the insecurity and misfortune of the sluice and the carriers. The cost of these are sometimes enormous. Mr. Ralph Creyke erected a sluice costing £5,500, and expended as much as £7,350 in main, carriers, and embankments, and as much as £1,000 was lost by an unfortunate accident in his works, the whole of which cost some £17,000; but he covered 1,600 acres with warp, and raised land from some 8s. or 10s. per acre to be of the value of 32s. to 35s. per acre.

Another great point in warping is that the land is perfectly free from weeds: it is capable of growing crops varying from three to five in succession without manure. It is very easily worked, being neither loose nor tenacious; and a little guano will soon place it, how exhausted soever it may be, in circumstances immediately favourable for the growth of a crop.

So much for the mechanical and practical effects of warping. But to what is all this change in texture, productiveness, and value attributable? Several attempts have been made to elucidate it, but hitherto we have not met with any satisfactory explanation.

Although the mechanical and practical operations of warping are well known to almost every person of common sense and observation in the neighbourhood where it is practised, still the cause of its beneficial effects is involved in obscurity. Mr. Thornton J. Herepath made several analyses to show the chemical nature of the warp, and the result of his analyses were at the time given in the Royal Agricultural Society's Journal. He found the warp to be especially rich in chlorides and alkalies, some little phosphate and some sulphate, with some quarter per cent. of ammonia. He says, speaking of the warping water in its different states, "We see that it (the water) has experienced very little change in composition during the process, except in the proportion of the warp or insoluble matters which it held in suspension; consequently if we leave out of consideration what is owing to the saline ingredients of the water absorbed by the soil, it is evident that the whole of the increased fertility which is conferred upon land by warping is produced by the mud or silt which is deposited by the water. Nor in fact is the proportion of deposit so produced by any means inconsiderable; in the specimen examined, whilst the water in its former state contained 233½ grains per gallon of insoluble matter separable by a filter, the second specimen contained only 24 grains." Thus he goes on to show that every acre had received 3¾ tons of warp for every foot in depth of water that flooded it.

This material when laid on successively for years

he shows to be very considerable in the elements of crop-producing materials.

Taking, say, eighteen inches of warp soil to be deposited, there will be a stratum of 2829½ tons of super soil, or chemically speaking, there will be, of—

	Tons.	Cwts.
Soluble salts of river water	47	12½
Organic matter, including 5½ tons of nitrogen	170	16½
Carbonate of lime, including 74 tons 2 cwt. of lime	103	19
Carbonate of magnesia, including 44 tons 15 cwts. of magnesia	74	11
Alkalies	5	1½
Lime	11	2
Magnesia.....	48	11
Phosphoric acid.....	7	16
Silicic acid, sand, oxide of iron, and other comparatively marl substances	1016	10½

This is so far satisfactory: it agrees in the main with the Nile warps as given by Lassaigne in 1844, who thus describes it:—

Water	10·70
Ulmic acid and nitrogenous organic matter	2·80
Peroxide of iron	13·65
Silica	42·50
Carbonate of lime	3·85
Carbonate of magnesia	1·20
Alumina	24·25
Magnesia.....	1·05
	100·

In addition to these comparatively small proportions of fertilizing materials, supplied however in large quantities, Mr. Herepath contends that the mechanical improvement of the soil has also to do with the great fertilization produced by warping, and this has, no doubt, very important advantages. But he also attempts to answer the question as to the locality from whence this never-ending supply of warp is obtained. Not from the sea, he argues, for at the Humber mouth the water is perfectly clean; not by land floods, he further contends, for they injure rather than improve the warp; but from the action of the tidal waters, he urges, on the soft strata of shaly clay from the bottom of the Lincolnshire marshes; the organic matters being derived from cultivated land through which the rivers pass.

Now we may be permitted to differ from so great an authority, but with the greatest diffidence. We believe the cause of the fertility of the warp is due to another and entirely unsuspected agency. Mr. Charles Charnock, of Holmfield, whose practical knowledge as a farmer is even surpassed by his skill as a natural historian and microscopist, completely demonstrated to us the clear cause of the fertility of the warp to be due to *infusorial animalcula*. He had specimens of the best warp collected, and these he put under a very powerful microscope, and nearly the whole consisted of semi-transparent animalcula, resembling light sand to the eye, having the feel of the soft pliant warp; and being, in fact, almost the entire mass of the silt. He showed us, also, specimens of less valuable warp, nearer the clough or sluice, which contained the same animalcula, but mixed in a smaller proportion with the sandy and aluminous matter, in a fine state of comminution, and which seemed to be completely in accordance with the theory that these infusoria being light and floating on the water, or being lightly suspended in it, will be carried to the farthest point, while the marly earthy matters will be sooner deposited; and therefore the best crops are produced at that part of the warping the farthest from the inlets.

We hope a microscopical as well as chemical examination of the warp may be made, for it could scarcely be possible that Mr. Charnock's could be an isolated case; but it is always desirable to have as much evidence as possible.

It becomes an interesting question as to the origin of these animalcula. Where could they come from?—from the land, the sea, the river? We apprehend the latter. The decaying matter forms the bodies of these myriads of scavengers, who revel in putrescence; whose infinitely small ova are drifted on the breeze, or carried by the stream; and in their onward progress they die on their approach to the salt water, and thus float in the water while agitated, and are deposited in the mud and silt when it is still; and may not the fertilizing Nile, and the alumina of rivers also be due in part to these unknown, unsought for, because unsuspected, swarms?

The improvements of Hatfield Chase, a barren moor, by the alluvial deposit of what was once the bed of the tidal river Idle, where it had been buried for some couple of centuries, is doubtless due to the same mysterious cause—the bones, so to speak, and decayed bodies of these infusoria, another sort of guano mixed with sand and mud.

The drainage of the moor left a solid bed of peat over a subsoil of sand; and upon this a layer of 8 or 9 inches of the old warp is carted on a railroad laid down for the purpose. Four thousand acres are in course of this improvement; and the change produced thus instantaneously is most wonderful. In the place of a barren waste, nay, of a hopeless bog, the most surprising crops of oats, wheat, and beans, are grown; and the excavated bed of the river affords a reservoir to sub-irrigate the soil in case of necessity—an advantage in a peat subsoil of an almost illimitable kind.

Now, though few farmers can have either the one

or the other, there are few who cannot clean out old ditches or poudsteads, where the richest alluvial matter is deposited, and which will not only improve the water, but will also afford a valuable supply of the very best kind of manure.

The question, too, admits of other views. May not other sources of manure be opened out by investigations as to the presence of dead or live infusoria? and is it not probable that some of our chalks and our limestones are more abundant than others in them, or their remains?—Gardeners' and Farmers' Journal.

ON THE CULTIVATION OF THE POTATO.

BY A PRACTICAL FARMER.

"Let the skye rain potatoes!" said Shakespeare. "Alas! that he who conferred so great a benefit on this country should lose his head on the scaffold!!!"

The potato crop is undoubtedly the most important and most valuable root-crop known to the British isles, and its proper culture and management demand the most careful attention and unrelaxing energy of the British agriculturist. No root has yet become of so great and universal a requisition, whether as food for man or beast—the tables of the prince and the benches of the poor are alike served with it—to the latter it may be said to be invaluable: it provides a vast and cheap sustenance for their families, and in its cultivation creates immense demand for their labour. It has become one of the most interesting, as well as most profitable, crops known in British husbandry, whether we look to the amazing amount of good and universally approved food it produces, or to the extent of the population engaged in its cultivation; and perhaps no department of husbandry has undergone a greater improvement, both in the cultivation of the root itself and in the introduction of new and approved varieties; like new wheat, or new peas, every season brings out a new sort, so that we have varieties and subvarieties under names almost innumerable; in reality, the varieties are very numerous and distinct, and many sorts are exceedingly good, and may be selected to suit with great nicety almost every kind of soil, climate, and season. We have our early sorts for spring use; our best table or marketable sorts for general use; and our prolific sorts for cattle consumption. Its introduction has generally been ascribed to Sir Walter Raleigh, about 1586, who it is said brought the first sample from Peru or Virginia. The crop for many years obtained but very little notice, the root being small and unpalatable. It is to its improved cultivation that we owe its astonishingly extensive usefulness, and is a convincing proof what may be attained by the application of knowledge and industry applied to husbandry.

The Soils adapted for its Culture.—The soils best adapted for the culture of the potato are deep loams of considerable consistency, of good quality, but not too rich. Rich soils invariably cause a degree of "scabbiness" on the potato, and they will frequently turn yellow on boiling. This is generally the case on lands broken up from grass. The potato crop of such soils should invariably be preceded by a corn crop or pulse crop—this we say is the kind of soil to produce the largest crop of potatoes of the finest quality. The next we would name are the alluvial warps: these are good in proportion to the depth and quality of the warp—the frequency of the finest crop and the weight produced are extraordinary—the best warps have been known to yield alternate crops of wheat and potatoes for fifty years in succession under appropriate culture and the application of manure, some planters expending annually £10 per acre in manure for their potato crop; and it is by no means unusual for a crop to yield from 100 to 130 sacks per acre, of 2 cwt. each, exclusive of chats. Of the weaker warp lands the potato crop is sometimes taken after seeds or clover. The clover after being once mown is allowed in its second growth to get into full bloom; it is then dressed with fold-yard manure, and ploughed in at a shallow depth; in the autumn it receives a deep ploughing, and is thus laid up for the winter—the rotting clover, the manure, and winter's frosts, make it in admirable order for the early planting. The next we would name are the peat and moory soils: these are exceedingly good under proper culture and perfect drainage. Potatoes will not thrive in wet soils or in rainy seasons; subsoil drainage is, therefore, indispensable to the most profitable culture of the crop. The next variety of soils includes all deep loams capable of deep pulverization: these, upon whatever subsoil they rest, are well adapted for potato culture, and we think the same general directions for preparing the separate varieties of soils named above will suffice. Chalky gravels, dry sandy soils, adhesive clays; indeed, almost every variety of soil will, under very liberal treatment, produce tolerable crops of potatoes; but we cannot advise the adoption of this exhausting crop on such soils, under the disadvantages to be overcome in procuring a tilth of requisite depth and in keeping up their fertility.

The Preparation of the Land.—Deep clayey loams, alluvial warps and deposits, peat and peaty fens, deep friable loams of every character—these we class together in one general system of management, though differing in some measure in detail, which we shall

point out. The great general rules we would lay down are first, a truly efficient subsoil drainage; next, that all be ploughed up in the autumn at a depth of not less than seven inches, and as much deeper as possible, in accordance with the depth of loam or the useful nature of the subsoil—an admixture of an inferior subsoil with the surface soil is not to be discarded, it is frequently of great service, and ultimately becomes so incorporated as to form a deeper loam for future use; should the winter be favourable, and the land dry, it may be advantageously cross-ploughed ("*cross-culted*"); but, at all events, this must be done as early as possible in the spring, and all the power and appliances of the farm be brought to bear upon it to get it in order for early planting. We think with ordinary care and attention, and the judicious application of scarifiers, harrows, and rolls, the land may be so well worked as to produce a truly good and deep pulverisation; should, however, this fail, another ploughing must take place, and the working by scarifiers, &c., proceed as before, till a fine deep tilth is effected. It is of very little service to plant the potato unless this is accomplished. The cleaning must of course go on simultaneously with the working—all weeds should be carefully picked off and burnt, and the ashes spread upon the heaviest parts of the field to keep it open and friable. In breaking up old pasture or seed land for the potato crop we would recommend ploughing twice, or "two farrow deep," *i. e.* that the sward be turned down and covered by the under furrow being ploughed up at great depth and thrown or turned over it—this is done readily by a good ploughman. The first furrow drawn should be carted away; as the plough returns back the furrow is turned upon the furrow sole of the first furrow, this being ploughed very thin; returning back, the furrow taken is at great depth and turned upon the first. The next is a difficult furrow to get up, as it has to be turned from a great depth over or on the top of the other two, and will most probably require the aid of an assistant with spade. When this is effected the course is easy throughout: the thin sward furrow being turned down to the deep furrow-sole is covered by the deep or subsoil furrow being ploughed up and turned over it. The field should be left till the sward is well rotted, when it may either be set by spade, or worked as above, and set in the usual way, which we shall presently describe. In the fens or peaty soils it is desirable to wait till nearer spring, as generally they are more readily worked and more easily brought to a proper tilth, and injury from wet is more likely to be avoided, nor is early planting quite so requisite on these soils.

Chalky gravels, clays, dry sands, and other varieties of soils—to these the same general rules apply; but as it is impossible on some of them to secure a deep fine tilth, we can only advise its being done as far as practicable; they must be broken up as deeply as possible in the autumn or during the winter, and in the early spring to receive similar working as for the better soils. The great difference we are disposed to make as respects these soils is, in the course or rotation of the crop—of which presently. We always feel it a difficult task to point out these simple matters of business, as so many things present themselves as to the details. It is very important that all adhesive or chalky soils should have the advantage of winter's frosts. It is often desirable to manure the land during the winter—it furthers the course of business. We think it most profitable to manure the land immediately before planting; but such course cannot always be pursued; in this variable climate the judgment of the farmer must be the principal guide. If the land is kept dry and the manure is properly ploughed in before, or in the winter, it will undoubtedly be of great value to the succeeding crop. The great loss in value is from drenching rains or snows draining its best portions into the subsoil. The atmosphere will also abstract much of its choicest particles if the working of the land should be protracted and setting is late.

The course or rotation of Cropping.—The soils of the best quality, as classed above, we think would yield the most profitable crops under the following rotation, and with proper care and liberal treatment their fertility may be kept up, being occasionally varied according to circumstances:—First, *fallow* to be well worked, highly manured, and sown with turnips or coleseed—these to be fed off on the land. Second, wheat or oats. Third, potatoes; the land to be well worked and manured in manner as already named. Fourth, wheat. Fifth, beans, peas, or seeds (clover). Sixth, wheat; and in some cases when the land is in high condition, this fifth crop may be followed by potatoes, managed as before; and lastly wheat. The inferior soils, as classed above, are certainly ill adapted for the cultivation of the potato, but it may frequently be necessary or desirable thus to appropriate them. We think the crop should invariably succeed to fallow crop: this being fed off on the land, together with the manure used to produce the turnip crop, will leave it in fair condition for potatoes. The course will be—first, *turnips;* second, *potatoes;* third, *wheat;* fourth, *clover* or *seeds*, manured for; fifth, *wheat*. We know these are heavy courses to pursue; but we would observe that it is of no avail to cultivate the potatoes unless the land under cropping is naturally or artificially prepared for it—it must be in a high state of fertility.

The mode of Planting or Setting.—This must vary according to the nature and condition of the land to be planted. If it is naturally rich in quality, or is artificially worked up to a highly fertile state, the planting may be at wide intervals from row to row and thin along the rows; if the land is poor or ill-conditioned, the planting may be proportionably thinner. The

same rule will hold good as respects the varieties of potato to be planted, and the choice should be made accordingly—the smaller and dwarf growing sorts for rich soils, the larger and freer growing sorts for the poorer soils. We have no room for remarks upon varieties; but would, in passing, say that the *regents*, the *pink kidneys*, the *white ruffs*, the *red ruffs*, the *Devonshire reds*, the *York reds*, and some others, are known to us as good general varieties for the best soils; as are also those early varieties, the ash-leaved kidney and the Yorkshire kidney; and we also know the *ox-noble*, the *white-blossom*, the *snother-ground*, the *early shaw*, the *poor-man's profit* (blue), and the *mangold-wurzel* (this is for cattle exclusively), to be good varieties, and well adapted for inferior soils.

The Sets.—These should be prepared immediately prior to planting. The smaller potatoes may be advantageously planted whole, but the larger ones should be cut into proper sized sets, none being smaller than a very large walnut; and care must be taken to see that each set has at least two perfect eyes. We think the best crops are to be obtained from planting large sets cut from the best and finest potatoes. This, however, is seldom done owing to the great difference in value between the *marketable* and the *chat* or *seed* potato.

Planting.—On soils recently broken up from pastures or seeds, where it is desirable to prevent the grassy sod from being turned up and exposed on the surface, it is customary to set by the spade or by a kind of dibbling. In setting with the common spade the usual course is to lay lines along the field; a number of men, each attended by a setter, work along the line at given distances, so that all finish at the same time, and are prepared to remove the lines for the next row; the men make a hole with the spade by digging it into the soil, and slightly turning it so as to admit the pototo set; and as they proceed rapidly down the line, they make the holes, the lad or setter drops in the set, upon which the man puts his foot on passing, and it is done. This mode we frequently practise; and our sets are put in at ten-inch intervals, and about four inches in depth, in rows about twenty-seven inches apart. On the old cultivated lands the customary mode of planting is on the furrow sole made by the plough. The usual course we pursue is as follows:—The land being properly prepared, and the manure ready for spreading, two lines are drawn or points are set out about 35 to 50 yards asunder at each end of the field—from point to point the whole length of the field the spreading of the manure commences, being thrown out of the cart, and is well shaken about by lads, the cart being led as straight from point to point, or down the line, as possible, and the spreading is just wide enough to give room for the next operation, and no wider; as we hold it to be of very great importance that the manure be put in fresh, the potato set upon it, and the whole covered in at once. As soon as this is done the whole business proceeds together: the ploughman draws out two ridges along these manured lines, going a round or "*bout*" on each, by which he will leave the edges of the furrows nearly 28 inches wide, the setters proceeding to set the one as soon as ready, whilst the ploughman is setting out the other; and thus the work goes on throughout the field—the setters are setting one ridge or furrows around it whilst the ploughman is preparing the others; our usual practice being to set on the sole of the land side of every third furrow, the width of each furrow being in accordance with the desired width between the rows. The manuring is also arranged in a similar way: each ploughman has a lad to follow and draw into the furrow the manure as equally as possible, and along the rows to be planted more particularly. The sets are planted on the furrow sole with their eyes downwards if possible, and at about 10-inch intervals, according to the condition or fertility of the field; a light harrow is drawn over, and occasionally a light roll—either may be done without injury to the crop. Another common course is to ridge the field, as on the Northumberland plan for swedes, deposit the manure in the same manner, and plant the potato on the manure, and cover in and roll down as for turnips; we have frequently seen this done, but never to much advantage, possibly owing to the looseness of the soil around the sets, and the larger vacuum caused by the decay of the manure, and also the set in the ridge.

Subsequent Culture.—The first operation on the potato plant appearing above ground is to give the crop a light harrowing across the rows; in a few days the first horse-hoeing may take place, taking care to pass the side coulters as near to the plants as possible; in a day or two the ridge harrow should follow: both these operations should be repeated, if the weather is favourable, in about a fortnight afterwards; the great object is to keep up a thorough good pulverisation, as well as to promote cleanliness. As the plants grow, the next process is to pass the mould plough between the rows, and just throw upon, or rather in amongst the plants, sufficient loose mould to keep them from exposure, and aid their growth. The next horse-hoeing may follow in a week or two, this to be followed in a few days by the ridge-harrow; this will generally make a fine loose mould, which the mould plough in the next operation should finally throw up and around the plants sufficiently high to make one regular ridge, from the top of which the plants should appear to grow freely and unconfined, not being too closely pressed together, nor yet covered too high up their stems. *Hand-weeding*, filling up by sets with dibble or spade, should take place immediately after the second horse-hoeing, and *hand-hoeing* should immediately precede the last moulding up. As our paper has reached the limit we allot to ourselves, we will just say that in the autumn we may offer a few

remarks upon the storing and preservation of the crop during winter, and the mode of preservation for sale or market. We offer with diffidence

A few words upon the Potato Disease.—Amidst the various and conflicting ideas relative to the origin and nature of the potato disease put forth by the scientific world, as also the suggestions to be adopted to remedy such a singular and distressing visitation, we do not feel competent to offer any well-digested opinion. We are painfully conversant with the fact, and we only profess to take a common business-like practical view of the question as it stands; there it is—we must make the best of it. We are by no means partial to the adoption of nostrums of any kind; but as it is a certain fact that this is a progressive disease, from some cause yet to be discovered, our desire is that preventives may be attempted, and that our great assistants in modern agriculture—the agricultural chemists—will, as they have ever done, give us their best aid. We know what smut in wheat is—we know that smut-balls will infect the seed—we know that the same field that has been affected by smut or blacks in oats will produce smut in the wheat crop following it; we therefore dress our seed with various supposed specifics. We therefore venture to suggest a similar course with potato sets—something likely to retard or arrest the flow of impregnated matter from set to stem, or to destroy it in its progress either from stem to set, or *vice versâ*. Lime, sulphur, charcoal, vitriolized solutions, salt, chalk, gypsum, and a hundred other things might be judiciously mingled with the sets, and possibly some might to found to destroy the pestilential virus, supposing the seat of the disease may ultimately be discovered to be in the root. We merely suggest—we urge general effort—something must be attempted on a large and broad principle—discard not because you can't foresee the result—try. When the disease has extensively prevailed in a crop, the best practice we have seen pursued is, early in the autumn to pull up all the tops or stalks, and hill up as closely as possible with the hand hoe, so as to keep the roots from atmospheric or other influences.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Weekly Council was held at the Society's House in Hanover Square, on Wednesday, the 24th of March: present, Colonel Challoner, Trustee, in the chair; Lord Berners, Mr. B. Almack, Mr. Raymond Barker, Mr. Hodgson Barrow, M.P., Mr. Brandreth, Dr. Calvert, Captain Stanley Carr, Mr. John Church, Mr. Capel Cure, Mr. Fuller, M.P., Mr. Gadesden, Mr. A. Goddard, Mr. Fisher Hobbs, Mr. Law Hodges, M.P., Mr. Love, Mr. Maddison, Mr. Majendie, Mr. Mainwaring Paine, Mr. Rowlandson, Prof. Sewell, Prof. Simonds, Mr. Slaney, M.P., Mr. Reynolds Solly, Mr. Trench, and Prof. Way.

Dairy Management and Milk Pans.—Captain Stanley Carr in the year 1839 favoured the Society with a series of valuable and interesting observations, on the Rural Economy of North Germany, and especially on that of the Duchies of Schleswig, Holstein, and Lauenburg, in the latter of which his own estate lay. These observations, founded on his own extended personal experience, were printed in the first volume of the Society's Journal (pp. 124—134 and 371—387), the first series of them being honoured by the award of the Gold Medal of the Society. In those communications, Captain Carr makes the following remarks on the milk-cellars, dairy-maids, and milk-pans, which we select on this occasion, as having immediate reference to the statement made by Captain Carr to the Council at this Meeting, and to the discussion by which that statement was followed.

Milk Cellars.

The size and site of the milk cellar are esteemed by the Holsteiner as matters of first-rate importance: it ought to front the north; be shaded from the southern sun by rows of trees—elder being especially selected for this purpose, and, indeed, placed if possible near the windows, on account of their influence in keeping off the insect tribes; and a thatched projecting roof is preferred, affording greater protection from the heat: while, in choosing the site, peculiar care is taken to place the dairy beyond the reach of every thing calculated to generate bad odours, or in any way taint the atmosphere. The size of the milk cellar must necessarily be regulated by the number of cows, but it should always be calculated to contain the produce of four milkings; and as the milk dishes usually occupy a space of two feet square, the produce of 100 cows, giving on an average 8 quarts per day (a large average for the cows of this country throughout the year), would fill 50 milk dishes at each milking, and would require a ground surface of 500 square feet, as the milk dishes are invariably placed on the floor, the amount of each milking a little apart; and there must unavoidably be spaces left, to enable the dairymaids to go through their various operations of skimming, sieving, and removing cream, &c. The floor, though sometimes flagged, is more generally of brick, neatly fitted, so that no water may lodge in the joints; and always gently inclined, with a grated opening at the lower end, to facilitate the mopping and washing of the floor, which is never omitted to be done twice a day, notwithstanding that every avoidable impurity is carefully guarded against, and every drop which may fall at the time of the milk being strained, is instantly wiped up. A great improvement has been recently made in some newly-arranged dairies, by dividing the floor into compartments with brick ledges, from three to four inches high, between which the milk dishes stand; and the compartments (the lower extremity of which is fitted with a small sluice) being filled, by means of a pump, with cold water twice a-day, the milk is preserved so cool as to prevent all approach to acidity for several hours longer than when placed on a dry floor; thus affording, even during the summer solstice, sufficient time for a complete separation of the milk

and cream, without which the full proportion of butter cannot be obtained. For effectuating the same desirable result, ice is frequently resorted to in sultry weather, either by dropping a piece of pure ice in each milk pan, or by placing a pailful in the dairy, which by giving off its cold sensibly lowers the atmospheric temperature. It is considered necessary that the milk cellar should be sunk from three to four feet in the ground; be from 16 to 18 feet high (the best have an arched roof, as being more conducive to coolness than boards); and be furnished with two rows of windows (and, if possible, on three sides, north, east, and west), to secure a thorough air. The lower range consists of wooden trellis-work, provided inside with gauze frames to exclude insects, and outside with hanging shutters, which can be lowered and elevated at pleasure. The upper range is furnished with glass sashes when light only is requisite, which are exchanged for gauze frames, when more coolness is desirable.

Dairy Maids.

The dairy-maids, besides milking, cleaning the vessels, &c., work in the garden in summer, spin in winter, and wash, bake, brew, and cook for their own establishment, under the superintendence of the upper dairy-woman, who is by far the most important personage in it, as on her skill, attention, and diligence depend, in great measure, both the quantity and quality, and, by consequence, the profit of the produce. She must not only thoroughly understand, but accurately observe, the moment when the milk should be creamed; the degree of acidity it must attain in the cream-barrels; its temperature, whether requiring the addition of warm or cold water to the churn, as well as the all-important operations of kneading, beating, salting, and packing the butter. She must not only be punctiliously clean herself in person and work, but keep a strict eye over the cleanliness and order of her subordinate maidens. In very large dairies the upper woman has full employment without milking, and needs the assistance always of one, and sometimes of two, of the more experienced dairy-maids, in butter and cheese making; but in smaller establishments she milks a certain number, generally 10 cows, while each of her subordinates have 18; her wages are usually 55 to 60, that of her chief assistants 22, and that of the others 18 dollars per annum.—During summer the dairy people must rise at three, and even two in the morning, if the weather be very hot; for which they are indemnified by two hours' sleep, from one to three in the afternoon. At four they commence milking, which takes place in the field, and generally occupies two hours. At the beginning of the season each girl marks her own cows, by tying a particular coloured ribbon round their tails; and in some places they adopt the precaution of the milkers carrying a string, on which they cast a knot as each cow is successively milked, thus securing against one being forgotten. As the fields are large, and often at a great distance, the transport of the milk is facilitated by the very simple contrivance of a long, low, four-wheeled, one-horse waggon, in the side bars of which strong iron hooks are inserted, at such distances that the milk-pails, containing from 30 to 40 quarts each, may swing free of each other; and these, though filled nearly to the brim, are prevented spilling, notwithstanding many a rude jolt over the rough and often deeply-rutted road, by merely having thin pieces of wood, about the size of a dinner-plate, floating on the surface; a practice, indeed, universal in these countries, when pails with any liquid are carried even in the hand.

Milk Pans.

The milk when brought to the dairy is immediately strained through a 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 milking pails and dishes with a preparation of cinnabar, linseed oil, and litharge, has been adopted by the milk-venders 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 four years; and I give them a decided preference over all others. Their form is good, being 16 inches broad at the top and 12 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 consequently 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 butter depends much on 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.

Captain Stanley Carr commenced his statement to the Council, by expressing his regret at finding, that although the glass milk-pans (similar to those referred to in his communications to the *Journal*, and which had been sent by him to the Society from Germany some years ago, at the suggestion of Sir John William Lubbock) could be obtained on the continent at 8d. each, they had not been made in England in the first instance at less than *ten* times that price, nor, even after the duty on glass had been removed, could be obtained by the English farmer at less than *seven* times the charge made for them by the original foreign manufacturers to the native cultivators of the soil in Germany. It was true, that in the first instance only the finest flint-glass was used in England for the purpose; while, afterwards, light green bottle-glass had been employed; and he believed that superior quality in the glass was the plea urged by the manufacturers as a justification for the enormous disproportion between the English and the German charges for these respective milk-pans. But, without waiting to enquire whether the difference in the glass would make the difference in the prices demanded, he would say that the dark-green bottle-glass of Germany was quite sufficient for the purpose required, having a vitreous hardness and strength quite equal to the softer flint glass, into the composition of which a larger proportion of lead entered. The object to be attained was to get the manufacturers of England to make for the English farmer as cheap and good an article as the poorer, but not less patriotic, manufactruers in the pine-forests of Germany were so ready and reasonable as to make for the farmers of that country. The glass-pans, too, made in England, were cast in a different shape from the German ones Capt. Carr had sent over; he regretted this also, as the dimensions adopted in Germany were the result of much trial and combined experience, and would be found to be those best suited for dairy purposes. The German pans were of a regular shape and of uniform thickness: the English ones were of the same depth and capacity, but narrower at the bottom, wider and shallower over the sides, and irregular in the thickness of the glass in different parts; these circumstances in the English pans considerably affecting their strength, convenience, manipulation, and economical arrangement in the space of the dairy, as well as the equable rising of the cream from the body of the milk, and its clear detachment from the shallow sides of the pan. He had considered that this country stood the first and foremost; not only in its public spirit, but in the unrivalled skill of its manufacturers; and that he had only to send over from Germany a few specimens of the glass dairy pans, found there to be so economical and effective, to have them at once manufactured in England at an equal if not a lower rate for the use of the English purchaser. He did not, he must confess, expect disappointment in this object, in which he felt a warm desire to testify his regard to the agriculture of his native country; much less to be told, as he had been, that the English manufacturers did not think it worth their attention to make a cheap article of commoner but sufficiently good glass, while they could be justified in demanding seven times the price for a similar article in glass of a nominally higher value, though for the purpose in question not of superior quality. Captain Carr then stated to the Council the origin of his adoption of the glass milk pans. He paid a visit, about the year 1835, to a dairy situate on the borders of Mecklenburgh-Strelitz and Pomerania, and was particularly struck with the sweetness of the dairy in that bad butter-making district, so near the low sandy swamps of the Oder and the Baltic. On examination and enquiry, he found that the most scrupulous cleanliness reigned in every department of the dairy, and he there saw for the first time the milk placed in glass pans. The dairy-woman informed him that they were made at a cheap rate at the glass-houses in the pine-forests of the district, and that while wooden vessels had to be boiled to thoroughly cleanse them and remove acidulated matter from every crevice, these glass pans were at once rendered sweet and clean by simple washing with a sponge. Captain Carr found that these glass pans, such as the one then placed on the Council table, being one of those originally sent by him to the society, could be purchased at sixpence sterling each, at the glass-house, and conveyed to his own dairy 180 miles distant for two-pence more, making the total price only eight-pence. He ordered in the first instance 20 of these pans for trial, and found them answer so well that he soon ordered 300 more. The usual objection to their use was their apprehended brittleness; but glass pans of the thickness those were made of were not found to break so easily as had been supposed. At first he allowed a sum of money to his dairy-woman to cover this breakage; but it was found by experience, that in a dairy of 180 cows, the actual loss by breakage never exceeded 3s. 6d. annually. He had the satisfaction to find that his neighbours gradually adopted these glass pans in their respective dairies. Being anxious not to be foiled in his attempt to place the same advantage within the reach of the humblest cottage farmer in England, he had determined, after finding that the English manufacturers would not think it worth their while to produce the cheap article required, to ascertain at what price the original German milk-pans could be imported

into this country; and the result of his inquiry was, that they could be supplied in any quantity, and, including all changes of every kind, could be sold in London at a price between one and two shillings. Until the arrangements and calculations were completed the exact price could not be fixed; but it was hoped that it might be reduced to 1s. 6d., or even 1s. 4d., for each glass pan. Captain Carr stated that the great objects of the German dairy management was to prevent the milk turning sour, to maintain throughout the milk cellar an equable temperature of 60° Fahrenheit, to place the milk-pans on the floor, to allow the continuous ascent of the air from the floor to the ceiling, and out of the upper windows, and keep the milk as long as possible in the pans before skimming. It was found that the last object was more effectually attained in the glass milk-pans than in any other; and it was supposed that the perfect state of insulation in which the milk was placed by so perfect a non-conductor as glass, prevented the passage of atmospheric electricity through it, and the production of that acid matter which so constantly resulted under ordinary circumstances on changes of temperature and during thunder-storms. So rapidly indeed did milk turn sour under such circumstances, that the dairy-maids had often been obliged to get up in the middle of the night to prevent it by churning.—Colonel Challoner had been informed that the depth of the milk in the pan ought to be less in proportion to its richness in cream.—Captain Carr had found as the result of thirteen years' experience that not more than four or five quarts of ordinary milk ought to be put in a glass circular pan, such as the one then before the Council, sixteen inches in diameter at the top, and twelve at the bottom.—Mr. Raymond Barker remarked that different cows, according to the locality, were applied by the farmer to different purposes.—Lord Berners inquired how often the milk was skimmed in Germany, and how long it remained before skimming.—Captain Carr replied, that they never skimmed the same milk but once, and then not until it had stood at least thirty-six hours; but the longer it could be kept before skimming, at 60 degs. F., without becoming sour, the greater in proportion, to a certain extent, was the amount of cream obtained.—Mr. Law Hodges wished to know whether glazed earthenware pans would not equally answer the purpose as glass ones.—Capt. Carr remarked that in Germany they also employed glazed vessels and iron. The earthenware, however, being often badly baked, was on that account more fragile than glass, besides being more easily soiled and less easily cleaned; it was also at the same time a less perfect non-conductor of electricity.—Mr. Slaney, M.P., wished to say a word in favour of the manufactures of our midland counties, and to beg leave for specimens of them to be placed in competition with wares of glass. He alluded to the Staffordshire Potteries; and thought they would be able to furnish for half the price—at least for one shilling each—a milk pan of earthenware glazed on both sides, which would have all the advantages of the glass ones, as well as being cheaper and obtained in a more accessible manner than from Germany.—Col. Challoner wished to know whether Mr. Slaney meant the yellow Staffordshire ware, or the old red and black milk pans or "pancheons."—Mr. Slaney referred to the improved coarse Staffordshire ware; and from the conversation he had had with Ald. Copeland on the subject, he thought that an article could be cheaply produced that would meet all the requirements proposed.—Captain Carr remarked that all his desire was to excite that competition which would best tend to the promotion of the object in view, and he should rejoice, however the selection of party or country might eventually be made, if a great boon was through his means thus conferred on the English cottage farmer. He had himself, however, had a long experience in the use of dairy utensils, and he had reason to believe that earthenware vessels would not be found to possess the advantages of glass ones, which were cool in summer, resisted the inroads of electricity, and produced a finer cream and butter. The real net profit of the two would be found, he thought, in favour of the glass.—Prof. Way quite agreed with Capt. Carr's ingenious theory of the electrical insulation of milk in the glass pans. The milk in them would not turn sour so soon as it would do in metal vessels. We did not, he thought, well understand the mode of action of elictricity on liquids. When electricity passed through the air to the earth, the freer the passage, the more harmless it was. He was disposed to attribute the influence of electricity on liquids to chemical changes occasioned by electricity in the air itself, as in the well-known case of nitric acid in small quantities being produced in the atmosphere during thunderstorms, when such acidulation would at once act determinately on delicately poised constituents like those of milk, especially after that increased sultry temperature which usually precedes such a disturbance of the electrical equilibrium of the air. He quite agreed, too, with Capt. Carr, that milk should be kept cool and its temperature equable. Metallic vessels would in this point of view be far more liable than glass ones to communicate to milk those changes of temperature which take place in the surrounding atmosphere. He would venture to suggest whether the insulation of the milk from the influence of heat or electricity would not be more complete if a cheap glass cover was also provided for the glass pans. Glass, under all circumstances, would have advantages that earthenware had not, unless when very well glazed; for it was very often found in the laboratory that liquids would percolate unglazed, or but imperfectly glazed, earthen vessels; and if the milk penetrated at all into the substance of the earthenware pan, it would leave there its animal matter, which would rapidly decompose and create a taint and an acidity most injurious to the succeeding operations of the dairy.—Col. Challoner enquired the nature of the glaze on earthenware.—Capt. Carr believed the principal glaze contained lead.—Prof. Way stated that there were two glazes in ordinary use: first the common-salt glaze, of which the basis was the metallic sodium of the salt: this glaze was imperfect, but harmless; second, the white-glaze of lead, which was liable to be dissolved by acid matter, and would prove deleterious. There was also, he believed, a white glaze made without lead.—Capt. Carr thought that a cover to the pan would not be found to answer, as it would pre-

vent that spontaneous evaporation in a continuously ascending current from the floor of the milk-cellar to a height of 14 feet above it, and then out at the windows, which was found to have so beneficial an effect in preserving the dairy cool and fresh. When the floors were lower the milk did not keep so long, and, as he had before said, the longer they could keep it the better.—Mr. Fisher Hobbs had been very much interested in all that he had then heard on this important subject connected with our dairy management. Professor Way had stated that lead was a bad material. Mr. Hobbs had known slate used with great success, and he was not aware of there being any objections to its employment; it was a cheap material, and he had seen shallow trays that were constructed of it, and fixed in the dairies in Buckinghamshire, from which the London market derived some of its best butter.—Mr. Fuller, M.P., had for a long time used nothing but slate in his own dairies. He had a son residing in Anglesey who had a herd of 15 Alderneys; and slate in that part of Wales being very plentiful, cheap, and of large size, he had fixed milk-coolers constructed, of three or four square yards' extent, which kept the milk both clean and cool. —Mr. Raymond Barker believed that farmers generally were discoutinuing the use of lead. He agreed with Captain Carr, that it was desirable to place the milk-pans low down on the floor.—Mr. Slaney, M.P., thought it would be desirable to ascertain, by reference to meteorological registers, the difference between the prevalent temperature and electrical condition of the atmosphere in Holstein, and those in the West of England.—Captain Carr remarked, that the dairy was half underground, being required to be dry, but not damp; that it was always kept at 60 deg. of temperature, and its floor supplied with little channels of water.—Mr. Rowlandson agreed with every observation that had fallen from Captain Carr, particularly in reference to the form adopted for the glass milk-pans he had sent to the Society. The shape of the English glass pan then on the table before them was most ridiculous: from its shallow, shelving sides, it could not be moved by the dairy-maid without great inconvenience to herself, much disturbance of the milk, and liability, without great care, to a portion of it washing over the rim: from its irregular shape, too, one portion of the milk would have parted with its cream before the other. Where fixed pans were adopted in a dairy, he thought that slate would be the best material if adjusted in exact mechanical order; but when moveable dishes were used, he thought glass ones of the German shape were superior to any other. The colour of the glass was of no consequence, provided they would stand hard usage, and were liable to no chemical action. He thought it one of the wasteful facts in this country, that our manufacturers would not attend to economy in the articles they produce. There was no doubt that they could, if they felt disposed, make glass milk-pans as cheaply as the manufacturers of any other country; but unless the article they manufacture yields a certain price and profit, they were, he feared, but too indifferent to its production on other and more liberal grounds. Mr. Rowlandson took that opportunity of submitting to the inspection of the Council an Italian Siphon, which was regularly in use in large acid manufactories, and which he thought might conveniently be employed as a dairy siphon to draw off the milk from below the cream. It would indeed be necessary in this instrument, as Colonel Challoner remarked, to first use the mouth to draw out the air and promote the flow of the current of milk. When that objection was obviated, by some additional contrivance, he would again bring the siphon under their notice.—Col. Challoner remarked, that in Lord Camoy's Siphon, submitted by his Lordship to the notice of the Council a few years ago, that point, agreeably with communications which had passed between Lord Camoys and himself, had been particularly attended to, and the air being removed by means of a piston-rod formed of a piece of wire with a roll of tow at its end, drawn completely out of the siphon, the milk immediately began to flow.—Prof. Way thought that the Italian Siphon would, on account of its double-curved shape, require a flexible wire to form the piston-rod in this case. In speaking of lead being decidedly objectionable in the glaze of milk-vessels, he had spoken of its oxide in mixture or chemical combination, and ready for entering into new compounds on there being an acid present: he did not speak of the sheet or metallic lead to which Mr. Fisher Hobbs had referred, on which a weak acid had no action. Slate, he thought, quite unobjectionable in a chemical sense; but unless the joints were most accurately fitted, the milk would penetrate between them, and become the source of contamination.—Capt. Carr stated, as an instance of the great advantage arising from improved methods of dairy management, the case of the Baron Biel, a gentleman connected by marriage with some of the first families in this country. He had a farm in Mecklenburg, on which was a dairy of 150 cows, badly managed, and yielding a miserable return to its owner. At Capt. Carr's suggestion, he had expended £1,300 on the requisite improvements of his dairy, in the erection of suitable buildings, and a mill for churning. The Baron had previously spent no less than £3,000 in purchase of horses in England; but Capt. Carr was quite sure that he would not have expended £1,300 on his cows unless he had been thoroughly convinced of the judiciousness of the outlay. The result had proved the correctness of his conviction; for the Baron now sent his butter to the London market, where it fetched him one shilling a pound. The dairy, said Capt. Carr, ought to be free from the very semblance of dirt; the brick floor should be cemented, and hard; the walls smooth, and white-washed, and both wood and stone free from hanging dust of any kind; the air should circulate freely, and there should be no dampness in the rooms; the pans should be placed low down on the floor, otherwise the milk would not yield the full quantity of cream, and the vapour rising from the milk should have an opportunity of passing off unobstructedly from the upper part of the dairy; there should be no taint or bad smells; the aspect should be to the north; and the roof should be pent-house. Along the floor should be passages, on

which the dairy woman could walk in wooden slippers. In Holland, no milk was placed in pans on shelves, but always on the floor, as in Holstein. He could assure the Council that in those parts of the Continent where the dairies were managed in the scrupulous manner he had described, the object was simply *profit*; and the means thus taken to secure that end were those best adapted for the purpose, however they might have the appearance in detail of being employed on grounds only of elegance, taste, or even cleanliness.—Mr. Love informed the Council that his father had lived in the neighbourhood of Glasgow, where he employed slate as the material for receiving the milk in his dairy, and had found it superior to every other he had tried. He had himself never heard of any objection to its use, and it had been adopted by others. The milk-receptacles were from 3 to 4 inches deep, 2½ feet wide, and 3 feet long, and were excavated out of the solid blocks of the slate. They were placed on shelves in the dairy, and were considered as fixtures, the milk being drawn off at the bottom, while the cream was left behind in the cavity of the slab. He had seen them after being in use for fourteen years, when he perceived no other change in the material than that which consisted in a little better polish being given to it by wear. Mr. Love considered such masses of slate as equivalent to non-conductors of sudden changes of temperature, and as preserving the milk, in consequence, in a state of equable coolness. His brother, who succeeded to the management of the dairy, had tried zinc, tin, and earthenware, but found the slate far superior to any other material, being as clean in its use as it was possible for anything to be.—Capt. Carr enquired whether all the milk was churned?—Mr. Love replied that near Glasgow it was so, but at a greater distance from that city it was converted into cheese, or cream and skimmed milk.—Captain Carr was well acquainted with the dairy management in the neighbourhood of Glasgow, having thirty years ago paid a visit to Sir John Maxwell, of Netherpollock in Renfrewshire, when he had an opportunity of inspecting the celebrated dairies of the parish of Mearns in that county. He considered one of the great advantages of these discussions to consist in the communication of personal experience, and interchange of sentiments on topics of practical interest, such as had taken place at that meeting.—Colonel Challoner was glad to hear the statement Mr. Love had just made. The excavation of the slabs, he confessed, was new to him, and did away with those objections against the use of slate that were founded on the difficulty of effecting a perfect accuracy in the fitting in the joints of several separate pieces as employed by other parties who had used slate. The Council were much indebted to Mr. Love for the very practical and useful experience he had given them on that point.

Colonel Challoner then expressed to Captain Carr his own thanks and those of the Council for the great interest he had at all times evinced in promoting the objects of the Society, and in bringing before them on this occasion the interesting details he had done, with the same view. It was then arranged that on Wednesday the 21st of April, at noon, the subject of German glass Milk-pans would again be brought forward by Captain Carr, that of Dairy Siphons by Mr. Rowlandson, and that of Churns by Mr. Capel Cure.

Clover Insect.—Mr. Murcott, of Leamington, transmitted to the Council the following communication, dated the 20th of March—

> I hasten to inform you, that a sample of Red Cloverseed examined by me this morning yields me the clover vibrio in the interior of the seed, as I had expected. There is now no doubt that limed land becomes again subject to clover sickness by re-sowing of the vibrio in the clover seed itself. I was told, on receiving the sample of seed, that it was about to be sown this spring. This will render supply of sample unnecessary to determine the point, but leaves open to inquiry what sort of pickle will best ki them in the seed.

Professor Simonds remarked that having a few days since received a communication of this statement, he had examined some red cloverseed under high magnifying powers in the microscope, but had hitherto failed to detect any vibrio, or worm in it; he would, however, continue his research with different seed, and report the result to the Council. But Prof. Simonds thought that even the existence of an insect of this kind in the seed, would not explain the anomalies of clover failure. If the cause of clover-sickness originated in the seed, it ought to fail every year; whereas certain soil would grow a good crop of clover one year, and would not bear a similar crop until a certain interval of time, different according to circumstances, had elapsed. Mr. Murcott had sent to Prof. Simonds a bag of soil from land notorious for its failure of clover. Prof. Simonds had potted this earth, and sown clover seeds in it, which in due course produced plants, some of which certainly did go off; but on examination, he found the vibriones, or insects, alike infesting the plants which stood and those that went off. Again, white Dutch clover, it was known, would grow on soil where the red clover would not; but they both grew alike, and with the same effects, in this infested soil. In fact, the insect, to which Mr. Murcott's attention had been so strongly drawn, was, in Prof. Simonds's opinion, only one instance of the peculiar forms of animal life which were widely diffused throughout nature wherever there existed the slow process of animal or vegetable decay. Diseased wheat was well known to swarm with peculiar insects; and this clover insect, whether found in the seed or the stem, was, he believed, only of a parasitical character, and the natural effect of vegetable decay.—Col. Challoner and Mr. Raymond Barker then favoured the Council with their own experience of circumstances connected with the general question of clover-sickness.

Management of Pigs.—Mr. Fuller, M.P., stated that he had suffered a serious loss among his pigs by some distemper or disease, of which he was at present ignorant. He had lost six of his finest porkers before Christmas; afterwards a fine sow in pig, containing a large litter; last week, nine other pigs; and he feared, unless some remedy was found that would effectually arrest the disorder, that he should lose his whole stock. From the examination

that had been made, the lungs of these animals appeared to be much affected with acute inflammation or disease of some kind.—Prof. Simonds informed Mr. Fuller that, as a member of the Society, he would be privileged to send to the Royal Veterinary College for the best information and assistance that institution could give him, on the same terms of charge as if he were a subscriber to the college. If he would therefore send up the diseased carcasses of the next pigs that died, with a history of the mode and symptoms of attack from their being first taken, the subject should have every attention paid to it.—Mr. Fisher Hobbs, about this time last year, had lost several of his most valuable breeding sows from ulceration of the throat. Without staying to inquire what privileges he might avail himself of at the Veterinary College, he lost no time in requesting, on his own account, that Prof. Simonds would at once repair to the spot, and favour him with his professional aid and advice. He did so, and having investigated the whole circumstances of the food and general management of these pigs, he gave those instructions, which being followed, entirely saved the remainder of Mr. Hobbs's stock. Pork and cabbage it appeared did not always agree. The animals had been fed too low. Too great a quantity of vegetables had been given to them in a raw state, as well as trimmings of mangold-wurzel and turnips which it appeared had become partially decayed. His breeding-sows had, in consequence, been frequently subject to abortion, and been injured in their milking properties. Mr. Fisher Hobbs particularly recommended the food of pigs to be boiled before being given to them; and he had himself begun with great advantage to cut their straw into lengths of from four to six inches. He also strongly impressed upon all breeders of these most useful animals, the greatest attention to be paid to the mode in which they were lodged and treated, and a most scrupulous regard to cleanliness in every arrangement connected with them. No kind of live-stock either suffered so sensibly from a want of cleanliness, or so well repaid attention to this essential particular. He would also include due ventilation of the houses in which they were kept, and a careful selection and assortment of their food, as among the most desirable essentials for the successful management of pigs. He had himself bred every kind of farmers' live-stock; but pigs, he found from experience, required more attention to their management than any other kind of agricultural stock. On these points, he would only add, that with better management pigs would generally be more profitable. He had never known pigs do well either in houses with a northern or eastern aspect, or on a coarse red brick flooring, which absorbed and retained a large amount of moisture. A friend of his had expended a considerable outlay on his piggeries in Kent, but he was at a loss to discover how it was that his pigs did not do well, until it was pointed out to him by Mr. Hobbs that the buildings had an eastern aspect, and the floors were laid down with red brick. Mr. Hobbs had ascertained the same result connected with piggeries so constructed in different parts of the country. In his own case, he found that during the progress of his farm-buildings, his manager had removed his pigs to other piggeries, having damp floors; the consequence of which was that the animals were at once injured by the change; but, on removal to boarded floors, they soon recovered, and did well afterwards. In Sussex, he had seen the piggeries floored with flagstones and bricks; and he feared that until their old buildings were all knocked down, the pigs would not do well. Mr. Fisher Hobbs, in conclusion, remarked, that, although in his own case he had by great care been enabled to maintain his breed pure and in full vigour, in no animal, generally speaking, did a judicious cross exercise a more important influence in the improvement of a breed than in the case of the pig: the system of in-and-in breeding, with a few animals nearly allied to each other, could not be carried beyond its natural limits without a visible deterioration in the breed and produce.—Col. Challoner could most fully confirm what Mr. Fisher Hobbs had stated. He had imported his pigs from Naples, and they were fine specimens of the celebrated breed of that country; but, in endeavouring to keep the race pure by breeding in-and in from the same stock, he found that he was only thwarting nature in her established laws instead of improving or even maintaining the value of his choice Neapolitans, which became in consequence most degenerate, small in the litter, full of rheumatism; in short, all that was bad. Thanks, however, to the cross obtained with Mr. Fisher Hobbs's breed, he could not possibly have better pigs than he had now. Retaining much of the Neapolitan blood, he now continued his stock by alternation of the Essex with the Berkshire breed; and he obtained his best breeding sow by putting to Mr. Hobbs's boar the female offspring of the same boar with a Berkshire sow. His litters now consisted of never less than twelve sucking pigs of the first-rate quality, still showing the predominant influence of the Neapolitan blood, sustained by the combined admirable qualities of the Essex and the Berkshire. The floors of his pig-houses were formed of bricks set on end; but over these floors he put an oaken frame-work, so open in its divisions as to keep the pigs dry and warm, without allowing their feet to get through the separate boards of which it was composed. Having witnessed during his residence in Italy the folding of pigs in the chesnut groves of Sorrento, on the green and rocky promontory of that peninsular branch of the Apennines which separates the Bay of Naples from that of Salerno, he was led to adopt the same plan of management for his pigs in England, instead of leaving them injuriously to bake in the heat of the sun as in the summer months was so often seen to be the case in different parts of the country. Accordingly, he went into his woods, and selected the most convenient damp spots, where he formed a double-hurdle fold, into which the pigs in hot weather were driven after their morning meal, and supplied with cabbages and a few mangold-wurzel roots. The purifying effect of this cool and refreshing folding on the pigs was most striking. He began with porkers, which soon acquired a pure, soft, fat condition; and the subsequent progress they made when put on barley-meal was astonishing, the animals becoming fat in half

the time they used to do. He had again to thank Mr. Fisher Hobbs for the great service he had derived from the adoption of his invaluable and well-known breed of pigs.

The Council then adjourned to their weekly meeting on Wednesday, the 31st of March.

A WEEKLY COUNCIL was held at the Society's House in Hanover Square, on Wednesday, the 31st of March: present, Mr. Raymond Barker, Vice-President, in the Chair, Hon. R. H. Clive, M.P., Sir Charles Lemon, Bt., M.P., Mr. T. B. Browne, Mr. Burke, Dr. Calvert, Mr. Evelyn Denison, M.P., Mr. Dyer, Mr. Foley, M.P., Mr. Fuller, M.P., Mr. Gadesden, Mr. Fisher Hobbs, Mr. Kinder, Mr. Love, Mr. Maddison, Mr. Majendie, Mr. Overman, Mr. J. M. Paine, Professor Sewell, Mr. Stansfield, M.P., Mr. Trench, and Professor Way.

POTATOES.—Mr. Trench, of Trehill, near Southampton, favoured the Council with a supply of two varieties of potatoes, cultivated by himself with great success, and the following statement in reference to them:—

> I have cultivated the Forty-fold Potatoes for many years; and hitherto they have been all but free from taint of disease, even when planted close to others of which one-half have suffered from it. As an early as well as a late potato, I find this variety the best for the table of any I am acquainted with; and if planted in rich land, the most productive variety also: on account, however, of the number of the tubers (whence its name), it requires corresponding support from the soil in which it is grown. Besides being an early kind, the Forty-fold potato is very mealy and keeps well. I also send a sample of another kind, called the Early Lemons, much in request in that part of Hampshire where I reside, chiefly on account of their being equally free from disease. I had last year and the preceding one five acres of these Early Lemon Potatoes planted on a light sandy soil, and of the produce not five bushels were bad. The Early Lemon is a good marketable potato, but inferior to the Forty-fold for table use. The retail price of the latter in the Southampton market was, last autumn, one-third higher than that of other market potatoes. I have this year planted nine or ten acres of the Early Lemons, not having had enough of the Forty-folds to plant more than five acres.

—Mr. Love remarked that the different names now given in different districts to the same potatoes rendered it difficult from the name alone to identify any particular variety. The Forty-folds then on the table had a great resemblance to the old Rough Reds; but these did not yield so many tubers to each individual plant, although a greater produce per acre. He had often remarked, that the produce per acre was not to be inferred from the simple fact that a great number of tubers were yielded by each plant. In many instances the converse was found to hold good. He had himself grown on one occasion a crop that yielded no less than 24 tons per acre, from plants individually furnished with but few tubers. These were the Manton potatoes of Northamptonshire, a variety very similar to Phillips's Seedlings. He had been in the habit for twelve years of growing 25 acres of potatoes, and he might state his average produce at about 12 tons per acre. This was the produce, he understood, of Mr. French's Forty-folds; and it might at the present time, when the potato crop yielded so much smaller a return of sound tubers than formerly, be regarded as a very good produce.

SILESIAN BEET.—Mr. Reeve, of Randall's Park Farm, near Leatherhead, transmitted to the Council a sample of the Sugar obtained at the Mount-Millick Factory in Ireland, from the white Silesian Beet-root. The proportion in which this sugar was found to exist in this variety of Beet, was a circumstance which, in Mr. Randall's opinion, would tend to bring these roots into great repute for the purpose of feeding cattle, as well as for that of the extraction of saccharine matter for the sugar market; and he found his stock prefer the white Silesian Beet-roots to any other kind.

ENGLISH FLAX.—The Hon. R. H. Clive, M.P., presented a fine sample of Flax grown on his property in Worcestershire. The flax-straw had been prepared by Mr. Ludolph, and after retting yielded nearly one-fourth of its weight of flax, which in the Leeds market had been valued at £45 per ton. He also laid before the Council the following statement of the produce and cost of this flax, in comparison with Sir James Graham's statement on the same subject:—

STATEMENT OF FLAX PRODUCED BY THE HON. R. H. CLIVE, GROWN UPON HIS FARM, "THE POLES," 1851, FROM 2 A. 3 R. 23 P.

PRODUCE.

To 58½ bushels seed, at 8s. per bush.	£23	8	0			
5 tons 1 cwt. of straw, say 40s. per ton	10	2	0			
				£33	10	0

EXPENSE.

By ploughing, harrowing, and sowing.	1	15	0			
Rent of land, rent-charge, and rates..	3	3	0			
5½ bushels seed, at 9s.	2	9	6			
Pulling and setting up	3	18	2			
Tying up, lugging, and thatching	0	10	6			
Thrashing, winnowing, &c.	4	10	11			
				16	7	1
				£17	2	11

Profit per acre, £5 18s. 6d.

SIR JAMES GRAHAM'S STATEMENT.

Produce from 2 A. 0 R. 20 P. of Flax, grown 1851.

To 38 bushels of seed, at 6s. per bush.	£11	8	0			
3 tons 18 cwt. of straw, at 60s. per ton	11	14	0			
				£23	2	0

COST.

By two ploughings, harrowing, sowing, &c., 16s. per acre	1	14	0			
6 bushels of seed, at 10s. per bush..	3	0	0			
Weeding cost 9s. 8d. per acre	1	0	6			
Pulling, harvesting, thatching, &c., cost 21s. per acre	2	4	6			
Rent of land, rates, &c., 26s. per acre.	2	16	0			
Housing and thrashing seed, at 12s..	1	5	6			
Carriage of straw to Carlisle, at 6s...	1	3	6			
				13	4	0
				£9	18	0

Profit per acre £4 13s.

The Council then adjourned to the 7th of April.

A MONTHLY COUNCIL was held at the Society's House in Hanover-square, on Wednesday, the 7th of April. The following Members of Council and Governors of the Society were present:—The Earl of Ducie, President, in the Chair, Earl of Chichester, Lord Bridport, Lord Ashburton, Sir John V. B. Johnstone, Bart., M.P., Sir Robert Price, Bart., M.P., Mr. Raymond Barker, Mr. S. Bennett, Mr. Brandreth, Mr. Burke, Col. Challoner, Mr. Druce, Mr. Foley, M.P., Mr. Gadesden, Mr. Garnett, Mr. Brandreth Gibbs, Mr. Grantham, Mr. Fisher Hobbs, Mr. Hornsby, Mr. Hudson (Castleacre), Mr. Jonas, Mr. Kinder, Mr. Lawes, Mr. Pusey, M.P., Prof. Sewell, Mr. Shaw (London), Mr. Sillifant, Prof. Simonds, Mr. Simpson, Mr. C. Hampden Turner, and Prof. Way.

FINANCES.—Mr. Raymond Barker, Chairman of the Finance Committee, laid before the Council the report on the accounts of the Society to the end of the previous month; from which it appeared that the current cash-balance in the hands of the bankers on the 31st of March was £2,661. The Chairman explained to the Council the manner in which this total balance was ma up from the different balances of special accounts. At the suggestion of the Finance Committee, Messrs. Molineux, Whitfield, Dicker, and Co., of Lewes, were appointed by the Council to act as the Local Bankers of the Society during the period of the ensuing Country Meeting at that place in July next.

AGRICULTURAL CHEMISTRY.—Mr. Pusey, M.P., Chairman of the Chemical Committee, laid before the Council the following Report agreed to by that Committee on the preceding day.

The Chemical Committee have received a very satisfactory statement from Mr. Way respecting the progress in the laboratory. As this statement is now presented to the Council it is unnecessary for them to enter into its details. They cannot, however, forbear from adverting to Mr. Way's paper on superphosphate of lime, published this year, which has been highly useful to the manufacturers and to the public. The increase of private analyses of Guano has nearly doubled, but they strongly recommend to members of the Society to avail themselves more widely of this cheap security for that and other manures. Even though the analysis be made after the purchase, there can be no doubt that if it should show adulteration to have taken place, security would at least be obtained against the repetition of such practices in future. Where large purchases have been contemplated, previous analysis has often prevented serious loss. The subjects recommended for investigation in the present year are—1, The absorptive power of soils; 2, The action of lime; 3, The action of burnt clay. The Committee recommend that Mr. Way's offer to deliver three lectures before the Society be accepted.

Mr. Pusey also submitted to the Council the following Report made to the Chemical Committee by Professor Way, the Consulting-Chemist to the Society.

I beg to make a report to you of the operations which have been carried on in the laboratory during the last twelve months. The number of analyses made for Members of the Society at the reduced fees, from the 1st of April, 1851, to the same date in the present year, is 141; which may be thus classified—Limestones and marls 14, soils 14, guanos 36, superphosphate of lime 24, waste manures 9, various artificial manures 10, coprolite and other phosphoric substances 15, oilcakes 12, waters 1, animal and vegetable products 2, other miscellaneous substances 4.—Total 141. It will be observed that the analyses of guano amount to 36, a number which, although small when the importance of the manure and the facilities and economy of its examination are considered, is yet a considerable increase over that of the previous year. The analyses of samples of superphosphate of lime, and of phosphoric substances employed in their manufacture, have also formed an important item in the work of the laboratory. Since the last annual report two papers have been published in the *Journal* of the Society. The 1st, in the midsummer number for 1851, "On the Composition of Superphosphate of Lime—the modes of making and using it:" and the 2nd, in the last Christmas number, "On the Chemical and Agricultural Characters of the Chalk Strata." A short paper "On Dried Blood as Manure" was also published at the same time. The enquiry with regard to superphosphate of lime was not strictly amongst the investigations recommended by the Committee; but the increasing importance of the manure, and the want of any definite standard of comparison, seemed to point it out as a subject well worthy of attention. I may be allowed to say that the paper in question has, in the sphere of my own observation, had a most beneficial effect, not only in serving as a guide to what should be the composition of good samples of this valuable manure, but in the assistance which it has afforded to those embarking in the manufacture of superphosphate, and in stirring up the existing makers to the production of an article which should bear the test of chemical examination. During the last year a few more analyses of grasses have been made, and this investigation is in a forward state for publication whenever it may be considered desirable. With the sanction of the Committee, I would propose not to carry this enquiry any further at the present time.

Believing the subject of the absorptive properties of soils for manure to be one deserving the most careful attention, and promising results of the very highest importance to the theory and practice of agriculture, I have steadily pursued the investigation into these properties during the last year, and I am glad to be able to report to the Committee that I have succeeded in forming artificially substances possessing the properties which had been previously discovered to reside in soils, and I am now in a position to explain satisfactorily some of the mutual actions of the soil and manure which were before surrounded with so much obscurity. I propose very soon to give a statement of the progress of the investigation, in a lecture before the Members of the Society, and, if the Committee approve, to prepare a further account of the experiments, for publication in the next *Journal* of the Society. The prosecution of this enquiry entails a large amount of investigation of a purely chemical character; it is therefore necessarily tedious, and the details are unsuitable for publication in an agricultural journal, but the results are so interesting and important that I hope the Committee will sanction the continuation of the enquiry so long as any part of it remains incomplete. At the same time it would seem desirable to pursue such other subjects as may seem to possess an independent interest of their own, and be at the same time more or less connected with the absorptive properties of soils. The subjects which occur to me as of this nature are, the influence of liming

on soils, and the burning of clays. All of these subjects have been at one time or another recommended by the Committee, and have been more or less entered upon by me. I would suggest that the Committee should still leave them open for prosecution as the progress of the main enquiry may render expedient.

In addition to the enquiries already mentioned, I have, at the request of the Council, made during the last year analyses and reports to the Society on the subject of Australian guano and American phosphate of lime, and also a report to be transmitted to the Admiralty in aid of the search after guano by officers of Her Majesty's navy. In the last spring and summer three lectures were delivered before the Members of the Society at their weekly meetings. The subjects selected were respectively the use in agriculture of salt, gypsum, and lime. I propose to give also three lectures in the present season. The 1st, On the causes of the absorptive properties of soils for manure. 2nd, An examination of the agricultural principles of Jethro Tull. 3rd, Practical bearing of recent investigations on Tull's views.

These reports having been received and adopted, the Council agreed to the following arrangement for the delivery of Lectures, as proposed to them by the Chemical Committee:

LECTURES.

April 28.—Prof. WAY: On the Absorptive Power of oils.
May 12.—Mr. TRIMMER: On Agricultural Geology.
May 26.—Prof. WAY: On Jethro Tull's Principles of Agriculture.
June 9.—Prof. WAY: On the Absorptive Power of Soils.

VETERINARY INSPECTION.—The following report was received and adopted by the Council:—

The Veterinary Inspection Committee beg to recommend to the Council, that the duties of the Veterinary-Inspector of the Society at its Country Meetings be two-fold, namely:

1. To report to the Stewards of the Yard on the presence of any contagious or infectious disease in any of the animals brought to the yard.

2. To be in attendance in the Show-Yard, in order that whenever any doubt should arise in the minds of any of the Judges as to the existence of disease or imperfection in those animals which they may consider worthy of a prize or commendation, the Veterinary-Inspector may be called in to give his opinion thereon.

VETERINARY GRANT.—The Council postponed the consideration of this subject until their next Monthly Meeting, appointing in the mean time a Special Committee for its consideration, and their report to the Council on that occasion.

LEWES MEETING.—The following arrangements were reported from the General Lewes Committee, and agreed to by the Council:—

Tuesday, July 13.—Implement-Yard open in the evening to Members of Council and Governors of the Society, at Half-a-crown.

Wednesday.—Implement-Yard open to the public from 8 in the morning till 6 in the evening, at Half-a-crown.—Cattle-Yard open in the afternoon to Members of Council and Governors of the Society at Half-a-crown, and to the public at Five Shillings.

Thursday.—The Cattle and Implement-Yards (thrown together into one general show) open to the public from 6 in the morning till 6 in the evening, at Half-a-crown.

Friday.—The General Show open to the public from 6 in the morning till 6 in the evening, at One Shilling.

FINES FOR NON-EXHIBITION.—The Council decided unanimously, that in order to maintain a consistent and impartial enforcement of the established regulations of the Society, all those parties who had failed to conform with the rule of entry to which they themselves had subscribed, and of their non-compliance with which they had already been twice informed, and a claim made upon them for the amount of fines incurred, should, without any personal distinction or exception, in each case where the fine remained unpaid after the 5th of May next, be at once summoned to the Westminster County Court, to answer in person the just claims thus made upon them by the Society.

COUNTRY MEETING OF 1853. — Memorials were received for the holding of the Country Meeting of the Society of 1853 in the South Wales District, comprising the whole of South Wales, with the addition of the Counties of Gloucester, Hereford, Monmouth, and Worcester. These memorials and the documents with which they were accompanied were referred to a committee of Personal Inspection, consisting of Mr. Raymond Barker, Mr. Brandreth, Mr. Druce, Mr. Brandreth Gibbs, Mr. Fisher Hobbs, and Mr. Shaw (of London), with a request that they would visit the proposed localities, and report on the subject to the Council at their next Monthly Meeting, previously to their consideration and decision of the particular place for the holding of that Country Meeting.

The Council adjourned over Easter to the 21st of April.

NEW MEMBERS.

The Earl of Cottenham, of Tandridge Court, Surrey, and James Gadesden, Esq., of Ewell Castle, in the same county, were elected Governors of the Society.

The following new Members were elected:—

Allardice, Robt. Barclay, Ury, Stonehaven, Kincardineshire
Anderson, Alexander, Horsemonden, Kent
Ashby, Alexander, Staines, Middlesex
Bagot, Richard W., Kildare, Ireland
Bearn, William, Handley Farm, Towcester, Northamptonshire
Bowyer, Captain, Steeple-Aston, Woodstock, Oxon
Catt, Henry, Westfirle, Lewes, Sussex
Chadwick, David, Treasurer of the Borough of Salford, Lanc.
Elliott, Thomas, Scotsfloat, Blaydon, Rye, Sussex
Fernandez, Albert, H., 99, Chancery-lane, London
Fishwick, Henry, V.S., Burnley, Lancashire
Meeson, William Taylor, Great Doggetts, Rochford
Hainworth, William, Hitchin, Hertfordshire
Hodges, Basil, Vincent, Margate, Kent
Holyoake, George, Neachley, Shiffnal, Salop
Johnson, E. H., Gravelye House, Lindfield, Sussex
Jones, Fred. Robt., jun., Lane-End, Huddersfield
Marychurch, William, Haverfordwest, Pembrokeshire
Ruston, Alfred, Chatteris, Cambridgeshire
Sharp, Isaac, Dairy Knowle, Middlesborough-on-Tees
Stickney, William, Ridgmont, Hull
Wood, George, Rochford, Essex
Woodhams, W. R., The Hammonds, Rye, Sussex.

LONDON FARMER'S CLUB.

"THE BEST SYSTEM OF MANAGEMENT FOR LIGHT LAND."

The usual monthly meeting took place at the Club rooms, Blackfriars, on Monday evening, April 5. Subject for discussion : "The best system of management for light land." Mr. Thomas occupied the chair.

The CHAIRMAN, after adverting to the fact that he had been elected by the Committee to fill that post for the ensuing year, proceeded to say, that he considered the subject set down for discussion to be one of great importance to all who, like himself, were cultivators of this description of soil ; and, although he had no doubt that their friend Mr. Bennett had come armed at all points and was quite prepared to argue the question on its merits, yet there were a few circumstances to which he (the Chairman) wished to advert before he called upon Mr. Bennett, and which he considered well deserving of the attention of the meeting. Although from his long acquaintance with Mr. Bennett he was convinced that there was no man more capable of pointing out the best mode of manipulating light land and producing from it the best crop, yet he thought they must take into account their altered circumstances since the year—to them the very important year—1846. It must be recollected that prices had been nothing like so remunerative since that period as they were previously. Whether the measure of 1846 was a wise and just measure, whether it was carried out with too great haste, or in a spirit of hostility to agriculturists, were not questions for them to consider on that occasion, the club having wisely and properly determined to exclude everything like party politics. But it would be preposterous in the highest degree for that Metropolitan Farmers' Club to enter into such a discussion as that which was about to take place, without bearing in mind the probable range of prices to which the act of 1846 would inevitably lead. He believed there were few men of business, of any ability, who were not aware when the act was passed that the present prices of corn and beef would be the inevitable result. For his own part he had no doubt whatever on the subject, and every year strengthened his conviction, that so long as they had unrestricted imports they could not expect any permanent rise in the price either of meat or of grain. It was true that in consequence of famine having extended in a certain degree over the northern parts of Germany, wheat was now seen at 42s. ; but if there had been of late similar imports from the Baltic to those of the last two years the price of wheat in the English market could not have ranged anything like so high as it was at that moment. He trusted that these remarks would not be considered out of place. It was for them to consider whether an increase of their flocks or an increase in the production of corn would in the long run, with present prices, prove most advantageous to the farmer. They knew that formerly the general system of Scotch farming was to make the farm self-supporting. The whole of the produce of the farm, with the exception of wheat, barley, and live-stock, was constantly consumed upon the farm ; and that man who farmed the land in a clean manner, kept it well drained, observed a judicious mode of cropping, and showed dexterity in the management of his flocks and herds, could not be considered otherwise than a good farmer. Nevertheless, so long as he made the farm self-supporting he could not be called a high farmer (Hear, hear). His friend Mr. Hutley, and some other cultivators, had perhaps been laying out more on oilcake and so on than the whole amount of their rent. Up to 1846 that method of farming was very remunerative : whether it was so now he would leave the meeting to decide (Hear, hear). For his own part he did not believe it to be so ; and if they might judge from the balance-sheet of their quondam friend Mr. Mechi, it certainly was not (Hear, hear). In looking over a speech delivered lately by Sir James Graham, at Carlisle, he found that the right hon. Bart. recommended the tenantry to abandon to a very great degree, with the present low prices, the cultivation of grain ; and in looking over the work of Mr. Caird on British agriculture, he found it stated that the tenants of Sir J. Graham, adopting their landlord's advice, were laying down their land for pasture for four or five years, and looking to an increase in the value of their flocks for remuneration. Now this was a point which should be taken into consideration that evening. That was the best system which in the long run, looking to a series of years, would prove most advantageous alike to the tenant and the landlord (Hear, hear). He must observe, however, that if this doctrine of Sir James Graham were carried out throughout the length and breadth of England, they must look forward to an exodus of the peasantry similar to that which had taken place in Ireland. He believed that the policy of 1846, if carried out, would leave scarcely anything in the end but sheep-farms and bullock-runs, and evidence of this tendency was not wanting. Although the gross population of this country was a little more now than it was ten years ago, the agricultural population was found to be less, numbers having been driven into the large manufacturing towns (Hear, hear). He must apologise for having troubled them at such length, but he could not help seizing the opportunity of drawing attention to these points.

Mr. BENNETT : Mr. Chairman and Gentlemen,—The subject for discussion this evening, as many of my

friends around me are aware, is not one of my own selection. I lay no claim to originating it; and having consented, at the solicitation of my friends, merely to stand sponsor for its introduction, if my effort should prove an abortion, which I fear it will, the gentlemen of this club will, I doubt not, still extend to me their wonted indulgence. I dared not have undertaken its introduction but from the understanding that I was to be followed and supported by a very eminent manager of light land from the west of England, Mr. Sainsbury (cries of Hear, hear), and our able and scientific friend, Mr. Nesbit, &c. I feel, therefore, much relieved, from the assurance that, although it will be but feebly introduced, the subject will be handled, in the course of the evening, in a way that cannot fail, I trust, to render it beneficial to the farming world (Hear). I hardly need premise to an intelligent audience of agriculturists like that before me, that no uniform system of management for all kinds even of light land can be profitably adopted, so very much depending on local situation and the peculiarity of the soil. The most, therefore, that I can hope to accomplish this evening is to throw out a few general suggestions, the result chiefly of my own experience and observations, and that as a help to a better understanding of the subject, rather than to originate anything new (Hear, hear). For the sake of order, and to avoid misapprehension, I shall divide what may properly be termed light arable land into three classes: it might be divided into many more. In the first class we comprehend all those tracks either naturally fertile, or which have been rendered so by skilful management for a series of years, and sufficiently porous in their character to admit of the profitable depasturing of sheep in feeding off turnips. The most profitable system of management of this better description of light land, all practical men well know, must depend largely upon its peculiar adaptation, and to its proximity to towns of extensive population, rendering sometimes, as a matter of course, a system of partial garden cultivation more profitable than the common and ordinary system of stock farming, however judiciously carried out. I mean where the sale of straw and some of the root crops can be effected on advantageous terms, and good manure easily and cheaply obtained. And I feel assured this club will agree with me, that in too many instances advantage has been taken of such local facilities to palm upon the public certain statements as to the profits of farming, which the parties must know are inapplicable pretty well to ninety-nine farms out of a hundred as found in the country (cheers). In situations where no such advantages present themselves, it has become a question, I know, whether on the best convertible land the four-course system of farm management is the best. It is contended that there need not be so much as one-fourth of the arable land in fallow, which I admit, under the judicious operation of the horse and hand hoe and hand manuring, is not always necessary; but, whether it is not better to take an extra crop alternately of winter beans, white peas, or tares, for soiling on a part of the fallows, rather than depart from the system as a general rule, should, I think, depend more or less upon the nature of the soil. Nay, I will add further, if it be good cropping land, and not so kind for turnips, or particularly favourable for sheep, then I think under good farming an extra white straw crop may be grown more profitably to the tenant, and without injury to the landlord, converting it into what is commonly called the five-field system. The advantage, however, of this extra crop is often over-estimated, for you lessen the quantity of wheat on the farm, greatly reduce the sheep-feed, and I think increase the cost of labour; while on the other side it must not be denied, that this stubble crop under high management produces certainly either a superior quality of barley, or a fine sample of oats. I repeat it —while I am not sure on good stock land whether the ultimate result is much, if any, in favour of the five over the four-field system of farming—on land not so kind for stock, but will crop well, it is in my humble opinion a more profitable mode of management (cheers). There is, however, no uniform system of carrying it out in the country. In parts of Leicestershire, in particular, I observed the five-course system adopted, but quite in the inverse way to what is generally practised elsewhere; sowing, as they do, barley or oats after the clover, and then wheat. The argument in favour of the system is, that they have the benefit of the clover ley on which to draw some of their turnips during the winter for sheep and other stock; and a convenience no doubt it is, but, in my opinion, bought at too dear a rate. There is certainly a strong prejudice with those who practise it in favour of the system; and having pretty generally good land to practise upon, they do succeed in growing wheat: but I never saw a single field under this treatment but which towards harvest showed signs of sickliness—the invariable consequence of attempting to grow wheat after a white-straw crop, and on half the land of the kingdom, by adopting it, you would not grow two quarters of wheat per acre, more especially after barley. In common fairness, I must confess that I am not surprised that there should be in landlords a strong predilection in favour of the four-field system, it being obvious that, if the farm falls into bad hands, it is not so quickly deteriorated as under a more lax system of management. At the same time, it is unfair to punish the good farmer for the delinquencies of the bad. I hold, therefore, it would be beneficial to the country to have less stringent covenants as regards the system of farming, requiring chiefly that a just proportion of land should be left for cropping for the use of the incoming tenant, and the land generally given up in good heart and plight. Such a covenant

would of course apply to every description of land. In the second class I embrace the great bulk of average quality of convertible land in the kingdom; and in an assembly like this I scarcely need say, if water is found in the soil within two feet of the surface, the first or paramount object must be to get rid of it, by skilful under-draining, regulating the depth of the drains more or less by the character of the subsoil, taking great care, if it be of a sufficiently porous quality, to let the drains be sufficiently deep, being less expensive in the cost, as well as more effective, than a greater number of shallow drains. That accomplished, if the land be too light to give you quality of grain, or sufficient strength in the root crops, if clay is to be had within any reasonable distance, by all means apply it; the quantity varying, as a matter of course, with the degree of lightness you have to correct. The method of farming such land has become almost patent throughout the country. Starting with your fallow or root crop, then barley or oats—principally the former—laid down with seeds, after which comes your wheat; this, for the most part, completes the round, according to the generality of leases, and the custom of the country on such soils. In Hertfordshire and some other counties, they superadd, even on this second-rate land, a crop of oats; and as I said of the better soils, where the land is well farmed, and not kind for turnips, there can be little objection to it. It would be almost presumptuous in me, before such an audience, to enter into the minutiæ of farming; but I will just say that I have found on such soils the first great leading objects should be, to make clean fallows, manuring as high as you can for the root crops; and where you have to resort to artificial manure, not to apply the farm manure heavily on a part of them only, and then complete with artificial manure alone, but to ascertain your capabilities as to the home-made manure, making it extend over the whole, and add as much rapecake, guano, &c., as will force up a first-rate crop, never forgetting that the cost of cultivation is the same in other respects, whether you grow fifteen or five-and-twenty tons of roots per acre. For mangold wurtzel and Swedish turnips the ridge system, properly carried out, will grow the most, while the hoeing is much better effected, and at about two-thirds of the expense. The common white turnips are better grown upon the flat surface. I think it is not the most economical to sow all swedes or mangold as the fallow crop, for a good crop of white or green turnips I have found may be grown under skilful management after you have grown a fine crop of winter tares for soiling cattle. In that case the land should be cleaned and manured previous to the autumnal sowing, and then ploughed but once after the tares with a skim coulter, rolled heavily and repeatedly, with the necessary harrowings, and by drilling in about two and a half cwt. of Lawes' dressing with the seed, a splendid crop may be obtained on most soils. The great secret lies in getting the land very close within, only taking care not to roll when the land is wet. Barley after turnips of course for the most part follows, and then comes the question as to seeds. Many excellent farmers sow one moiety with red clover, and the other with mixed seeds for sheep-feed, and so changing it quadrennially. But it has been found that very little of this kind of land will bear red clover well, even every eight years, so that winter beans or peas have been substituted with success in many cases. In the west, especially in Wiltshire, it is the practice, in many cases, to sow one moiety with rye grass and trefoil, mowing it for hay, and then after once ploughing, sow turnips or rape, planting it still with wheat, but often not till February. There are doubtless gentlemen present who can, however, speak of the advantages or otherwise far better than myself. It is a custom, however, and perhaps not a bad one, of selecting a portion of the weaker part of the farm, and leaving it out of the regular rotation of cropping, keeping it in what is called up and down land, cropping it largely with sainfoin, and occasionally with corn. But whether that is best, or whether to lay down a part of the shift with sainfoin every year, letting it lie till the land comes next for wheat, and so take it up quadrennially, I leave rather to the determination of the gentlemen around me. At any rate, all will agree, more especially upon the chalky soils, that sainfoin is a most important acquisition to all farms with a chalky subsoil. We have now only to treat of the wheat crop. Among all our more experienced farmers, the aim is first to plough neatly, but *not deep*, for wheat, well covering everything upon the surface, using either the presser after two ploughs, or to do the whole, and put Crosskill's clodcrusher, or a very heavy roller, over the land previous to drilling. On naturally weak chalky land, I have found the common land presser following two ploughs, succeeded by five hundred weight of rapecake per acre, produce the most astounding crops, and on all lands requiring artificial aid I question much whether a better system can be devised. Our third class light land comprehends the lowest description of sands and gravels; and where clay (the great restorative of such soils) *is not to be found*, as also the very thin-skinned chalks, where the sterile rock approaches so near the surface as almost to defy the hand of cultivation. It is, I believe, to these soils that the original promoters of this discussion had intended mainly to direct attention, and I shall therefore leave in their hands, very largely, the necessary amplification on this part of the subject; just premising as a general rule, that if cultivation is attempted, the capabilities of such soils of raising food for sheep must be the leading or paramount consideration, because the flock upon extremely light land is not only the remunerating article, but it forms also the main source from whence corn can be produced. Within the last thirty years, although an ungrateful public give us little credit for it, these barren sands have been vastly ameliorated, and cultivation has as-

cended nearly to the top of these sterile rocks; but to every sensible man the difference between 7s. and 4s. 9d. per bushel in the price of wheat cannot fail, ultimately at any rate, to drive the cultivator from such scenes of labour (Hear, hear, and cheers). Nor has our agriculture made less progress on the second class lands of the kingdom. The humble individual who addresses you has succeeded within the last twenty years, by the high feeding of stock, &c., adopting the system of cultivation above named on a naturally weak soil, in raising the annual produce of the root crop from fifteen—aye, and often from five tons per acre—to five-and-twenty, and the annual produce of the wheat from twenty-five to forty bushels per acre, and that pretty systematically. Mark, I do not say that this was all profit. Oh no; it was done at much pains and cost, virtually adding another annual rent to the land; and many of you, gentlemen, have doubtless done as much. There are spirited agriculturists in the country who have done still greater things. Gentlemen (continued Mr. B.), I cannot take my leave of the subject, therefore, without solemnly reiterating what I have often said before, and I do it in the teeth of all the twaddle of political economists (Hear, hear), that this increased production is so much real wealth created in the country (cheers). There was a day, "ere England's griefs began," when the men who effected these ameliorations were regarded as true patriots, and as the benefactors of mankind. But, strange to say, yet not more strange than true, so perverted is the public taste become in that respect that the farmers of England are now only the butt of ridicule, the song of the drunkard, and too often the scoff and derision of those who should know better (Hear, hear, and cheers).

Mr. W. Sainsbury said that after the able practical remarks of Mr. Bennett, there remained little for him to address the Club upon; and in the observations he should make he meant to confine himself to a particular description of land which he had been in the habit of farming (Hear, hear). He did not come amongst them arrogating to himself the position of a teacher—rather he was there to learn. Still, so far as his practice extended, he was desirous of communicating its results to his brother farmers; because, if as agriculturists they had been conducting their operations at a loss, and they thought they had found a remedy for that state of things by improvements in the cultivation of that description of soil, it was right those improvements should be explained. He premised, however, that he did not conceive the tenant farmer was bound to carry out his (Mr. Sainsbury's) recommendations, unless under proper covenants inserted in his lease as a guarantee for the investment of his capital in the land (Hear, hear). By laying out his capital in the permanent improvement of these light soils, he not only promoted the increase of the stock on the land, but likewise augmented the produce in grain, and was consequently a benefactor to mankind (Hear, hear). The land to which he was about to allude was situated on Salisbury Plain, and had been broken up and brought into tillage only within the last few years. In that district vast tracts of land were now adapted to the keep of sheep stock and the growth of root and grain crops, which were formerly, comparatively speaking, barren wastes; and he was one of those who had undertaken to break up a great portion of that land (Hear, hear). The subsoil was chalk, and probably the top soil might vary from 2 inches to 6 in depth. At all events it was of a particularly light character; and in the month of March he had seen it drifting for miles, as if it were sand in the deserts of Arabia (Hear, hear). He would now endeavour to explain the course he had pursued of late, with the view of making that land advantageous to himself as the tenant. In the first instance he made the attempt to grow wheat; but he found that, after taking a crop from a virgin soil, where they had a light soil to deal with, there would ensue the difficulty of management. The system he pursued, therefore, was simply this: he gave up the cultivation of wheat altogether, because he could not get more than three or four sacks from the acre with the best possible management that he was capable of adopting, and taking the five-course system, began with the old lay. With regard to the old lay, his method was to chalk in the winter something like twenty bushels to the pole, and then by stifle-burning the land he obtained a good crop of turnips. But here, again, he desired to impress upon the Club that he considered the tenant-farmer was not justified in doing this, without the existence of some covenants in his lease, or part and parcel of the expense it involved being borne by the landlord (Hear, hear). In lieu of the wheat crop, which, as he had stated, he had given up, he followed the turnips with a spring crop of oats or barley. After oats or barley came a green crop, upon which he fed his sheep stock. The land was then sown with Swede turnips; for if it were laid in furrows he got no roots at all, because the soil was so light and porous that it would not consolidate, even though a Crosskill roller was used. By means of the green crop, however, the soil became more closely united, and a good crop of roots was secured. To Swede turnips succeeded barley or oats again, and then seeds.

A Member: For two years?

Mr. Sainsbury: Yes, for two years. When the old lay came round in the next course, another part of the land not burnt previously was then burnt in its turn, and so year after year; by which means every part of the farm was burnt once in five years (Hear, hear). Professors of Chymistry had stated that if land were burnt in this manner, the permanent qualities of the soil would be deteriorated or destroyed, rather than improved; but practically experience showed that land of the description to which he referred, if stifle-burning were prohibited by the landlord, could not be farmed at all in the present day. He was happy to say, however, that the bulk of the land he farmed was of a differen

character from this. If it were not, indeed, he should long since have been "driven to the wall" by his experiments. After losing much by farming on this sort of land, and incurring a considerable expenditure to find out the best mode of cultivating it, he had come to the conclusion not to advise any tenant farmer to follow his example, unless proper covenants guaranteeing the capital he laid out were inserted in his lease. He might state, however, that he had found it very advantageous to feed upon. The land was best adapted for winter roots. If he grew summer roots upon it, the manure did no good. It was the puddling of the sheep from November to February that did all the good for the crops of the farmer. On the other hand, if they went to strong lands of retentive qualities, instead of the treading of the sheep doing any good, harm was done, and the consequences could not be remedied the whole of the next season, whether the crop happened to be a turnip or a grain crop (Hear, hear). Providence had given to man a variety of soils for his manipulation, and it was the duty of practical agriculturists to meet together, and to communicate to one another the results of their experiments upon the different descriptions of soils under their management; so that, if possible, they might throw a little more light upon the matter (Hear, hear). In times like the present this was all the more necessary, because there could be no doubt that the agricultural interest were labouring under severe pressure, and that whether a man farmed "well" or "high," he must be a wonderfully good farmer indeed who made his balance-sheet exhibit a profit at the end of the year; that had been signally proved in the case of Mr. Mechi (Hear, hear, and laughter). He looked around him now, and asked where was that gentleman amateur, who had been so long engaged in teaching the farmers of England how to farm? How did Mr. Mechi's balance-sheet stand? There was the rub (Hear, hear). Then again there was Mr. Huxtable, another eminent amateur! He (Mr. Sainsbury) was one of the deputation sent from the South Wilts Farmers' Club to visit Mr. Huxtable's farm, and he would take that opportunity of stating that that gentleman's farm at Underhill was a heavy and strong description of soil, originally he believed pasture, and all virgin soil when brought into tillage. It was not to be wondered at, therefore, and there was nothing particularly strange in seeing good crops raised on soils of that sort for a series of years. The proper lands upon which to put these gentlemen farmers were, he thought, lands the previous occupiers of which had been "beggared out;" whereon bad farming had been practised, and no virgin soil was to be found (laughter). Don't let them work upon virgin soils, and then go and boast of the enormous crops they grow (Hear, hear).

The CHAIRMAN: Do you use any artificial food for your sheep, Mr. Sainsbury, in those clover-lays, to obtain your crops?

Mr. SAINSBURY: The stock he kept upon this description of land was principally breeding-stock, and they were there from November to February. Breeding-stock did not require more than hay or roots—at least, that was his opinion as a South Down breeder. On the other hand, upon the old field arable, where there were retentive properties in the soil, and upon which in the summer months he kept his summer stock, there he used artificial food to a considerable extent; but in the winter months, for breeding-stock, he found that it was not necessary to give them artifical food (Hear, hear). He used artificial manures, of course: without them he could not farm at all (Hear, hear).

Mr. NESBIT said he was about to recommend a system which was not generally practised. He advised the not fallowing for turnip crops, but the growing of the greatest possible amount of green crops between the corn crops. If time had permitted, he would have brought the statistics of four or five farms in different parts of the country, and the course of cropping during three or four years upon this system. It was quite clear to him, that by a proper system of farming it was not at all necessary to spend the time before the turnip crop in fallowing, but that they might have a green crop, and afterwards, by proper assistance, as good a turnip crop as if they had not had the green crop; and consequently they would be able to keep a much larger quantity of stock. In support of this view he read quotations from two letters, showing the rotation of crops from 1850, and proceeded to observe—Certainly, if that gentleman was not a gainer to the same extent that he might be under other circumstances, he was certainly not a loser to the amount he would be under another system of farming. He was not mentioning this plan as one of the best which could possibly be devised, but simply as one which was not generally carried out. He had seen much the same principle adopted on a farm in Oxfordshire, with the occasional interpolation of a crop of winter beans, between which turnips were sown in the spring of the year. He had heard much against the system, but he believed that the failure was for want of good management; he had seen excellent results produced where proper care had been taken. It was impossible for the same plan to be applicable to all kinds of soil; but the principle he wished to have well discussed was, whether it was at all necessary to have a fallow for turnips, recollecting that green crops were instruments for drawing from the air a much greater amount of nutriment than could be derived from the attractive properties of the soil, and that the more green crops they had the more stock they could keep, and the more stock they kept the more corn they could grow. He had seen in various parts of Dorsetshire straw placed on the land, and sheep folded over it, and had been told that it was the best possible plan for making the straw into manure directly upon the land without having recourse to bullock feeding. He was surprised that persons were not more generally acquainted with the beneficial effects of put-

ting chalk upon chalk. It was possible to find portions of chalk land without a particle of lime on the surface, which was owing to the tendency of lime to be washed downwards. The burning of soil must also be attended with beneficial results, as it produced a considerable quantity of carbon, which added to the absorbing property of the soil, and was of great advantage on light lands.

Mr. PAIN thought it must be evident that, especially in a country with such a climate as this, no positive rule could be laid down for all soils. In the county he came from they were generally restricted by lease to the four-course system; but where a tenant kept a good stock of sheep upon their light chalk soils, there could be little necessity for restricting him to any particular course of cropping, providing he left at the end of his term a good entry to the incoming tenant. On chalk soils he thought there was no plant grown with more advantage than sainfoin. It was customary in his part of the country to crop one-fifth of the land with sainfoin, leaving the remainder for four-course cropping; but on the hill, where they had no pasture for their sheep in the spring, they generally managed to leave a part of their winter turnips, pulling them up in November and pitting them in the field, at the expense of 5s. 6d. or 6s. per acre, cutting them in the spring for the sheep; and instead of sowing that portion of the land with green crops, sowing it with white turnips, bringing it in for wheat in the autumn and barley in the spring, and then the sainfoin. By this plan the ground was kept pretty clean and free from hay-seeds, which generally did much injury to the sainfoin crop. He did not agree with Mr. Nesbit when he advocated the growth of green crops before turnips; in his (Mr. Payne's) neighbourhood the attempt to sow turnips after winter tares was generally a failure; some part of them was left to the end of June or middle of July, and then it was almost impossible to get a crop of turnips. With regard to winter beans, he thought they would cut a sorry figure on Salisbury Plain.

Mr. SAINSBURY, in reply to questions, said that the price of stifle burning on raftering varied from 10s. to 12s. per acre, and was generally considered equal in value to two quarters of bones. About half of the soil was turned by raftering; and in the month of February, when they could not plough for turnips or barley without treading the land too much, the scarifier with the broad-shares was used. The earlier it was done the sooner it came to burn. He had burned a good deal of land; it not only produced valuable manure, but destroyed the insects, which was of great importance for the green crops. The sum he had named did not include the horse power.

Mr. FISHER HOBBS complained that the discussion had taken too political a turn, and had not dealt with some important points in connexion with the subject announced for consideration. He alluded to the improvements made by the late Lord Leicester, in enabling his tenantry to turn the rabbit-warrens of Norfolk into productive land, by bringing a portion of the substratum of marl to the surface—to the extraordinary improvements in the heaths and fens of Lincolnshire and Cambridgeshire, by claying and warping, &c. They had been told that under the present prices of corn and meat light lands could not be cultivated; but if under good remunerating prices it paid, it must in a degree pay under moderate prices. When they hired a farm, they did not take it for the profit or loss of one year, but they looked to the average of a number of years for a return for the capital they invested; they were looking for better times, when more justice should be done to the class they belonged to. He thought they might spend half-an-hour profitably in discussing various questions in regard to the management of light lands. Farmers in this country had frequently attempted to grow too many corn crops upon light land, and had not grown those green and root crops which in many instances would be more advantageous to the grazier and the breeder of stock. He thought that any one having light land, and using it as a sheep farm, could not have much to complain of for the last four years; and if a member came there and said he could not grow wheat upon his light land, he ought not to be allowed to leave the meeting with that opinion; he ought to be convinced that he had not tried every means in his power to enable him to grow wheat. He had not told them that he had applied either clay, marl, or chalk in any way to his land; that he had extensively used manures; that he had applied salt and various other things to consolidate the soil; but he had said that he had grown two white crops in succession ("No, no"); that he had burned the soil and gone on the exhausting principle, as too many had gone, and after they had laid out a few shillings in stifle burning, expected the soil to grow anything. He (Mr. Hobbs) thought that more green and root crops might generally be grown on light soils, and to these he would confine himself. He highly approved of cinquefoil for chalky lands, but it could not be advantageously grown upon sands. He thought there was a great breadth of land which might be sown with rye and vetches, rape, and other green crops, which would produce an excellent variety of food; and then with the Scotch or the yellow flesh turnips, which would come in good time either for late wheat or early barley. He was convinced that they might have three green crops, and that then the land would be in a better condition to grow a cereal crop than if it had been exposed to the sun for the greater portion of the summer months. With regard to clay and marl, when they recollected that some of the most productive land was once let for 2s. 6d. per acre before the application of those substances, it was of importance for them to consider whether a great portion of the sands and light lands could not be treated in that manner. He was not one of those who thought the tenant could do all these things for himself; but even where the landlord refused to assist him, money could be borrowed, he believed, from a certain company, for the purpose of making durable and permanent improvements.

Mr. SAINSBURY said he did not consider the plan he adopted to be an exhausting one: he could make his land carry wheat, no doubt, if it was situated near a clay-pit; but under the circumstances, it would cost him the fee-simple of the land to do so; neither did he think it advisable, while he could secure a fair crop of oats.

Mr. SHAW said, as a non-practical man, he should not have offered any remarks, had it not been for a remark of his friend Mr. Hobbs; and he (Mr. Shaw) now rose with a view of endeavouring to show, that while that gentleman had seemed to animadvert on the course which the debate had taken, there was a distinction to be drawn between what he meant and the statements which had been laid before the Club. The subject before them was, "The best management of light land;" Mr. Hobbs had alluded to what might rather be called the improvement of light land, and this was the difference between the view which he had taken and the course which they had adopted. He (Mr. Shaw) thought this was not a wrong view, because Mr. Hobbs himself had said, that he did not think the tenant should do all, but that the landlord should do his part. Now the improvements in Norfolk to which Mr. Hobbs had alluded, and which were perhaps the greatest improvements that had ever been effected in this country, excepting perhaps the wolds in Lincolnshire, had arisen mainly from the peculiar system adopted by Lord Leicester towards his tenants. It had not been through the management of land, strictly speaking, but through the improvement of the land. The landlord had given the tenant a long lease, at comparatively a peppercorn rent, which enabled him to make those improvements which the landlord ought to have made. He held, therefore, that the course taken by the club had been perfectly in accordance with the wording of the card. He thought that Mr. Hobbs was right in his view, in one sense, because, although there were certain improvements which the tenant might make, if he could get any return for them, there were also those which it was the bounden duty of the landlord to effect, and unless the tenant had the opportunity of recouping his capital, the improvement of land should be performed by the landlord and not by the tenant. He perfectly understood Mr. Sainsbury to be an advocate for what Mr. Hobbs advocated, viz., the greater extension of green crops, and the lessening of the corn crop, which drew so heavily upon the land. With respect to stifle burning, he (Mr. Shaw) had been acquainted with the practice from his infancy, and when corn fetched a high price, it was the custom to convert any hill-land which could be obtained into land capable of producing corn, and paring and burning was then, and he held it to be now, the best system for improving the character of that description of land. When he heard of that system being deprecated, and of landlords not allowing it, he could only say that it was just the argument which might be used against brandy. Brandy was a medicine, and very good when moderately used; but when it was immoderately used, they knew the consequence. It was just so with paring and burning. If they made the ashes they procured the foundation of their green crop (and he defied them to produce a better), and did not scourge the land afterwards, it was the best plan that could be adopted for the improvement of inferior or waste land. With respect to the political course which it was said the debate had taken, he must confess he did not think the Chairman had overstepped the mark, because it must be perfectly clear that a different system of management was necessary when corn was 5s. per bushel to what was necessary when it was 7s. He was glad to find that, at the close of his remarks, his friend Mr. Hobbs had come round; for they would recollect he had said that he was looking for better prices, when the land could be cultivated to more advantage. It was certain that climate must have a great deal to do with the production of green crops. It required an extremely good climate to produce two green crops in one season; and on light lands generally the climate was much against the attempt. Still, it was advisable to endeavour to grow green crops to as great an extent as possible.

Mr. TATTERSALL did not agree with Mr. Nesbit, that green crops could be grown to any great extent before turnips, as on a large farm the sowing of turnips occupied a considerable time.

Mr. LOVE thought the four-course system about as good a one as could be adopted on light lands. He recommended the use of a plough which would turn the land entirely upside down.

Mr. HOWARD dissented from Mr. Love's view with regard to the turning of land. There was no angle which would expose a larger surface to the action of the atmosphere than that of forty-five degrees.

Mr. BENNETT being called on for his reply, would not, he said, detain the meeting at so late a period. He must say, however, that he had felt rather amused at his friend Mr. Nesbit's remarks, as to doing away altogether with any fallow for the root crop, and at his plan of keeping an extensive farm quite clean, even under a *seven-course system*, by merely sending a man occasionally with picker and basket, at the cost of 2s. 6d. per acre, to pick out and gather the couch (laughter)! They all knew how valuable this gentleman's remarks were, when he dilated on subjects with which he was familiar, but on these practical subjects he was evidently at fault. He would just say that he thought the severe and very tart criticism of Mr. Fisher Hobbs, both on him (Mr. B.) and on the chairman, was altogether uncalled for (Hear, hear), and betrayed a feeling not at all creditable to that gentleman. He found fault at our not doing better, but failed himself totally in adding anything to our stock of information (Hear, hear). He complained that we had said nothing of what had been done by the tenants of Lord Leicester; but they, as a matter of course, had been included in the general improvements which had been effected. He would submit the following resolution for the adoption of the meeting:—

"That it is the opinion of this meeting that no uniform system of management can be safely laid down; that while the four-course system, as a general one, is perhaps the most applicable to light land, yet under good management it is not essential to restrict the tenant to a uniform system."

The CHAIRMAN said he needed the indulgence of the meeting more than ever, on account of the attack of his friend Mr. Hobbs. It would be impossible for each man present, were he the cleverest man in his own parish, to devise a system to which all would agree. The object of the discussion was to obtain the opinions of the most practical men in England, and make a digest of them, and endeavour to come to some conclusion respecting generalities; and although it had been thrown in their teeth that they had been sitting there for political purposes, he (the Chairman) would appeal to the columns of the *Mark Lane Express*, where he believed the proceedings of that club were honestly and faithfully reported, whether a single political opinion had been expressed, which did not refer to the subject under consideration, and whether in alluding to the lower price of corn since the year 1846, as suggesting a different course of cropping, he had overstepped the bounds of propriety. He repudiated, as much as any gentleman, the idea of making the club an arena for political quarrels, and he was sure no one could judge from his remarks what was the bias of his political opinions.

The resolution having been seconded, Mr. Hobbs proposed the following amendment:—"That in the opinion of this Club, the ordinary rotation of cropping on light land, which has prevailed of late years, may be altered much to the advantage of both landlord and tenant, by the application of marl, clay, or chalk, where applicable, or by greater attention to the more frequent growth of green crops for consumption, and allowing the grain crops to be of less frequent occurrence."

The amendment was put to the meeting, but the original resolution was carried, the numbers being 14 for the original resolution and 2 for the amendment.

The usual vote of thanks to the Chairman having been passed, the proceedings closed.

CULTIVATION OF THE BEET-ROOT IN IRELAND.

There is not a more wonderful phenomenon in the whole range of vegetable physiology than the power that plants possess to secrete their peculiar principles from one and the same soil, and their possessing precisely opposite qualities. Two plants shall be selected of the same size and age, or two seeds shall be deposited in the same earth, be watered with the same showers, be exposed to the same atmosphere, climate, aspect, and circumstances, and the one shall be sweet and the other bitter; the one eatable and the other the reverse—nay, the one highly nutritive and the other a destructive poison! A plant considered as a machine for working up the raw materials of soil, moisture, and gas, with proximate principles, will turn out the shining satin, the same stable and less brilliant silk, and the softer but shaggy velvet, from the same material. The raw material is the same; but the machine, the vital organism, is different: one arranges the ultimate elements into sugar, another into gum, a third into starch, while others are more elaborately combined into some peculiar and subtle agencies. The almond secretes the deadly Prussic acid, the nux vomica tree the poisonous strychnine, the rice plant the rich starch, the sugar-cane the sweet juice, and the wheat—the growing plant of all the gluten—to sustain and build up the still more wonderful structure, the human frame.

Some months ago we alluded to the movement in Ireland, with a view to the cultivation of the beet-root, to lay the foundation there of the making of native sugar; and we then stated that if the society incorporated for the purpose were in a position to pay the cultivator proper price for the raw material, there was no doubt of the two following facts—

1st. That if the proper kind of beet-root were selected and cultivated, there was no doubt of its producing excellent domestic sugar; and

2nd. That if a proper and remunerating price could be obtained, there was no question of the soil of either England or Ireland producing it both in sufficient quantities and of the proper quality for the purpose.

The scheme which we then alluded to has now come so far to maturity that the sugar works, which, by the bye, we may say are extremely simple, are now, we believe, quite completed at Mount Meillor, Queen's County, and that the process of manufacture has actually commenced. Nor has the fact of the favourable climate and the excellent soil of Ireland, both so remarkably adapted for root cultivation, been at all falsified by the experiments made last year. The beet is equal, at any rate, if not superior, to the French and Belgian roots; and we anticipate, if the subsequent practical and financial results are as favourable as the enterprising company hopes it is, that Ireland will be amongst the very first of the sugar-producing countries on this side the Atlantic. Nor let this observation provoke a smile; it is by no means either small or contemptible. In France it has been gradually progressing for some years; so long ago as 1828 some 5,370,000 lbs. and upwards were manufactured in

France, and in some nine years it has advanced to upwards of 72,000,000 lbs: while at the present time so important has the manufacture become to France, that some two-thirds of the whole of the sugar consumed by that country is manufactured from the beet: the quantity is stated to be upwards of 156,854,610 lbs. of sugar, and its consumption in France has increased some 25 per cent.

In Belgium, again, the experiment has been so completely successful, that there is now hardly a district where it is not most successfully carried on; and we had recently an application from the Russian government to recommend an agriculturist to take charge of a vast tract of land for the cultivation of beet, to be used for a similar purpose. We believe the establishment was as much as 8,000 acres.

Now, we repeat, Ireland is much more fitted for beet cultivation on a large and successful scale than any of the countries above named. It is so near the ocean in all its parts that it has always a moist atmosphere peculiarly favourable to the soil; and as its manure always requires chloriodic matter, this alone is of great consequence. There is no part of Ireland where the exhalations of the ocean are not carried, and so the soil is annually supplied with salt in one or other of its shapes. This can be said of but few countries. In England it can scarcely ever be the case. If it does occur, it is only on occasions so memorable as to be absolutely terrific.

In the "great wind" of 1839, the salt spray brought from the Irish sea swept so far over the island that the windows at Malton, within say 30 miles of the opposite coast, were encrusted with crystals of salt, so as to be both perceptible to the eye and very palpable to the touch and taste, making it evident that the whole of the western and midland parts of the island had a thin coating of saline matter. But this was an isolated case, produced by the happily unusual phenomenon of "*the* great January wind"—whereas in Ireland it is the commonest thing possible to have saline matter wafted across the island almost in every breeze, and brought down by nearly every shower. Hence for this reason it may be expected that the Irish beet root will be very fully developed. We understand it can be grown at a profit for a less price than even the estimated 13s. per ton, for it has been delivered at 11s. per ton; and there are farmers in Ireland who assert that they can grow it profitably at so little as 7s. per ton.

We would not, however, either be too sanguine, or forget that if all were carried off the land for some years in succession, it would be a very exhausting crop, because though not considered nor felt to be so now, it would soon become so if all sold off. Still it is a very favourable crop for several reasons: it will keep the land clean—its loss may be easily supplied by light artificial manures, as guano, &c.; and its being a new crop, it would give rest to land overcropped and sick of turnips and clover, as indicated by the fingers-and-toes in the former, and the clover-sickness of the latter.

The sugar itself seems to be excellent. Dr. Ure, Liebig, and other high authorities, speak of it as very superior. The recent chemical discoveries have much aided its manufacture; and to crown all, no less an authority than Robert Baker, of Writtle, now startles us by telling us that beet produces cheap and excellent *beer!* — Gardeners' and Farmers' Journal.

THE OSAGE ORANGE A HEDGE PLANT.—I was not aware until lately that this (Maclura aurantiaca) was hardy in England. The following is a description of the plant, written by Professor Turner, of Jacksonville, Illinois, from which it would appear that it is the very *beau ideal* of a hedge plant. "The Osage Orange, the favourite hedge plant of the United States, has already become too well known to need any particular description. It grows in the wilds of North America, in regions further north than New York, and further south than the Carolinas. It is usually from 10 to 15 feet in height, although, like the English Thorn, it is said sometimes to attain, in its native soil, a height of 50 and 60 feet. Its utility as a hedge plant is no longer an experiment. Hedges of the rarest beauty and excellence have been growing in Boston, Philadelphia, and Cincinatti, in Kentucky, Tennesse, and Northern Missouri; and, in short, in all the middle and southern states. Some of these hedges have been standing for 10 or 12 years; they were planted by gentlemen of wealth and taste around their favourite walks and grounds, at a time when the plants sold at the rate of 50 dollars per thousand. Among all who have written on the subject, no unfavourable account has ever come to my knowledge. The plant and the hedge are universally admired and commended; and it is confidently believed by the best judges that it will double the real value of any farm it surrounds. But the community must first learn that there is as much difference in the quality and comparative value of hedges and hedge-plants, as in houses or dry goods, or anything else on sale. Recent writers thus enumerate its many advantages: 1st.—Its tenacity of life is scarcely equalled. It is a native of the prairies, and will grow on any soil where common prairie grass will grow. Overflowing the land will not harm it; it will live for weeks and months entirely under water. The dead wood is exceedingly hard and durable, and fresh shoots from the stump soon supply the place of all which have been killed by fire or cutting. 2nd. Its protection is perfect. It is armed with a very stout sharp thorn under each leaf. Its iron branches soon become so interlocked that no domestic animal, and not even a common bird, can pass through it: both its thorns and its bitter acrid juice prevent all animals and insects from feeding on its branches. Its seed is like the orange, and its roots like the hickory; consequently it can never spread in the field, either from the seed or from the root, but keeps its own place, growing stronger and thicker, year by year. It thus perfectly secures orchards, fruit-yards, stables, sheep-folds, and pasture

grounds from all thieves, dogs, &c.; and one good gate, well locked, makes a whole farm secure from all intruders of whatever description. 3rd. Its beauty is unrivalled. Its dense mass of dark green leaves, its flowers in spring, and, above all, its golden orange fruit, make the hedge the most beautiful we ever beheld."—THOMAS LANG, Kilmarnock. [It neither flowers nor fruits in countries with so cold a summer as Great Britain. But it is quite hardy.—ED. *Gardeners' Chronicle.*]

DONCASTER COUNTY COURT.

THE VALUE OF TURNIPS IN 1847.

BRAILSFORD *v.* NEWSOME.

The plaintiff in this case was J. S. Brailsford, Esq., of Bramwith Hall Farm, and the defendant was James Newsome, Esq., of Barmby Dun. Both gentlemen are very highly respectable farmers and landed proprietors. The cause of the action was to decide the value of three acres and 37 perches of turnips, grown on the plaintiff's land, and eaten off the ground by the defendant's sheep, in the early part of the year 1847. The action had not arisen from any disinclination on the part of the defendant to pay; but the only question had been to ascertain their proper value, which had caused the matter to remain unsettled till the present time. The plaintiff's charge had been fixed at the rate of £7 7s. per acre, which was in accordance with a valuation made by the late Mr. John Wood, agricultural valuer and salesman. The defendant refused to pay that amount, considering it to be an excessive charge, and offered to pay as much for them as they were worth. Several very respectable witnesses were examined, as will be seen by the following report. Mr. Marratt, solicitor, appeared for the plaintiff; Mr. Collinson for the defendant.

Mr. Marratt opened the case. He said: This is an action to decide the value of the eatage of three acres and 37 perches of turnips; and therefore I contend that the only question for the Court to consider will be their value. I believe £17 odd has been paid into Court; therefore, the simple question with the Court is, what was the value of these turnips at that time? The plaintiff is a very respectable farmer at Kirk Bramwith. They were Skirving's improved turnips, which are well known to be of a very valuable kind. At that time a gentleman of the name of Wood was appointed to value them; but he is since dead. Under these circumstances, I shall call the plaintiff and a man of the name of Turton, both of whom would say that Mr. Wood had valued the turnips at the rate of £7 7s. per acre. Then I shall call Mr. Winder, a gentleman of great respectability, and whose veracity could not be doubted, having a farm adjoining the plaintiff's, and being in the habit of calling and passing by these turnips almost every day; and he will be able to speak to their value. All these parties will be able to speak to the value of turnips at that time, and would prove that the sum charged by the plaintiff had been paid for turnips not equally as good as his. They were aware that there was a very great scarcity in potatoes in 1847, which raised the value of turnips considerably higher than their usual price, in consequence of their being used to a great extent instead of potatoes; and I must say it is a matter of great astonishment to me why that price had not been paid. I will now call the witnesses, and your Honour will then have an opportunity of judging of the case by the evidence.

Mr. Brailsford: I am a farmer at Kirk Bramwith. The defendant purchased the eatage of three acres and thirty-seven perches of Skirving's improved turnips, in March, 1847. They were a very good crop. Skirving's turnips are an improved and valuable kind. In 1847 potatoes were very bad, and there was a general failure in the crop, which made turnips of considerable value at that time. My land adjoins that of the defendant, with the exception of a road that runs between his land and mine. Nothing was said at the time of the sale, but it was agreed that Mr. Wood should value them. Mr. Wood was a farmer and cattle salesman; he is now dead. A portion of the field, containing four and a half acres, had been sown with these turnips, two-thirds of which were set apart for Mr. Newsome's sheep. The defendant's sheep were turned in and eat the turnips. I saw Mr. J. Wood as to the price to be fixed upon, which was before the sheep came in. He said somebody was to value them, and I said Mr. Wood should do so. Mr. Wood's name was not mentioned until after the valuation was made. After Mr. Wood had valued I saw defendant and told him Mr. Wood had valued the turnips. He valued them before the sheep were turned in. This conversation between us was when Mr. Newsome called to pay for the turnips. I told him Mr. Wood had valued the turnips, but that the sheep had eat past their mark. I mean that the sheep had eat more than three acres thirty-seven perches, and therefore the turnips must be measured again. Skirving's seed is always very good. I then left the matter in the hands of my attorneys.

By Mr. Collinson: All the turnips were consumed in the month of March, and it was after that time that Mr. Newsome called and offered to pay me for them. I did not tell him what Mr. Wood had valued them at per acre. Mr. Newsome agreed to give me as much for them as they were worth. I do not know whether it was a part of the contract that I was to receive the same value per acre for my turnips as Mrs. Woodcock, who was at that time leaving Bramwith Hall Farm. I do not know that Mrs. Woodcock's turnips were as good as mine. I know that Mr. Oliver and Mr. Dickinson valued the turnips on the Bramwith Hall Farm when Mrs. Woodcock was leaving it, although I did not see them do so. Mr. Newsome said it would be a great accommodation if I would let him have them. Mr. Newsome came to pay for them shortly after they were eaten. I do not know whether Mr. Newsome had an interview with my solicitor. By his Honour: I made the charge of £7 7s. per acre about a year after Mr. Newsome called and offered to pay me for the turnips. I did not send him a bill before I put the matter into my attorney's hands. I asked them to send Mr. Newsome a friendly letter to settle for the turnips.

William Turton: I am in the employment of Mr. Brailsford,

and knew the late Mr. John Wood. I don't know that he was the man chosen to value them, but he went with my master to value them. Mr. Wood is dead. I don't know that Mr. Newsome knew what Wood had valued the turnips at. Mr. Newsome came into the turnip close where I was, and said he would give as much for the turnips as he was going to give for those at Bramwith Hall Farm. The bargain was this: Mr. Wood said if Mr. Brailsford could not get a customer for £7 7s. an acre he would find him one that would give that amount. 1847 was a bad season for turnips. I don't know what sort of a crop Mrs. Woodcock's was. Mr. Brailsford's was a good crop. I have been amongst sheep and turnips all my life, and can say that it was a very good average crop.

By Mr. Collinson: I told my master that Mr. Newsome wanted three acres of turnips. Nothing was said more about it until the sheep were turned into the turnip close. I did not tell Henry Stevenson that the turnips were to be valued by the same valuers who valued the turnips on the Bramwith Hall Farm.

James Allan: I live at Hatfield Woodhouse, and am a landlord. I also am a general shepherd among sheep. Gave £7 per acre for Skirving's improved turnips in 1848 to eat off the ground. Could not say whether they were dearer in 1847 than 1848.

Wm. Winder: I am a farmer at South Brampton, and knew the plaintiff's turnips well. In 1847 there was a scarcity as regards turnips. I don't know what the value would be for them to be eaten on the ground. They were a good average crop of turnips. I will have nothing to do with valuing them. I should have wanted £7 7s. an acre if I could have got it. I can't make my own markets. I again repeat I would not have taken less than £7 7s. if I could have got it (laughter).

This was the plaintiff's case.

Mr. Collinson rose to reply: Your Honour, in this case I appear for Mr. Newsome, a very highly respectable farmer, who is esteemed by his friends and by all who know him, and who would not have been here to-day if he did not believe that a gross imposition had been attempted to be practised upon him.

Mr. Marratt (interrupting): That is a very strong imputation.

Mr. Collinson: Whether it is a strong term or not, Mr. Newsome calls it an imposition, and whether I am justified in using that term or not will depend upon the evidence that I am prepared to bring before this court. The facts of the case, as I am instructed, are these:—Mr. Brailsford having two or three acres of turnips to dispose of, asked Mr. Brailford's man, named Turton, whether they would sell any part of them? the man replied that he did not know, but that he would ask his master, who is the plaintiff in this case, if they were to be sold. Mr. Newsome then told Turton that he would give as much for them as those that were being valued and sold to him on the farm which Mrs. Woodcock was leaving. Mr. Newsome saw him again, and he was told that they would part with them.

Mr. Marratt: I object to this conversation between Mr. Newsome and Turton as evidence, because I submit that Turton was not the agent for Mr. Brailsford at the time.

Mr. Collinson: I am instructed that Turton is the agent, and in the habit of buying and selling for Mr. Brailsford, and upon this occasion he took upon himself to bargain with Mr. Newsome.

Mr. Brailsford recalled: Turton is in the habit of selling my corn and receives the money.

Mr. Collinson: That Turton did take upon himself to bargain for these turnips, would be fully ascertained from the evidence of Mr. Newsome himself. If my friend Mr. Marratt had brought any one here to prove what the real value of the turnips were, then the case would have resolved itself into a very small compass. Nobody has said what the real value of them were. Mr. Winder has not ventured to tell us if he could get £7 7s. per acre for turnips in 1847. I shall show by the evidence that £5 10s. was the best and highest price given in 1847 for the most valuable kind of turnips sold and eaten off the ground. I shall also show by the evidence of Mr. Dickenson, who having bought some 50 acres of turnips in that year, had not given more than £5 per acre. Mr. Newsome has made every attempt to settle this business with Mr. Brailsford. He has even called upon Mr. Broughton, one of Mr. Brailsford's solicitors, and attempted to settle it, but without effect unless he had chosen to have paid the full £7 7s., but Mr. Newsome said "No, I will never pay you that amount unless the law compels me to do so, because it is an exorbitant charge." The question is really this—What was the value of turnips in 1847?

His Honour: I understand there has been some money paid into court for these turnips. What is the price that has been paid into court per acre?

Mr. Collinson: We have paid into court at the rate of £5 10s. per acre.

Mr. Newsome: I remember purchasing these turnips belonging to Mr. Brailsford. I had a great many sheep that spring, and fearing that I should want more turnips, I asked Turton, who was in the turn close at the time eating one, if those turnips were to be sold. He said, "I don't know, I will ask our master." I asked him if he knew the price, and he said he did not. I then said, "Whatever price John Dickenson and John Oliver put upon these turnips of Mrs. Woodcock's, I shall be very happy to pay the same price to Mr. Brailsford." The quality of these turnips was not superior to Mrs. Woodcock's. The second time I saw Turton, he said he did not know what the turnips were to be charged. I never saw him after. I never had any conversation with Mr. Brailsford himself as to the price of the turnips, and I sent my son Thomas to pay him for them at the time, but he still did not know the price. I called myself two or three weeks after, when he said, "I do not know the price. It is of no moment now. I do not know the price, and I cannot tell." I did not send my son again. I heard nothing more about them until I received a communication in July, 1849, which was the first time that I knew they were charged at £7 7s. per acre. This was on the occasion of my going to Mr. Raynes to settle about the rent of a house occupied by Mrs. Brailsford, and belonging to me. When I was about to settle with Mr. Raynes about this rent, he said, "O! by the by, I have an account against you from Mr. Brailsford for some turnips." I said, "Very well, I am ready to pay it." He opened the bill smilingly, and said, "It seems a great price to charge £7 7s. per acre for turnips." I said I would not pay it, and I wrote to Mr. J. Oliver to know the value of them. I then went to Turton, and said, "Don't you recollect the bargain that was made?" I never heard of Mr. Wood having valued them until I spoke to Turton about them in October last.

By Mr. Marratt: I mean to swear that I made the bargain with Turton. Mr. Dickenson is my valuer.

Mr. Oliver: I was employed by Mrs. Woodcock on the occasion of her leaving the Bramwith Hall Farm. I remember some turnips that Mr. Newsome had purchased from Mrs. Woodcock; they were a good crop, and the value I put upon them was £5 10s. per acre. I am sure that £5 10s. was the top price for turnips in that year. I had made a great many valuations on agricultural produce that year, and had not made any valuations that year as high as £5 10s., besides the one for Mrs. Woodcock.

By Mr. Marratt: I don't recollect these turnips of Mr. Brailsford's. Mrs. Woodcock's were a very good crop. They were Skirving's improved Swede turnips.

Mr. Dickenson: I was one of the valuers who valued on the Bramwith Hall Farm. I was employed by Mr. Newsome. Mr. Oliver was on the other side. The price we valued Mrs. Woodcock's turnips was £5 10s., which was a high price for turnips in that year. I have looked through my book, and I don't find any turnips that I valued in that year higher than £4 4s. I graze about 69 sheep, and the highest price I gave for the best crop in that year was £5 an acre, which were equal in quality to either Mr. Brailsford's or Mrs. Woodcock's.

By Mr. Marratt: I have grazed a great many sheep. I have grazed them for the year at £2 per head per acre. I had eleven score sheep grazing at Rossington at 11d. per head an acre.

Mr. Sykes: I went with Mr. John Newsome about the 30th Oct. last to Mr. Brailsford, and we offered to pay Mr. Brailsford £5 10s. per acre, but he refused it, and said he would not take less than £7 7s.

This was the case for both sides.

His Honour, in summing up, said: There is no proof in evidence of any greater value than £5 10s. having been given for turnips in the year 1847, therefore I have no doubt at all of the value being more than £5 10s., which is the price the defendant must pay.

His Honour allowed costs, £2. for witnesses, and £1 10s. for advocate's fee.

ON THE IMPROVEMENT OF GRASS-LAND.

The improvement of grass-land is one of the neglected parts of husbandry; and though the greatest amount, perhaps, of real clear profit is made by the occupation of grass-land, yet there is hardly anything so utterly neglected and left to itself as this unfortunate grass.

Although every agreement seems to take it under its especial care in reference to manure, to mowing, and to treatment, we venture to say that there is no part of a farm so thoroughly mismanaged, in nineteen cases out of twenty, as the grass-land of a farm.

If we reflect for a moment how the majority of grass-fields are managed, it will at once cease to be surprising that they have become so deteriorated. The meadows are mown year after year, and the hay given to cows and horses: and the little manure returned will not compensate at all for the mass taken away. The fog, again, is eaten by stock, which take away all the elements of nutrition, and leave as little manure as possible, carrying off the richest parts of the herbage. But this is not all. In the spring, it is eaten by ewes and lambs, or store stock, and is thus further robbed, the nutritious particles of the herbage going regularly off to make the milk, the bones, the muscles, and the sinews of the animals which are sold off the farm.

Nor is pasture much better dealt with. True, on alluvial meadows, full-grown cattle are grazed, and as much of the flesh and bone-forming materials are left as waste, perhaps, as is taken off the land, the fat-forming materials being those mainly supplied by the air and by water; but on all other grass-land where holding stock are kept, and where all the materials of growth are carried off, there must be deterioration to a greater or less extent.

Hence, persons are surprised at pasture land becoming poor and mossy, the grass thin and of a coarser quality: the surprise should be how it bears such scourging so long with so little injury. We have some land in our mind's eye that for years has been depastured with milk-cows, which give milk to an adjoining town, from May till October. From November till April, it is stocked with horses and breeding ewes. The milk dephosphatizes and de-azotizes, the horses and sheep do the same; and had it not one of the deepest alluvial soils, it would very soon be worthless as a pasture. It has this, however, and bears its depletion most admirably, though it is not what it was in some men's memory. And most of the grass-land of the kingdom is suffering more or less injury.

Now, whatever may be said of tillage land, there is no doubt but the best grass is in the strong rather than the light soils. There may be fine grass on some sorts of light soil, but it will be thin and short; but the best grass is on the friable loams. The decided loams and the dry clays have almost always better grass than the light sands, and bear a greater weight per acre. The worst grass is on the limestones, chalks, sands, and gravels, simply because *they will not hold the manure*. We once heard a very expressive remark from a day-labourer respecting a grass-field. He said it would *bear manuring three times a year*.

Now, as all kinds of *light-land* grass may, for the purposes of improvement, be considered together, we propose giving our counsels on that description

of land in the present instance under that general head.

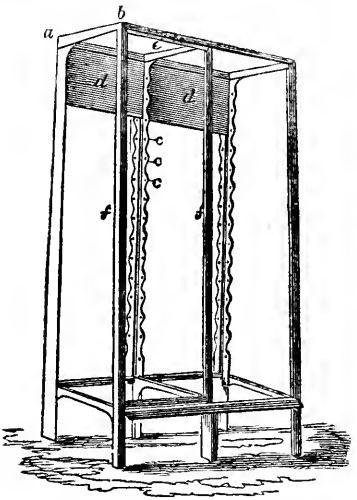
And perhaps the best kind of improvement for all such soils is, after all, the taking out of grass for a limited period. The Scotsmen know this so far as to keep it in grass but a short time only—two or three years; but it is difficult to persuade the English landlords that this is the case. We recently gave our opinion to a large landed proprietor, very decidedly, on the propriety of making his land tenantable by taking out some inferior grass; but he objected to such an injury to his family estate. His objection was valid as regarded experience. His tenants had always cropped the new grass-land till it was the poorest on the farm, and then came and asked for more being taken out to help it on. This is, however, not the right way. We urged green crop and artificial manuring, stipulating to being forced co-extensive with this taking out of the grass-land; and this being adopted, it would be of advantage to the tenant to plough out, and to the owner to improve instead of deteriorating his estate.

The mode of taking out will be a subject of some difference of opinion. Many parties so strongly object to paring and burning, as being destructive to the bulk of the nitrogen and carbon of the soil, that they prefer "rifting," or simply ploughing up with the ordinary plough, to any other process. This, however, generally involves the sowing of a white crop first; and it is the beginning of that system of scourging we have so much deprecated from witnessing its disastrous results.

Unscientific as it may appear, we confess we prefer paring and burning preparatory to a crop of turnips. True, we destroy some of the carbon—some of the valuable ammonia; but we cook the rest, which would otherwise become so inert as to be prejudicial rather than useful to succeeding crops. We once knew a case where, to save the vegetable matter on a light peaty soil, with a sandy subsoil, the land was digged out and sown with oats. It gave only two quarters per acre, which at that time sold for 25s. per qr., and just paid for the digging. We then raised turnips, ate them on, and sowed another crop of oats, which were certainly excellent.

Turnips once secured, the rest follows as a matter of course. One crop of oats, and then another crop of turnips, manured with dissolved bones alone—for this kind of soil requires no carbonaceous manure—and again fed off with fatting sheep, alternately turnips and oats till the land has got thoroughly consolidated, which will be in four or six years. It will then grow clover and seeds, and may be laid with white clover and Italian rye-grass, if the expense of costly artificial grasses is too formidable; for the seeds of the original grasses will be so invigorated by this treatment, that the soil will soon regain its wonted grasses of the best kind it is capable of producing. This is one of the best and most easy modes of restoring the fertility of impoverished or naturally poor grass-land.—Gardeners' and Farmers' Journal.

GLASS WALLS.—The annexed sketch, taken from a wooden model, represents a portion of Mr. Ewing's glass boundary wall—*a* is the back, and *b* the front. The holes in the uprights, *c c c*, are for carrying wires, and the grooves in which are for polished slate pannels *d d*, so that trees are trained in both sides—*i. e.*, outside and inside of the wall; or, in other words, the standards, *c c c*, carry the wires, and also hold the slate. The branches are brought within 2½ inches of



Frame for Glass and Slate Walls.

the slate. The top *c* is covered with glass, and the front *f f f* with the ends. The front of the wall is from 9 to 12 feet high, as the party may wish, and made wide enough to enter, and the whole made of iron, glass, and slate. The wall is firmly screwed and bolted to stone blocks in the ground. We learn that Mr. Ewing, in all his lights, is doing away with the small sash bars, with the exception of one down the centre. This is made precisely the same size and pattern as the frame, so that when the walls are made for the lights to slide, the whole has a very beautiful regular appearance, having the look of a plate-glass window. Another advantage, great saving is effected in painting. The mode of opening the sliding sashes is now reduced to the greatest simplicity, and becomes almost impossible to get out of order, and costs a mere trifle, as provison is made for most of it in the castings.

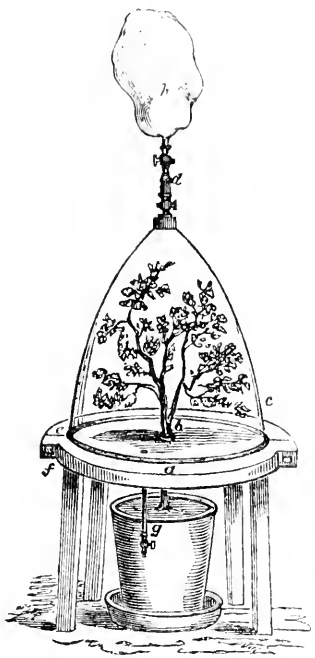
PROTECTING PEAS FROM BIRDS AND VERMIN.—I beg to offer a few hints respecting the

protection of Peas from birds, slugs, and mice. The best remedy for mice I have found is first to take the peas and soak them in water a few minutes, and then get some dry chimney soot, and put in into a bowl; that is, fill the bowl about half full of the soot, and then fill up the remainder with the wet peas, stirring them in the soot until the peas are completely daubed with the soot, and then, after the drills are ready drawn, strew some soot also along the rows, and sow your peas, and this will prevent the mice from smelling them so soon, and should the weather be tolerably dry the peas will receive but little injury from them. The next pest will be slugs, for which take barley chaff, or what is commonly called barley dust, and strew it around close to the peas, so as to cover the soil, and this will admirably stop their travelling, and thus save the peas. Care should be taken to screen the chaff through a fine sieve in case there should be seed of weeds in it, as is sometimes the case. For birds I take a long string of cord or twine, and tie at every two feet some white feathers of the wings of geese or fowls, &c., and at every three or four feet tie on two pieces of tin together, small shreds from any tinker will do, and then drive down some stakes each side of the rows, and tie up your lines of string, and this will keep in a regular movement, and rattle the pieces of tin, so as to frighten away sparrows or birds of any kind. Take notice that the same means may be taken for fruit trees against a wall, such as cherries, &c. My plan may not be altogether novel, but will, I hope, be useful to some of our young readers who may think fit to try it.—W. Hawkins.

ATMOSPHERIC INFLUENCES.--VEGETABLE PHYSIOLOGY.—Under the above title, in connection with the potato disease, I have investigated various natural phenomena, of the utmost importance to the agriculturist, more especially as regards evaporation as influenced by the relative electrical states of the air and the earth; and in the first of these papers I directed attention to certain facts in connection with snow and rain that have proved fatal to pre-existing doctrines, and showed clearly that snow, instead of being merely congested vapour, is a quadruple compound, composed of the nitrogen evolved from the atmosphere by combustion and respiration—the carburetted hydrogen generated during the decay of vegetable matter, and the gases of vapours. If, then, such be the case, and ammonia (an invariable constituent of both rain and snow-water) is formed by the combination of the nitrogen of air with the hydrogen of the carburetted hydrogen, it is clear there must be in the vegetable kingdom a property that enables it to restore these gases to their respective emporiums; and, in the article referred to, I observe—"There is therefore presented to the root of the vegetable kingdom:

Ammonia.....	Hydrogen, fixed by the plant Nitrogen	air
Carbonic acid	Oxygen Carbon, fixed by the plant	
Water	Oxygen Hydrogen	partly fixed, and evolved as vapour,

which, it will be observed, completes the chain in this branch of nature's operations; and if, in support of this theory, I have not shown that plants generate air, it has been from the want of ability to devise an apparatus that should afford unquestionable proof. Within the last five years, several have presented themselves to my mind; but perceiving in them objections, I have refrained from working them out. The accompanying sketch and description, which I have at last devised, will, I hope, be deemed by the vegetable physiologist worthy of his consideration, both on account of its simplicity of construction and certainty of action. This apparatus (fig. 62) consists of a stand in framework only, the legs being let into the corners, on which is placed a round board *(a)*, 1¼ inches thick, in the centre of which is a hole *(b)*, that should be a little larger than the stem of the plant to be subjected to experiment, and the surface of which is grooved for a glass shade, *(c)*—the groove and all the interior being lined with gutta percha, which may be readily floated over the surface with an Italian heater, so that the receiver being in its place, and the groove filled with mercury, or other substance that will exclude air—such as a composition of resin and tallow—the top of the plant must necessarily be in an air-tight chamber, and whatever gases may be generated cannot fail escaping through the stop cocks at the top *(d)*. To admit the stem of the plant into the hole, the round board is divided in the centre *(e)*, the parts being firmly secured by two ordinary bed-screws and nuts *(f)*, sheet India rubber being placed round the stem of the plant effectually to exclude air, and prevent the escape of the gases generated. To the interior is connected a gutta percha tube with stop-cock *(g)*, to draw off the water that may accumulate. The bladder *(h)* at the top is intended merely to represent the direction of escape of the gases; but, in practice, I intend to connect to the upper stop-cock a gutta percha tube, through which the gases will readily discharge into an ordinary pneumatic receiver, although probably a silk bag might answer every purpose, and for subsequent analysis preferable to the use of water, since one of the gases generated—oxygen—is soluble in that fluid. As this experiment must be made in the open air under the influence of the sun, it will be necessary firmly to secure the stand to the ground, and to it to screw the round board after making good the gutta percha joint with a hot iron, the shade being lashed to the edge of the round board with fine copper wire. These preliminary arrangements being made, it will be merely necessary to supply the root of the plant with a nitrogenous manure, such as the water of a dung-pit, and watch the result. The shade when placed over the plant will, of course, be full of air; but, if 10 or 100 times the original volume be obtained, its source will be unquestionable.—Franklin Conworthy (author of "Electrical Condition"), *Forest Cottage, Maresfield, Sussex, April 2nd.*



ALKALI WORKS—THEIR EFFECTS ON VEGETATION.

During the last few weeks we have had occasion to visit and inspect the woods, hedges, and hedge-row timber, upon the estate of Thomas Legh, Esq., of Golburn, near the alkali works of the Messrs. Muspratts, at the Newton Junction of the Manchester and Liverpool Railway. These works have been established on their present site for about twenty-five years, and are reported to be the largest works of the kind in Europe. For many years the works were carried on without any attempt to condense the muriatic acid gas which was produced in the manufacture of soda, &c., &c. Injury to the trees in the immediate vicinity of the works became manifest, complaints were made, and Sir John Jerrard, whose woods were upwards of two miles distant from the works, sued and obtained compensation for supposed injury to his plantations. This became a discovery to the farmers in the neighbourhood, who immediately began to value one another's crops. When they thought their wheat and their barley, their oats and potatoes and turnips, were not quite so good as they could wish, they set the difference down to the account of the Messrs. Muspratts, who were applied to, at first modestly, and for a little compensation, which seemed from the evidence was always paid, till at last these claims annually augmented, from £20 or £30 at first, to some £1,800 or £1,900 for the past year. It turned out that one of these small farmers had claimed and actually received for one year some ten pounds more than the entire rent of his farm. The Messrs. Muspratts were tenants of Mr. Legh, the plaintiff, and held a lease of their works, and were besides occupiers of most of the land for half-a-mile or more around the works. Mr. Legh, however, claimed damages for injury done to the timber and hedges growing on the estate, alleging that the injury occasioned by the works extended to a distance of about three miles. In our examination of the trees and hedges we found evident traces of injury to a distance of half-a-mile from the works, and on the south side in a line over which the prevailing winds travelled from the works, the distance was slightly increased.

With this brief preface we shall therefore describe some of the more striking incidents which occurred to us during our examination of the district. To the vegetable physiologist the district in question is not without interest. The trees throughout that part of the country are for the most part of stunted growth, except in sheltered situations. The hedge-row timber is seldom to be met with thirty feet, and a large proportion of it from ten to twenty feet in height, and with very few exceptions the trees are one-sided, leaning from the north-west, of which the accompanying engraving may be taken as

fair sample; some less, but many much worse. This example does not merely refer to the trees on the estate in question; they are found in the same condition over a large extent of that part of the country. To ascertain that this was the case, we visited Cheshire, as well as places in Lancashire, apart from the Newton estate, and found precisely the same effects resulting from the climate peculiar to all exposed localities on the western side of the island. To understand how it is that the trees present this one-sided appearance, it is necessary to know or remember that in rough weather, when strong gales of wind blow from the north-west, which they do for nine months in every twelve, in crossing the vast waters of the Atlantic the atmosphere becomes loaded with saline particles; and this is often driven in the form of vapour for many miles inland. When this happens during the summer months, when trees and vegetation are clad with tender leaves and shoots, the leaves and branches during these storms are struck fiercely against one another, and the extremely tender cuticle which at that season especially covers the tissue and vessels in which the juices of the plant are then circulating, become lacerated and torn. In the course of a day or two afterwards the leaves of trees which may have been thus exposed, from the effort which nature immediately makes to heal the scars and wounded parts, become of a brown colour, the leaves having a shrivelled and crumpled appearance, and many of them falling off. This is what takes place in ordinary cases in all very exposed situations, not only on the western coast, but in many parts of the midland counties. When

in addition to the mischief occasioned by injuries of this nature, the trees, &c., are so near the coast as to be exposed to the influence of salt in a state of solution carried along in the atmosphere, as all the western portion of Lancashire undoubtedly is, then the injury occasioned becomes much more fatal. That in storms of wind from the north-west large quantities of salt in a state of solution is carried over this district, and much beyond this, there is abundant evidence on every hand. We were told by Josiah Evans, jun., a private gentleman living on the Newton estate, that after severe storms of wind from the west he had himself scraped the white crust of salt from the stems of the exposed trees.* When this occurs during the growing season, as to a greater or less extent it does every year, we cease to feel surprised that trees exposed to such influences should assume the character indicated by our figure, which along that part of the country they everywhere do. Exposed to such an influence as this, the tender leaves will shrivel and die in four-and-twenty hours, should bright sunshine immediately succeed the storm. We were told by Mr. Skirvin that in his nursery he has had many thousands of trees killed in a single night from this cause alone.

There is a feature in this case bearing upon the culture and growth of trees, which seemed to have found no place in the estimation of those who reported and gave evidence on the subject. We refer to the fact that trees, according to the situation in which they grow, attain full growth and maturity at very different ages, and still greater difference in size; the "spread oak," for example, in Worksop Park, in Nottinghamshire, drips over half an acre of ground. As the opposite of this, oak-trees attain maturity and age at points of elevation and exposure, where, though of great age, they never exceed the size of a common gooseberry-bush; such, for example, are many oak-trees on the hill sides, near the road leading from Sheffield to Chatsworth. The hedge-row timber on the estate at Newton are many of them of great age, and decaying; but as they have not attained, and never can attain, the size which the owner unwisely expects, they are allowed to stand long after they have attained maturity; and the result is, that not only here, but equally so for many miles around, dead and dying trees may be seen in every hedge-row, certainly quite as many elsewhere as on the Golburn estate—with this difference, however, that in Cheshire, for example, and some other places which we inspected, the stunted trees and hedges were unsoiled with soot; while every hedge and tree on the Newton estate was smeared with coal smoke—a circumstance which added greatly to their deplorable and unhealthy appearance.

At the western end, and joining to the Newton estate, there exists a perfect forest of manufacturing chimneys, consisting of four or five alkali works, glass and copper works, iron foundries, coal-works, &c., &c.; in fact, besides the Muspratt's works, we stood at a given point, on the estate of Golburn, and judging by the eye, counted forty-eight chimneys within a distance of three miles, and two-thirds of the number were within a mile and a-half of where we stood. There is on the estate itself several coal-works, with seven or eight chimneys each, constantly pouring forth volumes of black smoke. There is also a rope manufactory, an extensive work called the Vulcan Iron Works, another iron foundry, the British Sheet-glass Company's Works, in the middle of the estate, at work night and day, with a perfect cloud of smoke from St. Helier's trailing over the estate, which, by the aid of the prevailing winds, it does nine months in the year. Add to this the smoke and fumes from the alkali works of Messrs. Muspratt's, which necessarily contribute to the mischief; and the only wonder seems to be that there is such a thing at all as a living tree upon the estate. That Messrs. Muspratt's works occasioned material injury to the trees and hedges to the distance of half a mile, or it might be a little more, was very obvious; but that they had anything whatever to do with alleged injury sustained at two or three miles distant is contrary to the most palpable and existing evidence. That Mr. Legh's tenants swore, by twenty in a row, that they had watched the course of the vapour for this distance, and saw it alight upon their crops, and found the latter become spotted, is as likely to be true as that one poor man found a drop of vitriol fall into his eye at a distance of *five miles* from the works, or that it was true, although three or four witnesses swore in succession, that the trees on the east and the west of the works were always most unhealthy on the side *next* to Muspratt's works.

We paid a great deal of attention to try and ascertain how far we could trace any symptoms of injury, and we are compelled to come to the conclusion that there is much misconception in respect to the distance at which muriatic acid gas is capable, under any condition of the atmosphere, of acting injuriously on vegetation. The upshot of the action was, that after a day and a-half spent in the examination of the plaintiff's witnesses, compromise was effected, the plaintiff accepting £2,000, instead of £20,000—the amount of damages claimed.—Gardeners' and Farmers' Journal.

* It is a remarkable fact, but it is one which we witnessed that in 1839, when the devastating hurricane blew down half the chimneys in Lancashire, such was the violence of the storm that we found the laurel leaves coated with salt in the botanic garden in Sheffield, eighty miles from the west coast.

METEOROLOGICAL DIARY.

Barometer.			Thermometer.			Wind and State.		Atmosphere.			Weath.
Day.	8 a.m.	10 p.m.	Min.	Max.	10 p.m	Direction.	Force.	8 a.m.	2 p.m	10 p.m.	
	in. cts.	in. cts.									
Mar. 24	29.93	29.96	34	56	42	S.W., N.E.	var.	fine	fine	cloudy	dry
25	29.97	29.97	29	47	38	N. East	brisk	cloudy	cloudy	cloudy	dry
26	29.91	29.80	35	46	36	N. by East	gentle	cloudy	cloudy	cloudy	dry
27	29.66	29.60	26	45	37	West, var.	gentle	fine	cloudy	cloudy	dry
28	29.61	29.61	27	50	40	W., E., var.	brisk	fine	sun	cloudy	dry
29	29.50	29.30	37	56	47	N.E., S.E.	var.	fine	sun	cloudy	rain
30	29.26	29.40	40	56	48	S. West	gentle	cloudy	cloudy	fine	rain
31	29.50	29.83	44	48	42	N.N. by E.	gentle	cloudy	cloudy	cloudy	rain
April 1	30.04	30.20	39	49	36	N. East	lively	cloudy	sun	fine	dry
2	30.26	30.28	28	46	36	East	lively	fine	sun	fine	dry
3	30.28	30.26	28	47	37	S. East	lively	cloudy	sun	fine	dry
4	30.17	30.13	30	51	35	E. or by North	lively	cloudy	sun	fine	dry
5	30.13	30.10	34	56	41	E. or by North	lively	cloudy	sun	cloudy	dry
6	30.11	30.12	36	55	46	N. East	lively	hazy	cloudy	cloudy	dry
7	30.16	30.20	40	48	41	East	lively	cloudy	fine	cloudy	dry
8	30.21	30.24	39	49	38	E. by South	lively	fine	sun	fine	dry
9	30.26	30.29	32	50	35	Easterly	lively	cloudy	sun	fine	dry
10	30.27	30.21	27	55	45	E. or by South	gentle	fine	sun	fine	dry
11	30.20	30.20	35	51	40	East	brisk	fine	sun	fine	dry
12	30.20	30.26	40	—	40	E. by South	gentle	cloudy	sun	fine	dry
13	30.32	30.26	35	61	47	E. by South	gentle	cloudy	sun	fine	dry
14	30.27	30.19	35	63	50	N. East	fresh	haze	sun	fine	dry
15	30.19	30.10	37	—	47	E. by North	brisk	fine	sun	cloudy	dry
16	30.05	30.—	42	47	36	E. by North	brisk	cloudy	cloudy	fine	dry
17	30.—	29.83	29	54	45	N. East	lively	fine	sun	cloudy	dry
18	29.79	29.96	37	44	36	N. E. by North	var.	cloudy	cloudy	cloudy	showers
19	30.06	30.08	33	45	38	Easterly	gentle	fine	fine	fine	dry
20	30.09	30.11	28	52	38	S.S.W.	fresh	fine	sun	fine	dry
21	30.11	29.98	32	54	41	Sly., E. by N.	brisk	fine	sun	fine	dry
22	29.90	29.84	38	63	50	S. East	lively	fine	sun	*	*

ESTIMATED AVERAGES OF APRIL.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.34	29.200	74	29	49·9

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
About 50	34.4	42.2

Weather and Phenomena.

March 24—Cutting wind, changing to N.E. 25—Cold and gloomy. 26—Clouds in masses, preparatory to the only rains of the month. 31—Cold, drying wind; a little drizzle.

Lunation.—First quarter, 28th day, 8 h. 50 m. morn. It may be here remarked that the barometer was below 30 inches till the 31st; and during that period, the small supply of spring rain occurred.

April 1 to 17 scarcely furnish any remarks, offering a uniform aridity of weather, of which we trace few examples. Several night-frosts are registered, but with little injury, in consequence of the dry state of the atmosphere. On the 18th a smart shower fell at noon; but the wind became fresh from the east, and the mercury again rose. As we close this table, a degree of fluctuation appears to exist; but the weather has been and is bright, and the sun powerful.

Lunations.—Full moon, 4th day, 2 h. 24 m. afternoon. Last quarter, 11th day, 8 h. 59 m. morning. New moon, 19th day, 11 h. 45 m. before noon.

Remarks referring to agriculture.

Progress slow, but steady. Everything appears to be in health, whether it be vegetable or animal. The meadows, however, certainly are in want of rain, and so will be the spring crops, ere long. The season of 1847 was certainly more dry, and far more backward, as the first genial rain did not fall till the 7th of May; but in that protracted winter much snow had covered the ground.

J. Towers.

Croydon.

* I regret that two blanks appear, which could not be obviated.

CALENDAR OF HORTICULTURE.

PLANT HOUSES.

Conservatory.—The extirpation of insects in this and other plant houses is at all times an important operation; but at this season more particularly so because they are now starting into existence by thousands, and if not nipped in the bud will do irreparable injury to the present and future display of bloom. In large erections it is often both very inconvenient and expensive to fumigate in an effectual manner, and by a little extra care it will not be necessary to do so very often; because if carefully watched it will be found that the vermin will make their appearance on a very few plants at first. Acting, therefore, on the principle of "taking time by the forelock," every gardener who has an extensive collection of plants to manage should endeavour to secure a small lean-to house capable of containing two or three dozen fair-sized plants, and retain it especially for fumigating purposes. The laps of the glass should be puttied, and the woodwork made as air-tight as possible. Into this erection let every plant infected with thrips or aphides be removed as soon as discovered, and if once fumigating is not enough apply it again, syringe the plants well afterwards, and stand in a shady, airy place to dry before returning them to their places. The white and brown scale are better kept in check by frequent spongings with warm soapsuds, or if the leaves are small and much infested syringe them forcibly with water heated to 120 degrees; but observe that this must not be done when there is any young and tender growth on the plants. Look well to the advancing stock of plants intended to succeed the Azeleas and other hardwooded flowering plants, such are Fuchsias, Scarlet Geraniums, Petunias, Salpiglossis, Balsams, Cockscombs, Amaranths, Brachycoma, &c., all of which should now be in a progressive state, and as there will be plenty of pit room when the bedding plants are removed to some temporary protection they may all be accommodated with liberal shifts and plenty of room to grow out well. It is not advisable to aim at growing more than can be conveniently accommodated. Kalosanthes, shifted according to previous directions, should now be making a nice growth, and must have plenty of light and air, and towards the end of the month place them out of doors in a sheltered place, but exposed to the full rays of the sun. Erythrina crista galli should also have a light airy situation near the glass, but no artificial heat. The beautiful varieties of Japan Lilies will require attention—a light and airy situation near the glass will suit them well; they should be kept moderately well supplied with water, and it will much assist the future growth to place some rough lumps of rotted fibry turf around the base of the stems, where they will throw out fresh roots; place a neat stake to each shoot as they advance. Chrysanthemum cuttings should be put in this week; our plan is to place about six round the edge of a four-inch pot, and place the pots on a gentle bottom heat in a dung-bed frame, and keep them shaded until rooted, often giving air to dispel damp.

Heathery.—Many of these plants will now be in flower or advancing fast thereto, and will require a considerable attention to affording them a good supply of air and root moisture, water freely when necessary, but only then. A slight shading will be of great advantage when the sun is very hot and bright. Maintain the temperature of the house as cool as possible, by keeping the paths and floors moist, taking care also that there is sufficient ventilation to obviate the ill effects likely to arise from a close moist atmosphere. This sprinkling with water will also keep down the dust, which if not attended to, is apt to adhere to the glutinous kinds and injure their beauty. Such as are past blooming should be removed from the house to make more room, the flowers picked off, and the branches cut well in; they may then be placed in a cold pit. Attend well to young plants advancing into specimens: shift when necessary in order to keep them gradually progressing, but by no means endeavour to grow them too fast, as it will render the plants constitutionally tender. I have indeed seen instances in which plants that had been hard pushed were entirely deprived of their leaves and rendered useless when submitted to harder treatment. Give them plenty of light and air, and if shaded at all it should only be from the midday sun. A little weak clarified manure-water may be applied now and then to such as are well rooted and growing freely.

FORCING HOUSES.

Pineries.—The principal crops of summer fruiters will now be advancing fast, and must have no check from want of bottom heat and atmospheric moisture to assist in swelling the fruit. Keep them well supplied with liquid manure, and syringe well over the surface of the bed and about the wall and floors two or three times a day, and close early. Bottom heat 85 to 90 degrees, top 80 to 85 degrees, with a good supply of air. Succession plants should also be kept progressing, by the necessary shiftings according to the room there is to devote to them; they should be classified according to your requirements. The forwardest will be required for autumn fruiting, and must be most encouraged. The Black Jamaica, and other sorts required for winter purposes, must have a due share of attention; in fact in pine culture it is absolutely imperative to look forward to the state you would have your plants six months hence, and regulate the operations accordingly.

Vineries.—Where the fruit is ripening off do not fail to keep the atmosphere comfortably dry, but not arid; therefore moderate the application of fire heat

as much as possible, and take every advantage of solar influences. Air must be freely admitted, avoiding cold draughts by only opening the top ventilators when such prevail. Thinning, stopping, and tying in, are the principal operations in the successional houses. Where new erections have to be planted, this month is the best for doing so. The plants grown from single eyes should have been previously excited into growth both at root and branch on bottom heat. A good plan is to have some shallow, open-work, osier baskets made for them, and plant the young vines in them when dormant, and plunge the baskets into a bed of leaves and dung with a heat of between 60 and 70 degrees, and let them have sufficient air to keep the top heat from 5 to 10 degrees lower; by the time they have grown from 18 inches to 2 feet the roots should have radiated out plentifully through the soil; they should then be carefully lifted, baskets and all, and transferred to their destinations in the border, cover the roots from two to three inches, and apply tepid water, and they will receive no check at all. I should observe that these directions are only applicable to houses built expressly for vines and arranged for inside planting. Where they must be planted outside (a practice to be avoided if possible) they should be in a dormant state when planted, and early in April is a good time to do so.

Pits and Frames.—Keep up a good supply of fermenting materials for successional beds and for linings, as a good bottom heat cannot by any means be dispensed with, although the sun may have great power; admit plenty of air, and see that the shoots do not get crowded together. Both Melons and Cucumbers should be slightly fumigated at times to keep down insects. The main crop of ridge Cucumbers may now be planted in the prepared beds under hand-glasses; keep them shaded for a time. A few hand-glasses may also be sown at the same time. Melons for the latest crops should be sown immediately. Sow also more Vegetable Marrows, and attend to advancing plants, by giving plenty of air and moderate watering.

FLOWER GARDEN.

If the former directions with regard to giving a little extra encouragement to plants intended for ornamental vases were carried out, they will now be in a fine state, and if there is any convenience for a temporary protection they may be planted at once, and thoroughly exposed all day, but covered at night. Look well to the state of the beds intended for bedding plants: if any are occupied with spring flowering plants they must shortly be transferred to the reserve garden, and the beds dressed with fresh compost and prepared for summer plants. Bulbous plants, used for spring decoration, may be taken up next week and laid in on a warm border to ripen. The present is the proper time to secure a good stock of the Viola arborea for another season: prepare a large bed in the reserve garden, in a situation if possible which does not get the midday sun; the beds which were planted in the autumn in the flower garden will furnish hundreds of rooted runners; these should be planted singly at from 6 to 8 inches square, and kept well watered. For extensive gardens a thousand of these useful plants will not be too many.

HARDY FRUITS.

Do not forget to plant out the forced pots of Keen's Seedling Strawberries, as recommended in a former Calendar, to be reserved for that purpose; also pick off the blooms from a portion of the stock of Alpines to induce autumn bearing. C.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR APRIL.

During nearly, or quite, the whole of the month, we have had a succession of easterly winds, and an almost total absence of moisture; indeed, it has been one of the most extraordinary months on record, its position in the calendar considered. The want of rain has, we need scarcely observe, been severely felt in all parts of England, and more particularly in the grazing districts, in which the pastures are remarkably bare of keep; hence, most of the graziers have been compelled to get rid of large numbers of both beasts and sheep, under the impression that dry food will become scarce and dear, and, further, that the stock of hay now on hand will become exhausted ere anything like a supply of grass can be obtained. The consequence is, that our cattle markets have exhibited heavy supplies of stock, and prices have ruled extremely low. It is somewhat difficult for us to determine the result of this state of things; but it is tolerably clear, that a few showers of rain, with a change in the wind to the southward, would speedily produce a sufficient quantity of food. This would enable the graziers to withhold a large portion of their supplies, and have the effect of raising the value of fat stock, notwithstanding that we might have increased importations from abroad.

All out-door farm labours are very forward, and the whole of the spring corn has been sown under the most favourable auspices; nevertheless, our accounts from various parts of the country cannot be considered very satisfactory. It is true that the wheats—though extremely short—are looking tolerably well; but barley has come up very irregularly, and exhibits most unmistakeable signs of the effects of a dry temperature. Oats, beans, and peas, have made scarcely any progress; whilst the night frosts, up to quite the 20th of the month, have materially assisted in checking their growth. As regards pota-

toes, we cannot write with any degree of certainty; yet our correspondents agree in stating that the breadth of land planted with that esculent is even larger than was that of last season. That the produce of 1851 was unusually extensive, and of very fine quality, is evident from the immense quantities which are daily received in the various markets, and the low range of value which they have borne during the past eight months. We may further observe that consumption has been almost wholly met by the home growers, as the crop on the continent was a decided failure. In France, Holland, and Belgium, including a large portion of Germany, very little rain has fallen; and some writers appear to be of opinion that light crops of spring corn will be gathered this season. Present appearances certainly do not indicate a large return of the soils' production; but it is yet by far too early to form anything approaching to a correct estimate of the aggregate yield. The scarcity of food, already alluded to, has been productive of an improvement in the value of both hay and straw. Many of the large growers of the former, residing in the neighbourhood of large towns, are not forwarding supplies at present; yet it would be advisable for them to consider the advantages held out to those living in distant localities by the railway companies, and the great competition for traffic, the charges for which are now unusually low, and, we may add, unremunerative. Very limited quantities of green vegetables have appeared on sale; nevertheless, the quotations have not materially improved, arising from the great abundance of potatoes.

Considering the falling-off in the imports of grain and flour from abroad, the corn trade has been in a very inactive state. In the early part of the month prices tended downwards; but a slight improvement in them was observed towards its close. Notwithstanding that a very large and fine crop of wheat was produced in England in 1851, it is admitted on all hands that the supply now in the hands of the farmers, arising from the unusually large quantities which have passed into consumption since the close of last harvest, is much reduced. The question of an advance in the quotations has, of course, occupied much of the attention of both sellers and buyers, as well as of consumers; but the extreme caution manifested by all parties in effecting purchases, and the want of all speculation, render it tolerably clear that, in a general point of view, confidence in the future is much shaken. We may pretty safely affirm that barley, oats, beans, and peas have seen their lowest range for the season, because it is placed beyond a doubt that heavy imports will be necessary to meet the consumptive demand.

The supply of foreign linseed has continued very small; but we learn that upwards of 190,000 quarters are still on passage to England. The trade has been by no means active; yet prices have ruled steady. There has been more inquiry for both English and foreign cakes, the value of which is well supported. The guano market has been firm, and it is calculated that upwards of 7,000 tons of that article have been disposed of on continental account. The stock held in London, and at the outports, is very extensive. The imports, since our last, have exceeded 20,000 tons, chiefly from South America. The seed trade has been somewhat dull, and the quotations have been by no means high.

On the whole, the wool trade has ruled steady; but the next auctions are expected to be somewhat small, from the fact that the shipments from Australia have been very moderate, compared with those of last year. The scarcity of labour in the above colony is calculated to have considerable effect upon the value of wool in this country. The tallow trade has become somewhat firm, and the currencies have had an upward tendency. Large quantities of tallow—upwards of 30,000 casks—are still held in London by Russian houses.

In Ireland and Scotland only moderate supplies of grain have been brought forward; yet the general demand has ruled inactive, and very little change has taken place in prices of any article. The shipments of grain to England have not materially increased.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

The unusually large supplies of stock on sale in the leading cattle markets—portions of which have been forced from the land, owing to the shortness of keep in the whole of our large districts—have been productive of great depression in the trade. Prices have, therefore, suffered a somewhat serious decline, although the imports from abroad have been on a very moderate scale; hence great losses have resulted to both graziers and feeders. It is gratifying to observe, however, that both beasts and sheep have been exhibited in first-rate condition, especially those from Norfolk and Scotland; yet we fear that, unless we have a speedy change in the weather, with a somewhat abundant supply of rain, a recourse must be had to expensive kinds of food, and that hay will be selling at unusually high quotations. The fall in the prices has been quite 4d. per 8lbs.; yet it is pretty generally considered, should the pastures speedily exhibit their wonted appearance, that a material rise will take place in them during the summer months. The lambing season has passed off remarkably well; but the de-

mand for lamb hitherto has been heavy, at very low figures.

The following are the imports of stock from abroad into London:—

	Head.
Beasts	923
Sheep	3,247
Calves	1,264
Total	5,444

During the corresponding month in 1851 the total arrivals amounted to 10,289; in 1850, 4,667; in 1849, 3,810; in 1848, 5,391; and in 1847, 5,826 head.

The annexed supplies were exhibited in Smithfield:—

	Head.
Beasts	18,089
Cows	418
Sheep and lambs	101,374
Calves	1,500
Pigs	2,580

COMPARISON OF SUPPLIES.

	April, 1849.	April, 1850	April, 1851.
Beasts	16,678	16,765	16,674
Cows	520	414	304
Sheep and lambs	110,070	97,920	108,824
Calves	1,178	1,299	1,152
Pigs	1,840	1,900	2,510

The past month's home supplies have been thus derived:—

	Head.
Norfolk, Suffolk, &c.	9,160
Other parts of England	2,800
Scotland	2,140

The average quotations have ruled thus:—

Per 8lbs., to sink the offal.

	s. d.	s. d.
Beef, from	2 2 to	3 6
Mutton	2 6 to	4 2
Lamb	4 4 to	5 6
Veal	3 0 to	4 2
Pork	2 6 to	3 10

COMPARISON OF PRICES.

	April, 1849.		April, 1850.		April, 1851.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Beef	2 0 to 3	6	2 4 to 3	6	2 2 to 3	8
Mutton	2 4 to 4	2	3 0 to 4	6	3 2 to 4	6
Lamb	5 0 to 6	4	3 8 to 5	8	4 10 to 6	0
Veal	3 2 to 4	2	3 0 to 3	8	3 0 to 4	0
Pork	3 0 to 4	2	3 2 to 4	0	3 0 to 3	10

Newgate and Leadenhall markets have been heavily supplied with meat killed in the provinces; but the supplies on offer slaughtered in the metropolis have been very moderate. The general demand has ruled very inactive, and the quotations have fallen from 2d. to 4d. per 8lbs.

CHESTER FAIR was the largest ever known in April, there being about 300 tons of cheese offered for sale. The average of former years was from 100 to 200 tons. We believe the cause of this is attributable to the dulness of the London market, and to factors not being anxious to increase their stocks, until there is an improvement. Prices were from 30s. to 48s. per cwt. When everything else is so cheap, there is no plausible pretext for keeping up the price of cheese, and meat is to be had so reasonable that people prefer it to dairy produce. There was rather a greater demand for lean stock. Milking cows much the same price as last fair. No increase in the price of fat stock, which ranged from 4½d. to 5d. per lb. Not many horses shown, and those of an indifferent quality.

CHIPPENHAM GREAT MONTHLY MARKET.—Our supply of cheese (upwards of 160 tons pitched) for the season of the year was great, varying from 15s. to 60s. per cwt.; and a great quantity of heifers and calves, being the nearest market to Devizes fair. Although the Basingstoke cheese market was the day before ours, it did not prevent our usual number of factors from attending. The quality of the cheese was nothing to boast of, it being the clearing out of the cheese lofts; but nearly the whole changed hands. Broad doubles, 42s. to 50s. per cwt; prime Cheddar, 52s. to 60s.; thin, 30s to 42s.; loaves, 44s. to 50s; skim, 15s. to 21s.

LINCOLN FAIR.—For horses of the better kind, of which there is a great scarcity, almost any amount of money was given, buyers being far more numerous than horses to supply their wants. There were a great number of foreign buyers in attendance, especially Frenchmen, and they, as well as several eminent London dealers, bought everything worth their money. It is said that many of the best horses were bought for military purposes. For the best nag horses the demand was great, and all were readily bought up at prices varying from 60 to 130 guineas, and in one instance a splendid mare, the property of Mr. P. Snaith, of Boston, fetched 150 guineas. The best kind of carriage-horses and hunters fetched high rates, and had a brisk sale, while inferior animals did not readily find purchasers. Some very large and splendid animals of the cart kind were shown, and such realized good prices; good cart colts and fillies also sold well, but the meaner sorts were scarcely looked at. The sheep fair was one of the largest known for many years, upwards of 40,000 sheep being penned. The trade was in consequence remarkably dull. Up to eleven o'clock very few lots indeed changed hands, and it was very evident that lower prices must be submitted to before business to any extent could be transacted. A pen of 110 hogs belonging to T. Winn, Esq., of Lincoln, were the chief attraction in the fair, but the high prices asked in the early part of the day prevented them changing hands. Inferior hogs made from 27s. to 33s.; and good fat hogs ranged from 34s. to 41s; fat ewes fetched 4d. to 4½d. per lb. The prize cup, given by Messrs Smith, Ellison, and Co., for the best pen of 20 hogs, to be exhibited and sold at Lincoln April fair, was awarded to Mr Charles Battersby, of Scothern, who has previously carried off the palm of victory. The other competitors were Mr. Haywood, of Welhingore, Mr. Abrahams, of Knaith, Mr. N. Giles, of Branston, and Mr. Walker, of Bigsby by Brigg. The whole of the sheep exhibited were really splendid animals, and were inspected with great interest by the Hon. A. L. Melville and a very large number of the leading agriculturists of the neighbourhood. The judges were Mr. Joseph Kirkham, of Aunleby, Mr. David Briggs, of Oxcombe, and Mr. Robert Martin, of Asterby. There was but one opinion as to the justice of the award. At the same time, Mr. Thomas Smith, late of the Horse and Groom Inn, Lincoln, but now of Hambleton House, Market Rasen, exhibited (not for competition) a pen of 40 magnificent hogs, which he had purchased, and which were allowed, by competent judges, both for wool and mutton, to be unsurpassed by anything of the kind exhibited in this part of the kingdom. They were universally admired.

LOCKERBY SPRING MARKET.—There would be nearly 4000 hoggs, chiefly half-breds, but with a proportion of cheviots. The lots were mostly in the hands of dealers, and had been laid in at high prices, which their owners were of course anxious to maintain. This, with the scarcity of grass and other keep, and the dull account from the House of Muir, made the market a slow one. There was no lack of purchasers, but they were unwilling to give the prices asked. The following lots may be mentioned:—A large one, half-bred, at 29s., being about the top price; another, 25s.; Cheviots, at 18s., 20s., and 23s., the latter the top price we believe, for this description. A good many were unsold. There was a very small show of cattle, and, with the exception of cows and queys, very little business was done.

STALLIONS FOR THE SEASON.

Name.	Colour.	Age.	Pedigree.	Performances.	Principal Performance.	No. of winners out by	Sire of	Standing at	Apply to	Price.
Abernethy			by Physician, dam by Orville or Walton.....	never appeared ..	——	——	——	Sandhutton, Thirsk ...	Mr. W. Wright..	5 gs., h. b. 2 gs.
Accident	brown..	12	by Camel, out of Miss Breeze, by Phantom ..	never appeared ..	——	10	Accident.....	Asterley, Salop.....	Mr. R. Chapman.	5 gs., h. b. 3 gs.
Alarm	bay	10	by Venison, out of Southdown, by Defence...	started 17, won 13	won Ascot Cup	8	Frantic.....	Hampton Court	——	15 gs. (25 mares)
Annandale.....	brown ..	10	by Touchstone, out of Rebecca, by Lottery....	started 15, won 3	ran second for Derby...	2	The Old Lad....	Sheffield Lane Paddocks	F. Croft	10gs.,p.f.o.winners5gs
Auctioneer.....	bay	16	by Pantaloon, out of Puff, by Waterloo.....	never appeared ..	——	——	——	Croft, Darlington.....	W. Wilkinson	5 gs., h. b. 2 gs.
Bay Middleton ..	bay	19	by Saltan, out of Cobweb, by Phantom	started 7, won 7	won the Derby	94	Flying Dutchman	Danebury, Stockbridge .	Mssrs. Weatherby.	25 gs. (30 mares)
Bay President...	bay	20	by President, out of Lady Elizabeth, by Akarius	never appeared ..	——	——	——	Waitwith, Richmond, York	——	5 gs , h. b. 2 gs.
Bedwardine	chesnut	6	by Harkaway, out of Cream, by Partisan	never appeared ..	——	untried.	——	Lowesmoor, Worcester.	Mr. Tustin	4 gs., h. b. 2 gs.
Beiram..... ..	chesnut	23	by Saltan, out of Miss Cantley, by Stamford .	started 17, won 8	won Drawing Room S..	17	Midas	Burghley, Stamford ..	Mr. H. Rose .. .	10 sovs.
Birdcatcher, Irish	chesnut	19	by Sir Hercules, out of Guiccioli, by Bob Booty	started 15, won 6	won the Madrids	76	The Baron	Easby, Richmond, York	R.M.Jaques,Esq.	Subscription full
Bishop of Romford's Colt	brown ..	12	by Jereed, out of Jemima, by Count Porro....	started 61, won 26	won the Royal Hunt Cup	untried.	——	Skirmett, Henley-on-Thames	Mr. Hussey.....	2 gs.
Black Eagle.....	black ..	6	by Voltaire, out of Cytherea, by Camel.....	started 8, won 2½	won £150 at Newmarket.	untried.	——	Knighton, Ludlow.....	Mr. F. Griffiths..	5 sovs., h. b. 2 sovs.
Black Prince....	black...	10	by Touchstone, out of Queen of Trumps, by Velocipede	started 1.....	——	1	Liberty	Rugby, &c.....	Mr. A. Walker..	2 gs.
Blarney.....	brown .	5	by Mulatto or Balinkeele, out of Bohemienne, by Conf derate	started 4, won 2	won New S. at Ascot	untried.	——	Broughton, Stockbridge	Mr. Dixon	10 gs.
Bolingbroke.....	chesnut	5	by John o' Gaunt, out of Spangle, by Crœsus .	started 7, won 3	won the Prendergast S..	untried.	——	Newmarket	J. Mockford	5 gs., d. of winners *gratis*
Bowstring.....	chesnut	8	by Amurath, out of Miss Bowe, by Catton	started 16, won 9	won the Biekerstaffe S..	untried.	——	Stockbridge	Mr. Hopkins	5 gs., h. b. 2 gs.
Brau	chesnut	21	by Humphrey Clinker, out of Velvet, by Oiseau.	started 8, won 6	won Swinley Stakes	26	Our Nell	Fox and Barrel, Delamere Forest	T. Hucknell.....	5 gs., h. b. 3 gs.
Burgundy	bay	9	by Ismael, out of Caroline, by (Irish) Drone	started 24, won 13	won Newton Manor Cup	untried.	——	Dycer's, Dublin	——	5 gs , h. b. 2½ gs.
Cæsar	bay	16	by Saltan, out of Cobweb, by Phantom	started 6, won 3	won the Riddlesworth ..	10	Icicle	West Hill Farm, Wandsworth	Mr. Rex.....	10 gs , h. b. 3 gs.
California (Bro. to Riddlesworth)	chesnut	19	by Emilius, out of Filagree, by Soothsayer ..	never appeared ..	——	4	The Mease.....	Bushbury, Wolverhampton	Mr. Phillips	5 gs., h. b. 3 gs.
The Caster	bay	12	by Emilius, out of Castaside, by Mameluke or Camel	started 11, won 4	won the Levant S.....	1	The Setter.....	Sledmere, Malton	——	7 gs., h. b. 3 gs.
Catesby	bay	11	by Slane, out of Cobweb, by Phantom.....	started 1	——	——	——	Brixworth, Northampt.	F. Moody	10 gs., h. b. 3 gs.
Cattonite	bay	11	by Muley Moloch, out of Jubilee, by Catton..	started 33, won 16	won Croxton Park Cup.	untried.	——	Leckhamton, Cheltenh.	Mr. J. Villars...	5 gs., h. b. 2 gs.
Chanticleer	grey....	9	by Irish Birdcatcher, out of Whim, by Drone.	started 37, won 21	won Doncaster Cup ...	untried.	——	Rawcliffe, York.....	T. Bateson.....	12 gs. (30 mares)
Charles XII.....	brown ..	16	by Voltaire, out of Wagtail, by Prime Minister	started 34, won 19	won St. Leger..... ..	18	The Swede ...	Bonehill, Tamworth ...	——	10 gs., h. b. 4 gs.
Chatham	chesnut	13	by The Colonel, out of Hester, by Camel.....	started 16, won 8½	won the Criterion	10	Woolwich	Ham, Arundel.....	Mssrs. Weatherby	17 gs. (15 mares)
Collingwood	bay ...	9	by Sheet Anchor, out of Kalmia, by Magistrate	started 70, won 34	won the Royal Hunt Cup	untried.	——	Maresfield, Sussex.. ..	J.V. Shelley, Esq.	11 gs. (30 mares)
Conyngham ...	bay ..	8	by Slane, dam by Whisker	started 8, won 4	won 2000 Guineas S.....	untried.	——	Newmarket	Messrs. Barrow..	10gs ,p.f.o.winners5gs.
Cotherstone.....	bay	12	by Touchstone, out of Emma, by Whisker	started 11, won 7½	won the Derby	25	Glauca	Althorp, Northampton .	Mr. Elliott.....	25 gs. (20 mares)
Cotherstone, Yng.	bay	4	by Cotherstone, out of Lilla, by Bo'sadil.....	never appeared ..	——	untried.	——	Audlem, Nantwich	Mr. Lisle	7 gs , h. b. 3 gs.
Cowl	bay.. ..	10	by Bay Middleton, out of Crucifix, by Priam .	started 8, won 5	won Buckenham S.	3	Confessor.....	Althorp, Northampton .	Mr. Elliott.....	10 gs.
Cranebrook	chesnut	9	by Alcaston or Lord John, out of Urganda, by Tiresias	started 19, won 6½	won the G. York Hand.	untried.	——	Northampton.....	Mr. S Dickens..	5 gs., h. b. 3 gs.
Crozier	bay	8	by Lanercost, out of Crucifix, by Priam	started 13, won 3½	won £650 at Ascot.....	untried.	——	Ardee, Co. Louth... ..	——	4 sovs., h. b. 2 sovs.
Delirium	brown ..	21	by Filho-da Puta, out of Lunatic, by Prime Minister	started 17, won 6	won a Royal Plate	4	Insanity	Croft, Darlington	Mr. Wilkinson .	6 gs , h. b. 2 gs.
Dey of Algiers ..	bay	16	by Priam, dam by Bustard	started 13, won 3	won Chester Cup	——	——	Ardee, Co. Louth.....	——	4 sovs., h. b. 2 sovs.
Don John	bay	17	by Tramp or Waverley, dam by Comus	started 10, won 9	won St. Leger	40	Iago.....	Willesden Paddocks...	Messrs. Tattersall	15 gs.
Dulcimer	chesnut	16	by Muley, out of Dulcamara, by Waxy	started 1.....	——	5	Dulcet	Diamond Farm, Oxford	Mr. S. Beezley ..	5 gs., h. b. 2 gs., winners and dams of *gratis*.

Earl of Richmond	brown ..	12	by Touchstone, out of Queen of Trumps, by Velocipede	started 1, won 1	won Lyme Park Stakes	4	The Ballet Girl ..	Theobald's Park, Enfield	Mr. A. Gray	7 gs., h. b. 2 gs.
Epirus	chesnut	18	by Langar, out of Olympia, by Sir Oliver.....	started 31, won 12	won Copeland Handicap	35	Pyrrhus the First	Pitsford, Northampton .	Mr. Pot'ertou ..	20 gs. (40 mares)
The Era	bay ...	12	by Plenipotentiary, dam by Whisker.....	started 26, won 7	won Liverpool Cup	untried.	——	Bromyard	Mr. Devereux ..	5½ gs., h. b. 2 gs.
E-sedarius.	chesnut	6	by Gladiator, dam by Velocipede	started 8, won 2	won Somersetshire S ...	untried.	——	Newmarket.....	Messrs. Barrow..	7 gs., h. b. 3 gs.
Fallow Buck....	brown ..	7	by Venison, out of Plenary, by Emilius	never appeared..	——	untried.	——	Andler's Ash, Petersfield	Mr. Ayling	2 gs.
Faugh-a-Ballagh	brown ..	11	by Sir Hercules, out of Guiccioli, by Bob Booty	started 9, won 5	won St. Leger.....	11	Goldfinder.....	Dean's Hill, Stafford ..	Mr. Painter.....	12 gs.
Flatcatcher	bay	7	by Touchstone, out of Decoy, by Filho-da-Puta	started 26, won 15	won 2,000 Gs. Stakes ..	untried.	——	Birch Farm, Oswaldrick	R. Thorpe	5 gs.
Flying Dutchman	brown ..	6	by Bay Middleton, out of Barbelle, by Sandbeck	started 16, won 15	won the Derby	untried.	——	Rawcliffe, York	T. Bateson.....	30 gs. (40 mares)
Footstool	bay	9	by The Saddler, out of Trudge, by Tramp	started 24, won 13	won Swinley Stakes	untried.	——	Newmarket	Messrs. Barrow..	7 gs., h. b. 3½ gs.
Gabbler	bay	8	by Bay Middleton, out of Flycatcher, by Godolphin	started 14, won 3	won £325 at Doncaster..	untried.	——	Erdington, Birmingham	Mr. D. Miles....	5 gs., h. b. 2 gs.
Galaor	bay	14	by Muley Moloch, out of Darioletta, by Amadis	started 13, won 5	won Manchester Cup ...	2	Congratulation ..	Harker Lodge, Carlisle	J. Watson	10 gs.
Gameboy	brown ..	10	by Tomboy, out of Lady Moore Carew, by Tramp	never appeared ..	——	2	Trousseau	Easby, Richmond, York.	R.M. Jaques, Esq.	10 sovs.
Glendower	bay	7	by Slane, out of Glencairne, by Sultan.....	started 19, won 12	won the Clearwell	untried.	——	Theobald's Park, Enfield	Mr. A. Gray ...	7 gs., h. b. 3 gs.
Glentilt	chesnut	8	by Plenipotentiary, out of Glenlui, by Sultan..	started 4, won 3	won the Clearwell	——	——	Danebury, Stockbridge.	Mrs. Weatherby	7 gs., h. b. 3½ gs.
The Hero	chesnut	9	by Chesterfield, out of Grace Darling, by Defence	started 37, won 29	won Emperor's Plate ..	untried.	——	Turf Tavern, Doncaster	Mr. W. Daykins.	10 gs.
Heron	brown ..	19	by Bustard, dam by Orville.....	started 41, won 17	won Liverpool Cup.....	10	Moorcock.....	Erdington, Birmingham	Mr. D. Miles....	5 gs., h. b. 2 gs.
Hetman Platoff .	brown ..	16	by Brutandorf, dam by Comus.....	started 10, won 6	won Northumberland P.	49	Cossack	Tickhill Farm, Rotherh.	W. Horshaw	10 gs.
Humphrey	bay	17	by Sandbeck, out of Oceana, by Cerberus	started 46, won 16	won Stockton P.....	1	Diana	Sawdon, Scarbro'	Messrs. Coverley.	5 gs., h. b. 2 gs.
The Hydra	chesnut	17	by Sir Hercules, out of Zebra, by Partizan....	started 19, won 5	won Croxton Park C....	6	Mark Tapley ...	Bodicot, Banbury	Mr. Austin.....	5 sovs., h. b. £2 10s.
Iago	brown ..	9	by Don John, out of Scandal, by Selim	started 18, won 10	ran second for St. Leger.	——	——	Dringhouses, York	Mr. Wilkinson ..	10 gs.
Joe Lovell	bay	11	by Velocipede, out of Cyprian, by Partizan....	started 6, won 3	won Great Yorkshire S..	untried.	——	Bretby, Burton-on-Trent	——	7 gs.
John o' Gaunt ..	chesnut	14	by Taurus, out of Mona, by Partizan	started 38, won 23	won Newmarket S.....	4	Bolingbroke	Leybourne, Maidstone..	Mr. Tweed.....	10 gs. (20 mares)
Knight of Avenel	chesnut	5	by The Doctor, out of Blue Bonnet, by Touchstone	started 6, won 4	won the Port	untried.	——	Theobald's Park, Enfield	Mr. A. Gray	7 gs., h. b. 3 gs.
Knight Templar	chesnut	8	by Jack-in-the-Green, out of Babel, by Interpreter	never appeared ..	——	——	——	Templenewsam, Leeds .	Mr. Mills.....	5 gs., winners *gratis* h. b. £2 5s.
Kremlin	brown ..	16	by Sultan, out of Francesca, by Partizan.....	started 13, won 6	won Cleveland Cup.. ..	15	Harp	Dairy Fm. Hgh Wycombe	Mr. Robinson...	7 gs., h. b. 2½ gs.
Lancastrian	bay	27	by Merlin, out of Mona, by Partizan	started 35, won 10	won £250 at Newmarket.	2	Retail	Needingworth, St. Ives.	Mr. Harradine ..	5 gs., h. b. 2 gs.
Lanercost	brown ..	17	by Liverpool, out of Otis, by Buzzard	started 40, won 26	won Ascot Cup	100	Van Tromp	York	Mr. Kirby	10 gs.
Launcelot	brown ..	15	by Camel, out of Emma, by Whisker	started 10, won 6½	won St. Leger	17	Portia	Ormeau, Belfast	Mr. Jamieson ..	6 gs., h. b. 3 gs.
The Libel	brown ..	10	by Pantaloon, out of Pasquinade, by Camel..	started 7, won 3	won Chester St. Leger..	1	Truth	Willesden Paddocks ..	Messrs. Tattersall	11 gs.
Lothario.....	bay	12	by Giovanni, out of Moggy, by Sultan	started 22, won 6	won Liverpool Cup	2	Fairy	Duddinghill, Willesden.	J. Bullock	3 gs.
Loup-Garou	brown .	6	by Lanercost, out of Moonbeam, by Tomboy..	started 6, won 1	received £15 ft.	untried.	——	Redlands, Reading	W. Jennings....	10 gs., winners and dams of, *gratis*
Maroon	brown ..	15	by Mulatto, out of Miss Giles, by Lottery.....	started 10, won 3	ran second for St. Leger.	——	——	Red Lion, Great Driffield	Mr. Stockdale...	5 gs.
Mathematician ..	bay	8	by Emilius, out of Maria, by Whisker.....	started 10, won 5	won Ebor Handicap....	untried.	——	Lowfold, Wisbro', Sussex	Mr. Scutt.....	2 gs.
Melbourne.	brown ..	18	by Humphrey Clinker, dam by Cervantes	started 18, won 9	won the Palatine S.	30	Sir Tatton Sykes.	Cawston Lodge, Rugby.	W. Scott	18 gs.
Merry Monarch..	bay	10	by Slane, out of The Margravine, by LittleJohn	started 4, won 1	won the Derby	3	Old Rowley.....	Ham, Arundel	Mrs. Weatherby	10 gs.
Meteor	chesnut	13	by Velocipede, out of Dido, by Whisker.....	started 2, won 1	won £2,000 gs. S.	1	Spot.....	Lutterworth, Leicester..	Mr Lucas	10 gs., h. b. 3 gs.
Mildew	chesnut	5	by Slane, out of Somerseria, by Voltaire.....	started 21, won 10	won Ascot Vase.....	untried.	——	Easby, Richmond, York	R.M. Jaques, Esq.	5 sovs.
Minotaur	chesnut	12	by Taurus, out of Lyrnessa, by the Flyer	started 22, won 12	won £800 at Newmarket	2	Theseus	Fountain Inn, Bedford	Mr. Ward..... ..	6 gs., h. b. £2 5s.
Mister Milner ..	brown ..	6	by Bay Middleton, out of Miss Milner, by Malek	started 2, won 1	won Molecomb S.....	untried.	——	Wooton Hatch, Dorking	——	£2 5s.
Muley Moloch ..	brown..	22	by Muley, out of Nancy, by Dick Andrew	started 17, won 11	won the Port	81	Alice Hawthorn.	Askham Bryan, York..	R. Hebblethwaite	5 gs., h. b., 2½ gs.
The Mummy....	chesnut	19	by Memmon, out of Mouche, by Emilius	started 2, won 2	won £200 at Warwick..	4	Skeleton	Peterborough	Mr. Church	5 gs., h. b. £1 5s.
Newcourt.....	bay	12	by Sir Hercules, out of Sylph, by Spectre ...	started 19, won 8	won Herefordshire S ..	untried.	——	Northleach.....	Mr. Isaac Day ..	10 gs. (20 mares)
Nutwith	bay	12	by Tomboy, dam by Comus	started 7, won 3	won St. Leger	4	Nutshell	Burghley, Stamford. ..	Mr. H. Rose....	20 gs.
Peep-o'-Day-Boy	chesnut	8	by Harkaway, out of Rosetta, by Roller	started 12, won 4	won Chester Cup	untried.	——	Duddinghill, Willesden.	J. Bullock	5 gs.
Phlegon	bay	12	by Beiram or Sultan, out of Lucetta, by Reveller	started 6, won 2	won G. Duke Michael S.	2	Phlegethon	Burghley, Stamford ...	Mr. H. Rose....	10 sovs.
Pompey	brown ..	12	by Emilius, out of Variation, by Bustard	started 26, won 10	won Gt. York. Hand. (2)	2	Nancy.....	Burton Pidesea, Hull ..	Mr. Baxter	10 gs.
Pontifex	bay	5	by Touchstone, out of Crucifix, by Priam	never appeared ..	—— ——	untried.	——	Great Driffield	Mr. T. Howden .	5 gs.
Post-Tempore ...	bay	6	by Stockport, out of Mrs. Gill, by Viator	started 25, won 9	won £265 at Chester. ..	untried.	——	Water Fulford, Yorkshire	Mr. Burton.....	7 gs., h. b. 2 gs., winners and dams of *gratis*
Pottinger.....	bay	8	by Plenipotentiary, out of Enterprise, by Defence	started 22, won 5	won £80 at Newmarket	untried.	——	Wroughton, Swindon ..	Mr. H. Reeve...	5 gs , h. b. 2 gs.

Name.	Colour	Age.	Pedigree.	Performances.	Principal Performance.	No of winners out by.	Sire of	Standing at	Apply to	Price.
Pyrrhus the First	chesnut	9	by Epirus, out of Portress, by Defence.....	started 13, won 10	won the Derby	untried.	——	Sledmere, Malton	——	10 gs , h. b. 4 gs.
Ratan	chesnut	11	by Buzzard, dam by Peyton	started 7, won 3	won the Criterion	4	Penang	Theobald's Park, Enfield	Mr. A. Gray	10 gs., h. b. 3 gs.
Ratcatcher.....	chesnut	22	by Langar, out of Rufina, by Blacklock	started 65, won 27	won the Cleveland Cup	9	Rat-Trap	Willesden Paddocks ..	Messrs. Tattersall	7 gs., h. b. 4 gs.
Red Deer	bay	11	by Venison, out of Soldier's Daughter, by The Colonel	started 20, won 10	won the Chester Cup ...	8	High Sheriff	Theobald's Park, Enfield	Mr. A. Gray	10 gs., h. b. 3 gs.
Red Hart.....	bay	7	by Venison, out of Soldier's Daughter, by The Colonel	started 16, won 8	won Grand D. Michael S	untried.	——	Goodwood	Mr. Kent	10 sovs., h. b. 5 sovs.
Retriever.....	chesnut	16	by Recovery, out of Taglioni, by Whisker	started 53, won 23	won Goodwood S.	10	Pio Nono.....	Brancote, Stafford.....	——	6 sovs., h. b. 3 sovs
Robert de Gorham	brown ..	13	by Sir Hercules, out of Duvernay, by Emilius	started 20, won 7	ran second for the Derby	6	Hesse Homburg .	Ham, Arundel	Mssrs. Weatherby	17 gs (15 mares)
Rodney	brown ..	8	by Sheet Anchor, out of Charlotte, by Perion .	started 8, won 3	won £15 at Rochester	untried.	——	Craven Arms, Southam.	W. Ivens	2 gs.
Roland	bay ...	6	by The Saddler, out of Executrix, by Liverpoo	started 15, won 5	won Wolverhampton S.	untried.	——	Nun Monkton, York .	Mr. T. Grove ..	5 gs., h.b. 2 gs., winners and dams of *gratis*
St. Francis.....	bay	17	by St. Patrick, out of Surprise, by Scud	started 49, won 28	won the Ascot Cup.....	15	St. Rosalia	Newmarket.....	Mr. Pettit	10 gs.
St. Lawrence ...	brown .	15	by Skylark or Lapwing, out of Helen, by Blacklock	started 58, won 22	won the Chester Cup ..	——	——	Lowfold, Wisbro', Sussex	Mr. Scutt.....	5 gs.
The Sea	bay	22	by Whalebone, dam by Orville	started 5, won 3	ran well in steeple-chases	4	Mermaid	Bonehill, Tamworth...	——	8 gs., h. b. 2 gs.
Siricol	brown ..	12	by Sheet Anchor, out of Nanette, by Partisan.	started 5.....	——	untried.	——	Clay Hill, Epsom.....	Mr. Wycherley..	7 gs., h. b. 3 gs.
Sir Isaac	brown ..	21	by Camel, out of Arachne, by Filho da Puta..	started 7, won 3	won Pro. S. at Liverpool	8	Yardley	Yardley, Birmingham..	Mr. Holloway...	0 gs., h. b. 3 gs.
Sir Roland de Bois	bay	7	by Touchstone, out of Falernia, by Chateau Margoux	started 1..	——	untried.	——	New Park Road, Brixton	Mr. Ramsey	6 gs., h. b. 3 gs.
Sir Tatton Sykes	bay ...	9	by Melbourne, dam by Margrave	started 12, won 4	won St. Leger	untried.	——	Theobald's Park, Enfield	Mr. A. Gray	10 gs., h. b. 5 gs.
Skane	bay	19	by Royal Oak, dam by Orville.....	started 18, won 9	won Waterloo Shield ..	75	The Princess ..	Bretby, Burton-on-Trent	——	20 sovs. (20 mares)
Snowstorm.....	brown ..	6	by Lanercost, out of Rebecca by Lottery....	started 25, won 4	won Great York-sh. H ..	untried.	——	Northleach	Mr. I. Day	10 sovs. (20 mares)
Sotterley	bay	7	by Plenipotentiary, out of Liberia, by Liverpool	started 24, won 1	won Newmarket St Leger	untried.	——	Ticketon, Woodbridge.	——	5 gs., h. b. 2 gs.
Springy Jack....	bay	7	by Hetman Platoff, out of Oblivion, by Jerry..	started 5, won 3	ran second for the Derby	untried.	——	Eaton, Chester	——	10 gs., h. b. 5 gs.
Storm.....	bay .	4	by Touchstone, out of Ghuznee, by Pantaloon	started 2, won 1	won £460 at Doncaster.	untried.	——	Stand Hill, Pilkington .	——	5 sovs., h. b. 2 sovs
Stronghow	brown ..	6	by Touchstone, out of Miss Bowe, by Catton..	started 41, won 20	won Liverpool Cup	untried.	——	Turf Tavern, Doncaster	——	7 gs , h. b. 3½ gs.
Surplice	brown ..	10	by Touchstone, out of Crucifix, by Priam ...	started 16, won 9	won the Derby	untried.	——	Turf Tavern, Doncaster	Mssrs. Weatherby	20 gs. (25 mares)
The Swindler ...	bay ...	5	by Wintonian, out of Venilia, by Velocipede..	started 2.....	——	untried.	——	Redlands, Reading ...	W. Jennings	2 gs.
Sweetmeat.....	brown ..	10	by Gladiator, out of Lollypop, by Starch.....	started 24, won 22	won Queen's Vase	2	Peppermint	Park Gate-street, Dublin	Mr. Murphy	8 sovs.
Theon	brown ..	15	by Emilius, out of Maria, by Whisker.....	started 6, won 3	won Doncaster 2 yrs. S	11	Sagacity	Crown & Anchor, Ripon	Mr. Blacker.....	10 gs., winners and dams of, 5 gs.
Thistle-whipper .	bay	14	by Beagle, out of Miss Muley, by Filho da Puta	started 11, won 8	won £325 at Newmarket	8	Knt. of the Thistle	Longstock, Stockbridge.	Mr. Woolcot....	5 gs., h. b. 3 gs.
Tory-Boy	brown ..	14	by Tomboy, out of Bessy Bedlam, by Filho da Puta	started 2, won 2	won Chester 2 yrs. S ...	4	The Iron Duke..	Foxholes, Eller, Garstan.	——	5 gs., h. b. 2 gs.
Touchstone	brown ..	21	by Camel, out of Banter, by Master Henry ...	started 27, won 14	won St. Leger	90	Surplice	Eaton, Chester.....	——	——
Tuftbunter.....	bay	8	by Sycophant, out of Marie, by Waverley....	started 24, won 12	won Audley End S. ...	untried.	——	Croxton Park, St Neot's	W. Frazer	5 gs., h. b. 2½ gs.
Van Tromp	brown .	8	by Lanercost, out of Barbelle, by Sandbeck ..	started 15, won 4	won St. Leger	untried.	——	York	Mr Kirby	15 gs. (40 mares)
Venison	brown ..	19	by Partizan out of Fawn, by Smolensko	started 22, won 16½	won Portland Handicap	101	Alarm	Broughton, Stockbridge	Mr. Dixon	25 gs. (20 mares)
Windhound.....	brown ..	5	by Pantaloon, out of Phryne, by Touchstone..	started 6, won 1	won £74 at Reading ..	untried.	——	Knockhill, Ecclefechan N.B.	R. Menzies.....	7 gs.
Wood-Pigeon ...	bay . ..	10	by Velocipede, out of Amina, by Sultan	started 17, won 7	won Ascot Stakes	——	——	Burghley, Stamford ..	Mr. H. Rose	10 sovs.
Yaxley	bay	20	by Sandbeck, out of Johanna, by Selim	started 1.....	——	3	Pine-Apple	Sheriff Hutton Park, Yrk.	——	5 gs., h. b. 2 gs.

The Groom's Fee varies from half-a-crown to a guinea; it is occasionally but not often included. The Dey of Algiers covered one season in Holland; and Birdcatcher and Launcelot have covered, if not still, in Ireland: we may have not placed *all* the "winners out by" in that part of the kingdom to their credit.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF APRIL.

The Derby Ministry have now been two months in office; but, as yet, the Government have manifested no intention of proposing any measures for the relief of the agricultural interest. That this may have been caused by a want of power rather than a want of desire is quite possible; but the fact is undeniable, that since the accession to office, the different members of the Government have been particularly guarded in their expression of opinion whenever the subject of Protection has been under discussion. Before what we are now writing shall have met the eyes of our readers, Mr. Disraeli will probably have brought forward his budget, which may, perhaps, afford matter for forming a judgment as to the intentions of Ministers, and show whether the attempt will be made to lighten the burdens bearing on the land. We must acknowledge that we are by no means sanguine on the subject. The prevailing feeling appears to be that even after a dissolution shall have taken place, no attempt will be made to put a duty on corn if a decided majority of Protectionist members be not returned. Very little excitement is shown at present on either side: the farmers appear apathetic, and the Free-traders, after their grand display at Manchester, have remained quiet.

This being the case, the possibility or probability of any alteration in the laws regulating the importation of corn into this country has had no influence on the grain trade, and the changes which have taken place in prices cannot be attributed in any way to doubts, fears, or hopes on that subject.

When we last addressed our readers wheat was drooping in value in all parts of the kingdom, and the downward movement was not checked until about the middle of the present month; since then, however, a small rally has taken place, and present appearances indicate a further moderate improvement. The somewhat improved tone has not been caused by speculation—buyers having, in general, acted with much caution; but, after prices had fallen about 4s. per qr. from the highest point attained in February, farmers showed evident signs of unwillingness to continue their sales. The deliveries from the growers consequently began to fall off, and as the supplies from abroad did not increase, purchasers ceased to have it all their own way. The exact fluctuations which the value of wheat has undergone will be given more fully when we treat of the operations which have taken place at Mark-lane.

We must now say a few words about the weather, which has certainly been of a very extraordinary character. Scarcely any rain has fallen in any part of the kingdom during the month, and the drought has now continued for nine or ten weeks. Under these circumstances, it is scarcely necessary to say that the pastures have long since become very bare, and that all kinds of green food is exceeding scarce. What may be the ultimate effect of so protracted a period of dry weather on the spring-sown crops we are unable to conjecture: hitherto, there is much less appearance of injury than might be expected; the seed has generally come up, and, though vegetation is backward, there are no unhealthy symptoms. There can, however, be no doubt that spring corn and pulse would suffer severely should we be much longer without rain. The wheat plant is rarely injured by drought, and we consider that the weather, however trying for the other crops, has proved beneficial to the autumn-sown wheat, the aspect of which is, with few exceptions, promising.

As regards the probable future value of wheat, we see no reason to calculate on any very important change, unless circumstances should hereafter arise of a nature to cause uneasiness to be felt relative to the growing crop. Prices are too low to allow of any further depression of consequence; and, on the other hand, we are inclined to think that if any improvement of moment on present rates should take place, the farmers would be inclined to meet it freely, as they still fear—and with good reason—that later in the year the importations from abroad may increase. Even now, with good English wheat of 63 lbs. weight at 40s. per qr., supplies to some extent reach us. During the month, ending the 5th inst., the total quantity of grain and pulse imported into the United Kingdom exceeded half of a million of quarters, and of this quantity 180,000 qrs. consisted of wheat, in addition to which 330,000 cwts. of foreign-manufactured flour were received. This having been the case with prices relatively higher abroad than in the British markets, it may be readily understood that a small rise here would suffice to encourage increased shipments.

The much-talked-of scarcity in the north of Europe would seem to have been a good deal exaggerated; at all events, there can be no doubt that prices were driven up much higher in the Baltic by

speculation than the real position of affairs warranted. This seems to be now generally allowed, and is, to a certain extent, proved by the great fall which has taken place at some of the ports where the rise was most important. The foreign merchants having, however, paid dearly for the stocks they hold, are likely to speculate on the chapter of accidents for bringing them out, and will probably retain their property until later in the year, trusting to an inauspicious summer, or some other unforeseen circumstance to afford them a more favourable opportunity for realizing.

The weather appears to have been similar to that experienced here over the greater part of northern Europe; and some of the letters from the Baltic express fears as to the rye crop, which it is apprehended may have suffered from the severity of the night frosts.

The very high prices, which have prevailed throughout the past winter on the continent for wheat and rye, has naturally caused an increased consumption of all articles suitable for substitutes, and as the spring-sown crops of 1851 did not yield largely, the stocks of barley, oats, beans, and peas are generally reduced into a very narrow compass in those countries from which England usually draws supplies. This is also, we are inclined to think, the case at home; and it would appear therefore that our markets are not likely to be over supplied with spring corn. Under these circumstances, any decline from present prices can scarcely be calculated on, and should we be much longer without rain, a rise would be very likely to take place. Barley and oats have ever since harvest commanded relatively higher prices than wheat; and this must, we think, have led to free deliveries of the former articles; indeed, oats have become so scarce in many parts of the kingdom, that higher prices have actually been paid in the agricultural districts than have been obtainable in the consuming markets, the few foreign, which have from time to time come to hand, having assisted to keep the large towns better supplied than those places which have had to depend entirely on the growers for supplies.

Considering the abundance of capital, and the cheapness of money (the Bank Directors having on the 22nd inst. reduced the rate of interest to 2 per cent. per annum), some surprise is felt that the corn trade should have remained in so very quiet a state; there has thus far been no disposition to enter into speculative investments, and merchants and millers have, in general, been content to confine their operations to purchasing just sufficient to supply their immediate wants.

The operations at Mark Lane will afford a very fair sample of what has been done elsewhere, and we cannot therefore do better than take a retrospect of the proceedings of the month. There has been no pressure of wheat on the market at any period, the weekly arrivals coastwise into the port of London have not much exceeded 4,000 qrs., and the receipts per railway have likewise been moderate. Notwithstanding the moderate nature of the supplies the millers managed to buy English wheat on rather easier terms on the 5th inst. than on that day se'nnight, and on the following Monday a further decline of 1s. per qr. was pretty generally submitted to, the value of good red Kent and Essex wheat being then 40s. to 41s.; and 50s. per qr. being an extreme quotation for white, excellent samples of the latter having on that occasion been sold for 48s. per qr. Since then factors have declined to make any further concession, and though buyers have acted with great caution they have found it necessary to pay rather enhanced rates. For the best runs of red wheat 42s. per qr. was paid on the 19th, and on Monday last that price was, in partial instances, exceeded by 1s. per qr., making the top quotation nearly the same as it was at the close of March, the decline which took place the first fortnight in April having since been recovered. This has also been the case in most of the country markets, and wheat cannot at present be purchased cheaper at any of the principal shipping ports on the east coast than when we last addressed our readers.

The arrivals of foreign wheat into London have been very small, only 20,000 qrs. having been reported, and of this quantity a considerable proportion has consisted of Egyptian, a quality not suited for the use of our millers. The insignificance of the supply has tended to render holders of granaried wheat confident; and though some slight reduction took place the first fortnight in the month, the fall was not equal to that submitted to on English. We must, however, report a very dull sale, the excellent quality of the English having prevented foreign meeting with attention, more especially as the prices asked for the latter have been relatively higher than those at which the former has been offered. Thus far the home supplies have sufficed to meet the wants of the local millers, and as yet but very few country purchasers have visited Mark Lane; as, however, the deliveries from the growers have within the last two or three weeks fallen off materially, it is not improbable that the inquiry for foreign may improve, and holders have latterly shown more disposition to raise than to lower their pretensions. The quantity hitherto shipped from the Baltic and other northern ports is quite inconsiderable, and we believe that there is less on passage from the Black Sea and Mediterranean than was the case at this period last year. The arrivals off the coast from ports lying east of Gibraltar have

not been very large during the month, and nearly the whole of the cargoes which have come forward have been placed, the major part to go to Ireland, and a portion for the continent of Europe. The foreign demand has, however, now ceased, and the transactions in floating cargoes have, during the last week or two, been unimportant. A large cargo of Polish Odessa wheat arrived, and in the first instance held at 38s., was ultimately sold at 34s. 6d. per qr., cost, freight, and insurance. White Polish Odessa is still held at 40s., and Ghirka at 38s. per qr., but there are at present no purchasers at those rates. Egyptian Saide wheat off the coast would not bring more than 23s.; one cargo of very good quality was sold about a week ago at 28s. 6d. per qr., cost, freight, and insurance. The disposition to purchase cargoes on passage has in a great measure subsided, and those only which are believed to be close at hand have met with any attention.

The top quotation of town-manufactured flour has undergone no change since our last; the sale was slow during the first three weeks in April, but within the last eight days the bakers have bought somewhat more freely, owing probably to the improved tone of the wheat trade. Water having become exceedingly scarce in most parts of the country, many of the mills have been brought to a stand, and the arrivals of country flour into London have been small of late. Norfolk households are bringing better prices at Manchester and other northern markets than in the metropolis, and we are therefore not likely to receive any supplies of importance. The receipts of flour from France were tolerably good in the beginning of the month, but the arrivals have since fallen off, nor have we received any quantity of importance from America; holders have consequently become firm, and good qualities have recovered a portion of the decline which took place about the close of March and early in April. The quantity of flour on passage from America is variously estimated at from 70,000 to 100,000 barrels. The greater part will probably go to Liverpool, and we question whether the London market will receive over 20,000 to 30,000 barrels of what is on the way. Prices range at present from 20s. to 23s. per brl.

Barley of home growth has not come to hand freely, but the malting season being nearly over, and many of the distillers having ceased to operate, the supplies have proved quite adequate to the demand. The finer qualities suitable for malting have gradually given way in value in proportion as the demand has slackened, and capital samples might now be had at 30s. to 31s., whilst 33s. per qr. may be regarded as an extreme rate for picked parcels. Distillers' barley has not fallen to the same extent, still the turn has been decidedly in favour of the purchaser. Feeding kinds have, on the other hand, been in good request, and have commanded quite as much money as before. The arrivals of barley from abroad from the 1st to the 25th inst. have amounted to about 22,000 qrs., and of this quantity a considerable part has been from Egypt. Good qualities from the Danish islands, &c., have met with a fair share of attention, and have realized 26s. 6d. up to 28s. per qr., whilst Egyptian has been offered freely at 21s. per qr. Of the latter a cargo or two on passage found buyers about a week ago at 19s. 6d. per qr. cost, freight, and insurance; since then we have heard of no sales.

The downward movement in the value of barley has naturally influenced malt more or less, and the operations in the latter article have for several consecutive weeks been on quite a retail scale. Quotations have not in general been altered, but the turn has certainly been against the seller.

The quantity of oats received at this port, including the late arrivals from abroad, have not amounted altogether to what has been needed for the consumption of the metropolis, which, at this period of the year, is estimated to amount to at least 20,000 qrs. per week.

The English supplies are more likely to fall off than increase, and the quantity on passage from Scotland is not, we believe, large. From Ireland, we may calculate on receiving some quantity with the first shift of wind to the westward; for though the shipments from thence have not, at any time, been important, the long prevalence of east wind must have caused an accumulation. From the north of Europe, there is not, we think, much on passage, the wind having been favourable for vessels coming from Germany, Holland, &c.

Notwithstanding the smallness of the supply, the reduced state of the stocks in the hands of the dealers, and last, though not least, the extreme drought, great difficulty has been experienced in obtaining any advance on oats.

During the first fortnight in April, prices remained nearly stationary. On the third Monday, a rise of 6d. per qr. was, in partial cases, realized, and a further improvement to about the same extent during the following week; but there has been nothing like activity in the demand, and the dealers have manifested a decided disinclination to purchasing beyond what they have needed for immediate wants. The present value of good English feed oats, of 38lbs. to 40lbs., is 21s. to 21s. 6d.; Scotch, of 41lbs. to 42lbs., 22s. to 23s.; Irish, 20s. to 22s., according to quality; and the value of foreign ranges from 19s. to 22s. per qr. Whether any further immediate improvement will take place,

may be questioned; but we are certainly of opinion that prices will rise in May and June, as the contracts entered into at Riga and St. Petersburg on British account are not nearly so large as they were last year; and the other foreign ports do not appear to be in a position to furnish very large supplies.

English beans have within the last week or two excited rather more attention than previously, without, however, leading to any important sales or rise in quotations. Egyptian beans were sold, about a fortnight ago, at 21s. per qr., cost, freight, and insurance; sellers have since raised their pretensions, and are not willing to accept below 22s. at present.

The operations in peas have been on a retail scale, but holders have been induced by the long protracted drought to ask rather higher terms, more especially for feeding qualities, which will, it is believed, become in more request later in the season. The weather is certainly very trying for the growing crop of peas, and a rise in the value of the article must follow, should we be much longer without rain.

Little or nothing has been done in Indian corn on the spot; indeed, hardly any comes to this port, the sole purpose for which it finds favour here being cattle-feeding.

A good deal of business is, however, done in the London market in free-on-board cargoes, and this branch of business is rapidly increasing in importance. By far the greater part of the Indian corn imported is consumed in Ireland; the captains of vessels from the Black Sea and Mediterranean generally receive directions to call at Falmouth or Cork for orders as to their ultimate destination. The Greek houses principally engaged in this trade have their establishments in London, and the purchases for Irish account are, therefore, for the most part, made through London factors and agents.

There was not much doing in the early part of the month, but latterly the Irish demand has again revived, and prices are now quite as high as they were at the close of March. Galatz could not, at present, be bought below 30s. 6d. to 31s. 6d.; and for Ibrail, 29s. to 29s. 6d. per qr., cost, freight, and insurance, has been demanded.

The various foreign grain markets have been influenced by the tone of the advices from hence. The fall which took place in the value of wheat in March and the beginning of April produced some effect in the Baltic, and also in the Dutch, Belgian, and French markets; but confidence has since been partially restored, and the latest continental advices are less desponding.

At Dantzig, holders have all along shown much firmness, and the value of wheat has not at any time fallen there in the same ratio as here. Supplies of new wheat from Lower Poland had begun to arrive; the quality is described as very various, the greater part inferior, but some good. Ordinary parcels, of 58lbs. to 59lbs. weight, had been held at equal to 35s. to 38s.; good mixed, of 60lbs. weight, at 40s.; and the fine descriptions of high mixed, at 42s. to 43s. per qr., free on board. Really fine high mixed old, in granary, had been held at such high rates as to check business. A few lots of Upper Polish wheat had come to hand, but had not been offered for sale. Of spring corn, hardly any stock was held, and rye was scarce. There being little demand for ships, the vessels which had arrived out seeking had been offered at low freights—say 2s. 4d. to 2s. 6d. for wheat for London. At Konigsberg, business appears to have become quiet, but there can be no doubt that real scarcity exists in that quarter; and it is not likely that shipments will be made from thence, unless prices rise materially here.

From Stettin, we learn that after a period of extreme depression, the inquiry for wheat had revived, and qualities which had at one time been firmly offered at 36s. to 37s., were then held at 38s. per qr. free on board; and for old Ukermark, of 62lbs. weight, 38s. 6d. per qr., free on board, was asked. Vessels were plentiful, and freights low, charters having been closed for London at 2s. 1d., and to Leith at 1s. 9d. per qr., for wheat. Rye, after having been sold at 27s. to 28s. per qr., had rallied, and good 58lb. parcels were then held at 31s. to 32s. per qr., free on board.

At Rostock, prices have fluctuated less than at some of the other Baltic ports—speculation not having been so active there during the winter as at Stettin, &c. The stock at that port appears to be in very firm hands, and holders do not seem to despair of an English demand later in the year. The latest quotation from thence for 61½lbs. wheat, in good shipping condition, is 39s. 6d. to 40s. per qr., free on board. Barley had, we are informed, come forward sparingly, and had not been sold below 24s. per qr., free on board.

At some of the Holstein ports, moderately good qualities of wheat might be bought at about 37s. to 38s. per qr.; when, however, we add freight and other expenses, it brings the cost considerably above the value of the article here.

The ungenial weather—the temperature having been very low on the continent as well as with us—was, it appears, beginning to create uneasiness; and the latest accounts from Hamburg state that holders of wheat had, since the previous post-day, rather raised their pretensions; fair Wahren, of 61½lbs. weight, on the spot, was then held at equal to 41s. 6d. per qr., free on board. Danish barley

was quoted 25s. 9d. to 26s. 3d.; and oats, weighing 38lbs. per bushel, 16s. 9d. to 17s. 6d. per qr., free on board.

In most of the Dutch markets, prices of wheat and rye receded materially in the early part of the month, owing to a cessation of demand from the interior of Germany. Subsequently, business improved, but only a portion of the fall was recovered.

In France, the tendency of prices has, on the whole, been downwards, but it would not pay to import either wheat or flour from thence.

From the Mediterranean ports, we have nothing fresh to communicate. Polish Odessa wheat was, according to the most recent accounts from thence, still worth 32s. up to 35s. per qr., free on board, according to quality, port, &c. At Odessa, the demand for wheat had, we learn, slackened; the best qualities were quoted 31s. to 31s. 8d.; and inferior to good, 23s. 8d. up to 30s. per qr., free on board. The stock was estimated at about 70,000 qrs.

By the most recent advices from the United States, we learn that the supplies of flour had quite kept pace with the demand, and, though rather important purchases had from time to time been made for Great Britain, the tendency of prices had been downwards at all the principal ports.

CURRENCY PER IMPERIAL MEASURE.

	Shillings per Quarter			
WHEAT, Essex and Kent, white	41 to 45	fine	up to 51	
Ditto ditto old	41	45	„	51
Ditto ditto red, new	39	41	„	43
Ditto ditto old	39	41	„	44
Norfolk, Lincoln, & Yorksh., red	40	42	„	43
Ditto ditto old, none			„	—
Ditto ditto white new	42	44	„	46
Ditto ditto old, none			„	—
BARLEY, malting, new				28 32
Chevalier				32 34
Distilling				26 29
Grinding				26 28
MALT Essex, Norfolk, and Suffolk, new	53	55	extra	60
Ditto ditto old	45	48	„	51
Kingston, Ware, and town made, new	60	61	„	64
Ditto ditto old	50	53	„	55
Irish feed, white	19	20	fine	22
Ditto, black	18	19	fine	21
OATS, English feed	19	20	fine	22
Ditto Potato	21	24	extra	26
Scotch feed	21	23	fine	25
Ditto Potato	23	25	fine	26
RYE	26	28	old	26 28
BEANS, Mazagan	27	28	„	27 29
Ticks	26	28	„	28 32
Harrow	29	30	„	30 32
Pigeon	32	34	„	32 34
PEAS, white boilers	34	35	„	32 35
Maple	30	31	„	30 32
Grey	29	30	„	29 31
FLOUR, town made, per sack of 280 lbs.	—	—	„	35 40
Country Household's	—	—	„	33 35
Norfolk and Suffolk, ex-ship	—	—	„	29 32

FOREIGN GRAIN.

WHEAT, Dantzic, mixed	42 to 44	high mixed	46	48	extra	54
Konigsberg	42 44	„	45	46	„	48
Rostock, new	41 42	fine old	44	46	„	48
Pomera., Meckbg., and Uckermk., red	40		41	extra	43	46
Silesian	„ 40		41	white	43	45

	Shillings per Quarter			
BARLEY, grinding			26	28
Distilling			28	29
Malting			none	—
OATS, Dutch, brew, and Polands			20	22
Feed			18	19
Danish and Swedish feed			19	22
Stralsund			20	22
Russian			20	21
French			19	20
BEANS, Friesland and Holstein	26	28	Konigsberg	30 32
PEAS, feeding	28	30	fine boilers	32 34
INDIAN CORN, white	28	29	yellow	28 29
FLOUR, French, per sack	28	32	fine	33 35
American, sour per barrel	20	21	sweet	22 24

IMPERIAL AVERAGES.

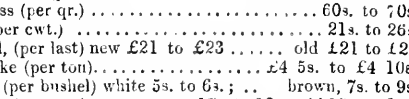
FOR THE LAST SIX WEEKS.

WEEK ENDING:	Wheat. s.	d.	Barley. s.	d.	Oats. s.	d.	Rye. s.	d.	Beans. s.	d.	Peas. s.	d.
March 20, 1852	42	8	30	3	19	9	31	11	30	4	29	10
March 27, 1852	42	2	30	2	19	6	30	5	30	3	29	8
April 3, 1852	41	7	29	9	19	4	32	3	30	0	29	7
April 10, 1852	41	4	29	4	19	7	32	8	29	11	29	2
April 17, 1852	40	10	29	1	19	4	33	6	29	10	29	11
April 24, 1852	40	4	27	8	19	3	31	7	30	3	30	2
Aggregate average of last six weeks	41	6	29	4	19	6	32	1	30	1	29	9
Comparative avge. same time last year	33	7	23	11	17	2	24	5	26	2	25	3
DUTIES	1	0	1	0	1	0	1	0	1	0	1	0

COMPARATIVE PRICES AND QUANTITIES OF CORN.

	Averages from last *Gazette* Qrs.	Fri. Av. s.	d.		Averages from the corresponding *Gazette* in 1851. Qrs.	Av. s.	d.
Wheat	71,027	40	4	Wheat	72,383	39	3
Barley	25,221	27	8	Barley	26,370	24	4
Oats	16,667	19	3	Oats	15,939	17	10
Rye	100	31	7	Rye	210	24	2
Beans	4,806	30	3	Beans	4,908	26	9
Peas	574	30	2	Peas	521	25	5

DIAGRAM SHOWING THE FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT DURING THE SIX WEEKS ENDING APRIL 24, 1852.



PRICES OF SEEDS.

BRITISH SEEDS.

Linseed (per qr.) .. sowing 58s. to 60s.; crushing 45s. to 48s.
Linseed Cakes (per ton) ..... £8 0s. to £8 10s.
Cow Grass (per qr.) ..... 60s. to 70s.
Trefoil (per cwt.) ..... 21s. to 26s.
Rapeseed, (per last) new £21 to £23 ..... old £21 to £22
Ditto Cake (per ton) ..... £4 5s. to £4 10s.
Mustard (per bushel) white 5s. to 6s.; .. brown, 7s. to 9s.
Coriander (per cwt.) ..... new 17s. to 19s., old 15s. to 16s.
Canary (per qr.) .. .... new 37s. to 39s.; old 38s. to 39s.
Tares, Winter, per bush., 4s. 6d. to 5s.; Spring, 4s. 6d to 5s.
Carraway (per cwt.) ..... new, 33s. to 34s.; fine 36s.
Turnip, white (per bush.) .. 8s. to 11s.; do. Swede, 10s. to 12s.
Cloverseed, (per cwt.) .... red 40s. to 54s., fine 54s. to 56s.

FOREIGN SEEDS, &c.

Clover, red (duty 5s. per cwt.) per cwt. 44s. to 50s., super. 5[illegible]s.
Ditto, white (duty 5s. per cwt.) per cwt. ..... 40s. to 58s.
Linseed (per qr.) .. Baltic 44s. to 47s.; Odessa, 46s. to 48s.
Linseed Cake (per ton) ..... £7 10s. to £9 0s.
Rape Cake (per ton) ..... £4 5s. to £4 10s
Hempseed, small, (per qr.) 32s. to 34s., Do. Dutch, 36s. to 37s.
Tares, (per qr.) ..... small 32s. to 36s., large 36s. to 40s.
Rye Grass (per qr.) ..... 28s. to 35s.
Coriander (per cwt) ..... 15s. to 16s.

HOP MARKET.

BOROUGH, MONDAY, April 26.

The best descriptions of old Hops continue to find purchasers at about last week's rates. In other sorts there is not much business doing.

	Per cwt.
Mid and East Kent.....	140s. to 250s.
Weald of Kent do.....	126s. to 145s.
Sussex pockets	108s. to 126s.

WORCESTER, (Saturday last.)—We have more Hops offering from planters than for some weeks past, which are freely taken by the trade at about former rates. Fine old ones are more inquired for at full prices.

COVENT GARDEN MARKET.

THURSDAY, April 29.

	s. d.	s. d.
FRUITS.		
Pine-apples, English, per lb.	4 0	to 8 0
Hothouse Grapes, do.	12 0	18 0
Lisbon Grapes	2 0	2 6
Apples, per bushel	2 0	3 6
Pears (dessert), per dozen	2 0	6 0
Strawberries, per oz.	0 6	1 6
Cobnuts, per 100 lbs.	0 0	100 0
Lemons, per dozen	1 0	2 0
Oranges, per 100	4 0	12 0
Almonds, per peck	0 0	5 0
Spanish Nuts, do.	4 0	5 0
Spanish Chesnuts, do.	3 0	5 0
Brazil Nuts, per bushel	12 0	14 0
Barcelona Nuts, do.	20 0	22 0
VEGETABLES.		
Rhubarb, per bundle	0 3	0 9
Horseradish, per bundle	1 0	4 0
Asparagus, do.	3 0	9 0
Mushrooms, per pottle	0 8	1 0
Parsley, per dozen bunches	2 0	3 0
Spinach, per sieve	1 0	1 6
Greens per dozen bunches	2 6	3 9
French Beans, per 100	1 6	2 0
Savoys, per dozen	0 10	1 8
Red Cabbages, do.	2 0	4 0
Red Beet, do.	1 0	2 0
Sage, per dozen bunches	1 0	1 6
Watercress, per dozen bunches	0 6	0 0
Mint, do.	1 6	2 0
Turnips, per dozen bunches	2 6	3 6
Carrots, do.	4 0	7 0
Potatoes, English, per ton	50 0	90 0
„ per cwt.	2 0	5 0
„ Cornwall, new, per lb.	0 1½	0 2½
Sorrel, per half sieve	1 3	1 6
Shallots, per lb.	0 8	0 10
Onions, per half sieve	0 2	0 4
Celery, per bundle	0 6	1 0
Marjoram, do.	0 3	0 4
Fennel, do.	0 2	0 3
Savory, do.	0 2	0 3
Thyme, do.	0 2	0 3
Garlic, per lb.	0 8	1 0
Leeks, per bunch	0 2	0 3
Radishes, per dozen hands	0 6	0 10
Brussels Sprouts, per half sieve	1 0	1 6
Broccoli, per bundle	0 5	1 0
Parsnips, per dozen	0 4	1 0
Sea Kail, per basket	0 9	2 0
Endive, per score	0 9	1 6
Jerusalem Artichokes, per half sieve	0 9	1 0
Cucumbers, each	0 6	2 6

HAY MARKETS.

THURSDAY, April 29.

At per load of 36 trusses.

	Smithfield.	Cumberland.	Whitechapel.
Meadow Hay....	60s.to80s.	65s.to84s.	60s.to80s.
Clover Hay	75s. 90s.	72s. 86s.	70s. 94s.
Straw.....	23s. 29s.	26s. 30s.	24s. 30s.

POTATO MARKET.

SOUTHWARK, WATERSIDE, April 26.

During the past week the supply, both coastwise and by rail, has been moderate; and our trade continues languid, except for best samples of Regents. The following are this day's quotations—

	Per Ton.
York Regents.....	80s. to 90s.
Scotch do.	70s. to 80s.
Fifeshire Cups.....	50s. to 55s.
Kent and Essex	70s. to 80s.
Cambridge and Wisbeach	65s. to 70s.

COUNTRY POTATO MARKETS. — MANCHESTER, Tuesday.—Potatoes, 5s. 6d. to 9s. 6d. per 252lbs. SHEFFIELD, Tuesday.—5s. 6d. to 6s. 6d. per 18 stone. LEEDS, April 20.—There was only a moderate supply; prices, from 6½d. to 7½d. per score of 21lbs.

PRICES OF BUTTER, CHEESE, HAMS, &c.

	s.	s.		s.	s.
Friesland, per cwt.	80	to 84	Double Gloucester, per cwt.	46	to 56
Kiel	78	80	Single do.....	42	48
Dorset ..... new	86	90	York Hams	60	66
Carlow ..... old	70	76	Westmoreland do.	60	66
Waterford.... „	66	74	Irish do.....	52	58
Cork..... „	66	70	American do.	28	36
Limerick .... „	60	63	Wiltshire Bacon, green, ...	50	54
Sligo..... „	66	72	Waterford Bacon..	49	51
Fresh Butter, per doz.	10	12	Hamburgh do.....	42	48
Cheshire Cheese, per cwt., ...	50	70	American	—	—
Cheddar do.	56	68			

BELFAST, (Friday last.)—Butter: Shipping price, 74s. to 78s. per cwt.; firkins and crocks, 8d. to 8½d. per lb. Bacon, 42s. 46s; Hams, prime, 56s. to 60s.; second quality, 50s. to 52s per cwt.; mess Pork, 67s. 6d. to 70s. per brl.; refined American Lard, in bladders, 50s. to 52s.; kegs and firkins, 48s.; Irish Lard, in bladders, 52s. to 55s.; kegs or firkins, 50s. per cwt.

April	Butter. per cwt.		Bacon. per cwt.		Dried Hams. per cwt.		Mess Pork. per brl.	
22.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1848	96 0	98 0	58 0	62 0	66 0	72 0	80 0	84 0
1849	70 0	85 0	48 0	50 0	68 0	75 0	77 6	80 0
1850	70 0	82 0	38 0	40 0	68 0	70 0	76 0	77 0
1851	86 0	90 0	43 0	44 0	60 0	62 0	60 0	62 0
1852	74 0	78 0	42 0	46 0	56 0	60 0	67 6	70 0

CHICORY.

Per ton.

	£ s.	£ s.		£ s.	£ s.
Foreign root (d.p.)			English root (free)		
Harlingen ..	27 0	28 0	York	8 10	9 10
English root (free)			Roasted and ground		
Guernsey ..	10 0	10 10	English ..	30 0	40 0
Kent & Suffolk	none.		Foreign ..	40 0	50 0

Duty on all Coffee and roasted Chicory imported, 3d. per lb. on Chicory Root £21 per ton.

OILS.

Linseed, 26s. per cwt.; Rapeseed, English refined, 30s.; do. foreign, 30s. 9d.; brown, 28s. 6d.; Galipoli, per tun, 44*l.*; Spanish, 41*l.*; sperm, 85*l.* to 87*l.*; do. bagged, 84*l.*; South Sea, 33*l.*; Seal, pale, 30*l.*; do., coloured, 30*l.* 10s.; Cod, 32*l.* to 33*l.*; Pilchard, 28*l.* to 30*l.*; Cocoa Nut, per ton, 38*l.* to 40*l.*; Palm, 29*l.* 6s.

WOOL MARKET.

BRITISH.

LEEDS, April 23.—There has been rather more inquiry for combing wools this week, for the immediate wants of the manufacturers, and the sales effected are at last week's rates.

LIVERPOOL, April 24.

SCOTCH.—There is no improvement to notice in the demand for Laid Highland Wool: consumers only take for immediate wants at late rates. White is scarce, and inquired for; Crossed and Cheviot are still only in sluggish demand at moderate prices.

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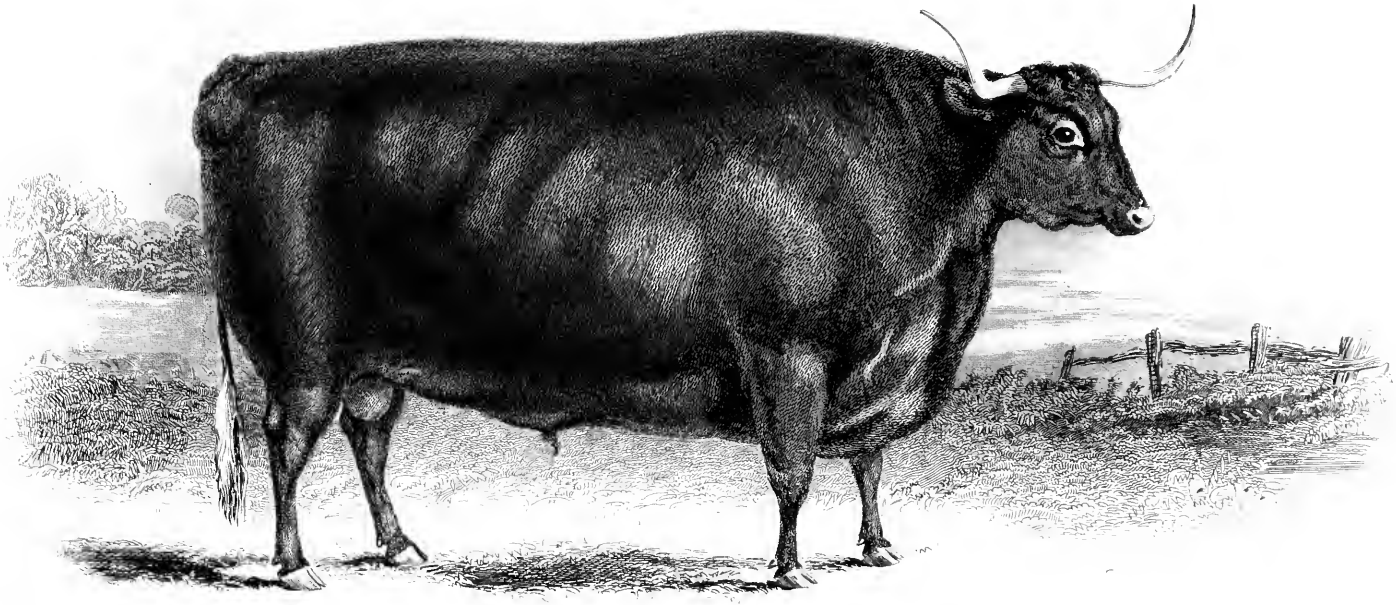
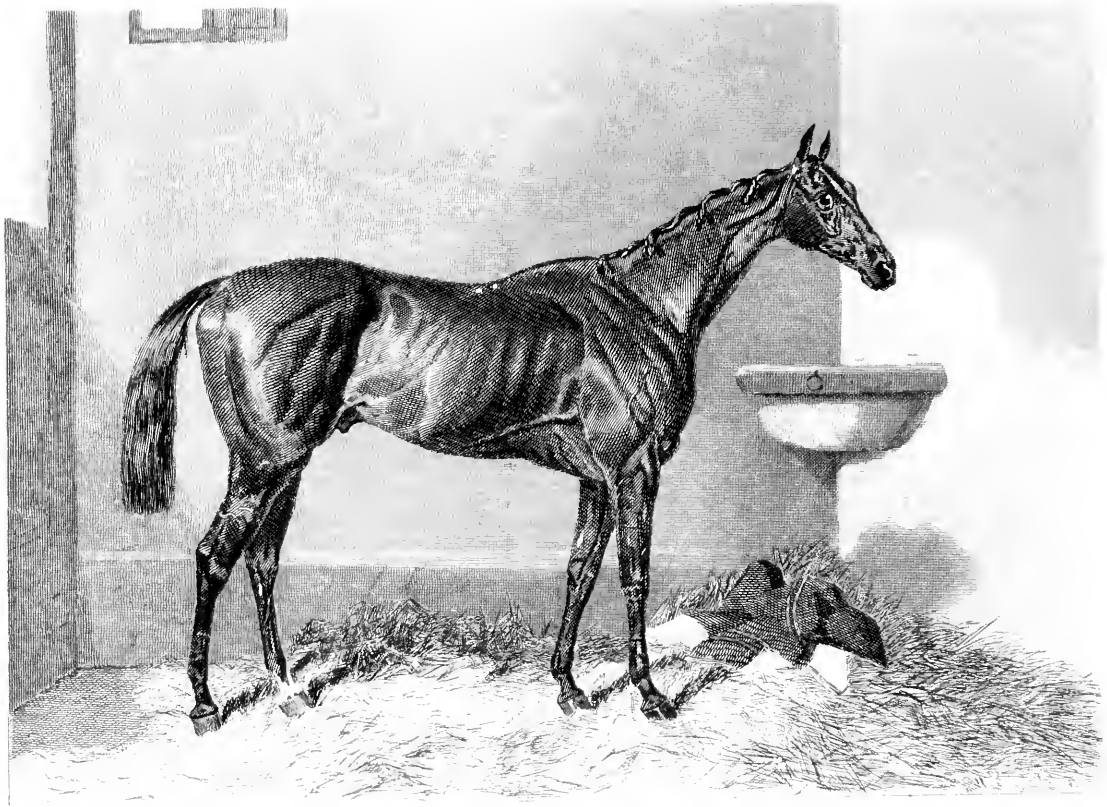




THE FARMER'S MAGAZINE.

JUNE, 1852.

PLATE I.

A NORTH DEVON OX.

The subject of our first plate, a North Devon Ox, the property of the Right Hon. the Earl of Leicester, obtained the first prize of Twenty Sovereigns and the Silver Medal in Class 4, at the Smithfield Club Cattle Show in December last. This animal was purchased by Mr. Collingwood, of Lamb's Conduit Street.

PLATE II.

RUSSBOROUGH.

Russborough, bred by Lord Miltown in 1847, was got by Tearaway, out of Cruiskeen, by Sir Hercules; her dam, Brandy Bet, by Canteen—Biggotinni by Thunderbolt.

Tearaway, bred by Mr. Wittle in 1838, was got by Voltaire, out of the Irish Taglioni. At two and three years old he took quite his share of the good things at the Curragh; while as a stallion, King of Kildare, Dough, The Darter, Tancred, and others, in addition to the Leger horse, already speak to his renown.

Cruiskeen, bred by Lord Miltown in 1834, made her name a household word on this side the Channel as a Chester Cup winner; she was yet more fortunate at home, and a terrible teazer for the Royal Plates and most other things worth entering for. The Stud Book reports her as having thrown two colts by Verulam, previous to the first Tearaway Cup, with another colt by the latter, now rising two years old. Cruiskeen died in 1849.

Russborough is a dark chesnut horse, standing fifteen hands three inches high; he has a good, blood-like, lean head, cleanly set into the jowl, with tapering nose and nicely pointed ears; he has a well-defined neck, beautifully oblique shoulder, good depth of girth, but is a little flat-sided and slack in his back; he has fine quarters, with very muscular thighs, and excellent hocks and knees, being short from the hock to the ground. Russborough is altogether a "telling looking" horse, of a beautiful colour, and with a very quiet and docile temper, though perhaps the very critical observer may fancy when out he goes a little tender before.

It will be gathered from the above pedigree that Russborough is all through of "Irish extraction," as the Hibernian gentlemen say of themselves when they don't wish to be confounded with their English friends.

THOUGHTS ON THE CULTIVATION OF FLAX.

BY J. TOWERS, MEMBER R.A.S., H.S. OF LONDON, ETC.

The great and increasing importance of this subject claims of me the following suggestions, and particularly as the discoveries by M. Claussen have rendered it peculiarly interesting to the analytic chemist. Admiring the physical structure and graceful beauty of the plant and its flower, it might be presumption in one not practically experienced in its culture on the farm, to offer any strong opinion in this place; and indeed, after so much has been written thereon, it would be superfluous to add anything to the facts stated before the weekly council of the R. A. S., as published at pages 300 *et seq.* of the April number of the *Farmer's Mag.*

Flax has been deemed an exhausting crop, one which impoverishes land by rapidly absorbing certain substances which constitute its own peculiar elements. This charge has been repudiated by many trustworthy authorities, to some of which we may refer the readers of the article above alluded to. But what *is* exhaustion of land, and what its remedy? And now, so far as the question applies to flax individually, I appeal first to Liebig, the great originator of the present fashionable *in*organic theory, in order to ascertain from his book the elements which are found in the *ashes* of the entire plant—its stem, foliage, and seeds. The total per-centage of these stand at 0.05, or 5 parts only in the 100. One hundred parts of such ash gave, of potass, 0.57, soda 9.82, magnesia 7.79, lime 12.33, phosphoric acid 10.84, sulphuric acid 2.65, silica or flint 21.35, chloride of potassium 5.07. If the analysis be trustworthy, it is evident that phosphoric acid and lime are the elements which the flax plant chiefly attracts from land, and these (for the silica or sand is unworthy of notice as being always abundantly present) can be restored by a very moderate dressing of bone phosphate. While admitting this fact, we must not be content to entertain so restricted a view of the whole *theory* of manuring. Philosophers are but too prone to let one governing idea "take the judgment prisoner;" and thus, I think, the modern doctrine of mineral or inorganic manures has been carried much too far, and by being so universally impressed in the lecture-room, and in the columns of agricultural publications, has tended to mystify and perplex those practical men who have been taught to consider the mixed substances from the fold and farmyard the pabula of vegetable life.

It has been shown, on the authority of Liebig, as above—that 100 parts of the entire flax plant yield only 5 parts of mineral *ash*; thus 95 per cent. of *organic* matter has been dissipated in the form of gas by the agency of fire. A very serious consideration this, and one which leads the mind to attach more importance to the *organic* portions of plants than chemists of the new school are willing to allow them to possess. The question of all others that appears most essential is this—if 95 per cent. of organic matter be lost by combustion of the flax plant, by what law of nature have the combination of all its elements been effected? In order to obtain something like a rational answer, let us take a glance at the said elements; and commencing with those of the ash, we find the two mineral alkalies, potash and soda—substances that are not present as such in a soil, and therefore requiring for their development a powerful decomposing force; magnesia and lime are in the same predicament, and require also specific decomposing agents; sulphuric and phosphoric acids are soluble in water, but were they ever detected in soils as such, free and uncombined? Silica, sand, or flint, is perfectly insoluble in the water of a soil, and yet no less than 21 plus per cent. are found in the ash of the flax plant. Chloride of potassium, formerly known as the salt of Silvius, must be the product of refined disturbing forces. The *organic elements*—those which form the *living* and *growing* structure of every vegetable—are found to consist, or properly speaking, to develop the elements called oxygen, hydrogen, carbonic acid, and occasionally nitrogen. Hence, in dung-mixens a fermentation takes place, which gradually progresses till the whole heap is finally reduced to a comparatively small bulk of the vegetable earth called humus; while, during this progress, are evolved ammoniacal gas, in consequence of the union of three volumes of hydrogen with one volume of azote (nitrogen), carbonic acid, and certain hydro-carbon gases. But this fermentation and all its products are *effects* resulting from some undiscerned, but powerful agent. It is customary to refer the phenomena of fermentation, decomposition, and combinations, to chemical action; but what is chemical action itself but an *effect* produced by the play of elementary electric affinities? If in lieu of placing farm and stable manure in masses, they be deposited deeply in the ground, the same fermentation, &c., will be established, though with less rapidity, and the earth will be en-

riched with humic matter. Here, at this point, we come again in contact with Dr. Liebig, who says, that "humus is soluble only when combined with oxygen; it can be taken up by water, therefore, only as carbonic acid. When moisture is absent, humus may be preserved for centuries; but when moistened with water, it converts the surrounding oxygen into carbonic acid" (*Chemistry*, 4th ed., p. 96). Again—"Humus supplies young plants with nourishment in the form of carbonic acid, *by the roots*, until their leaves are matured sufficiently to act as exterior organs of nutrition. Vegetable mould contains invariably carbonate of ammonia, besides the salts and alkalies left behind by the putrefaction of former vegetables" (*idem*, p. 100) I am not disposed to contest the theory of Liebig, especially because he admits that the carbonic acid derived from humus supplies nourishment to young (seedling) plants *by the roots*, until the leaves are matured. But the admission that organic matter is decomposed in the soil, and that "*its decay proceeds only when plants grow in a soil containing it*," is quite sufficient for the purpose I have in view, which is to elucidate the operation of manure by referring all its phenomena to the agency of that great principle which is termed electricity.

I presume that few persons who are acquainted with Dr. Faraday's researches will be inclined to doubt the universal presence of electricity, or its direct agency in every phenomenon of chemical decompositions and combinations. That putrescent or organic manures are decomposed is a certain fact; but the vast and comprehensive energy of the great principle is not sufficiently contemplated. As a subject for deep reflection, I suggest that every portion of matter, if in any degree *compound*, retains its atomic elements in a quiescent state, by a peculiar and specific etherial fluid, so long as they remain undisturbed by the attraction of some other matter which exists or is brought into a disturbing condition, one that by a play of new affinities leads to the production of new compounds. The subject is too immense to admit of much inquiry in a fugitive article; but I venture to hope that some light may dawn therefrom by which the predominate importance of organic matter may be shown, its efficiency in producing electro-chemical changes proved, and a veracious theory of fertilization and renovation of soils established.

THE BEET ROOT.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The cultivation of the beet-root, which recently formed the subject of a weekly discussion of the Royal Agricultural Society, is certainly extending in many districts of the United Kingdom. This increasing attention to the growth of mangold-wurzel will, there is little reason to doubt, long continue to produce profitable results.

For as the superior advantages of stock farms, in this time of lowering corn markets, are more and more clearly understood, so will more care be bestowed on those root crops which can be profitably raised on a different class of soils than those on which the turnip prospers.

A few notices, then, as to the chemical composition and cultivation of the plant may, at this season, be useful to many of my readers; since the more we understand the nature of the crop, the better shall we be enabled to derive the greatest advantage from its employment.

It has been long cultivated in France, Germany, and Switzerland, partly as food for cattle, and partly to be used in distillation, and in the extraction of sugar. So far back as the year 1811, General Beatson, then Governor of St. Helena, writing to the English Board of Agriculture, and describing the extraordinary produce of some beet plants, the leaves of which had been repeatedly cut to serve as a substitute for spinach, says:—"It certainly possesses advantages over every other plant hitherto introduced in field culture. Its produce is immense; and I have found it to grow, with considerable luxuriance, upon land where no other vegetation was ever seen. It has also the singular property of being unmolested by the dolphin-fly, which is here extremely destructive to cabbages, turnips, and radishes. I have very often observed, where alternate plants of cabbage and mangold-wurtzel were growing in the same rows, and touching each other, that whilst the former were absolutely annihilated by the destructive insect, not one was to be seen on the mangold-wurtzel leaves."—(*Com. to Board of Agr.* vol. vii. p. 241).

During the wars of the French revolution, the high price which colonial sugar obtained on the continent induced the manufacture of sugar in large quantities from beet-root. This has become so large in France, that, since the restoration of peace, the French Government have felt compelled to protect the beet-root sugar makers by the imposition of prohibitory duties on colonial sugars.

Some years since, the manufacture of sugar from beet-root began to be attempted, and not without

success, in England. The absence of any excise duties, and an existing considerable import duty on colonial sugars, seemed to offer a kind of premium to the English makers. The government naturally took the alarm; a revenue on imported sugars, which in 1850 yielded about £4,130,000, could not be allowed to be endangered. Parliament therefore interfered; and by the 1st Vict. c. 57 (1837), a duty of 24s. per cwt. was imposed on all sugar made from beet-roots in the United Kingdom. The manufacture was placed under the management of the commissioners of excise, and the entire process must now be carried on under the regular survey of their officers. Four hours' notice must be given before any maker can begin to rasp, or grind, or mash any beet-root for the purpose of sugar-making, and other restrictions are directed. In 1840—by the 3rd and 4th Vict., c. 57—the same duty was imposed upon sugar made from potatoes, rice, and other materials, in the United Kingdom. In 1845, however, by the 8th Vict. c. 13, the amount of this duty was reduced to 14s.

As I have in the *Farmer's Almanac* had occasion to remark, from the beginning of April till the middle of May is a good time for sowing mangold-wurzel. "Its different varieties," observes Mr. R. Pringell, of Strangford (*Trans. High. Soc.*, 1850, p. 178), "are the long red, the orange globe, and the red globe; the former thrives best in deep soils, and the latter or globe varieties on such as are of a lighter nature. In procuring seed, care must be taken that the seed of the common garden beet-root is not used, instead of the larger field variety. It is necessary to steep the seed for at least 48 hours before they are sown; if this is omitted, the seed will lie for a considerable time before it vegetates. Five or six pounds are required for an acre. As a food this root has considerable advantages; it does not impart a flavour to milk, and for fattening cattle it is at least as productive of beef as an equal weight of Swedish turnips." "The great advantage of beet over other roots," observes Mr. G. E. Raynbird (*Jour. Roy. Ag. Soc.* vol. vii., p. 222), "is the ease with which it may be kept in a sound state throughout the winter and spring, and even through the summer. It is suited to strong land, where the turnip will not succeed."

I quite agree with Mr. Hugh Raynbird (*Trans. Highl. Soc.*, 1851, p. 534) in his observations upon the value of the field beet. In the eastern counties of England it flourishes well upon the well-manured retentive soils, having a clay subsoil, as well as upon the highly farmed, light, sandy, and gravelly loams. It flourishes also upon the peat soils of the Fens of Cambridgeshire. It does not answer so well upon poor thin clays: upon alluvial soils, on the banks of rivers, and in maritime situations, it flourishes well. The presence in its mineral ingredients of a large portion of common salt (about 5¼ per cent.) will account for its love of the sea breezes.

The root of the mangold-wurzel was examined by Professor J. F. Johnston; he found in 100 parts of three varieties (*Quar. Jour. Ag.*, 1847, p: 605)—

	Long red.	Short red.	Orange Globe.
Water	85·11	84·68	86·52
Gum	0·67	0·50	0·13
Sugar	9·79	11·96	10·24
Casein	0·39	0·26	0·33
Albumen	0·09	0·18	0·03
Fibre, Pectic acid, &c.	3·08	3·31	2·45

Professor Way ascertained the average amount of the mineral matters contained in one ton of the bulbs of the turnip, mangold-wurzel, and carrot to be in lbs. (*Jour. Roy. Ag. Soc.*, vol. viii., p. 199.)—

	Turnip.	Mangel.	Carrot.
Silica	0·34	0·54	0·24
Phosphoric Acid	1·77	0·66	1·73
Sulphuric Acid	2.33	0·65	1·31
Lime	1·76	0·41	1·77
Magnesia	0·47	0·43	0·80
Peroxide of Iron	0·07	0·12	0·22
Potash	6·07	4·99	6·59
Soda	1·46	3·62	2·71
Common Salt	1·49	5·29	1·42

Salt abounds even in its seeds. Mr. Way (*Jour. Roy. Ag. Soc.*, vol. xi., p. 516) has given the analysis of 100 parts of the ashes of the seeds (I.) of mangold wurzel, (II.) of turnip, (III.) of carrot seeds—

Ash per cent. in Seeds.	I. 5·83	II. 3·67	III. 8·73
Silica	1·86	0·67	4·50
Phosphoric acid	13·35	40·17	13·38
Sulphuric acid	3·64	7·10	4·80
Carbonic acid	13·85	0·82	15·30
Lime	13·42	17·40	32·96
Magnesia	15·22	8·74	5·70
Peroxide of iron	0·40	1·95	0·84
Potash	16·08	21·91	16·21
Soda	6·86	1·23	1·23
Common salt	15·30	—	5·24

"The two great properties," continues Mr. Raynbird, "which recommend the beet as a field crop, are, that it will succeed upon soils too heavy and retentive for the turnip, and that its early maturity and the absolute necessity for its early removal from the soil, to be stored for use, render it a better preparation than the turnip upon those soils for the following grain crop. Another recommendation is that it improves by storing, and that it does not

come to its full perfection for feeding until late in the season: when turnips and swedes are either consumed or become unpalatable and almost useless for fatting cattle, the beet root has arrived at its greatest perfection. Some of the most experienced graziers in the eastern counties use white turnips till Christmas, then swedes till February or March, keeping the mangold in reserve for feeding in March, April, or May; indeed we have frequently reserved mangold for beasts as late as July. In spring our fatting sheep have mangold cut for them when feeding off clover and rye-grass, and the box-fed beasts have a supply in the same manner, in addition to grass, clover, or tares, which are daily brought to them from the field." The plan recommended by Mr. Raynbird, on free-working soils, is the ridge, or common drill system. Farm-yard manure, and 1 or 2 cwt. per acre of guano, or superphosphate of lime, sown broad-cast, previously to splitting the drills, upon the dung, the seed drilled about 4lbs. in April or May, covered in rather deeper than turnip seed, by a small roller following the drill: the plants set out by the hoe rather wider than for turnips. Gaps may be filled up with transplanted cabbages or swedes. The roots should be stored before the frost sets in, and in dry weather, in October or early in November. The average cost of cultivation is thus given by Mr. Raynbird—

	£	s.	d.
Rent and charges upon land.....	1	15	0
Cleaning, harrowing, &c	0	15	0
Three ploughings	1	4	0
Ridging	0	4	0
Drilling and rolling	0	1	6
Carting and spreading manure.....	0	8	0
Hand hoeing	0	7	6
Horse hoeing three times	0	6	0
Storing the crop	1	0	0
12 loads of farm-yard dung, at 5s.	3	0	0
1½ cwt. of guano.....	0	15	0
4lbs. of seed	0	4	0
Per acre	10	0	0

PRODUCE PER ACRE.

20 tons of roots, at 12s.....	£12	0	0
Value of leaves	1	0	0
	£13	0	0

In 1851, two eminent French chemists, MM. Payen and Richard, thus give the results of the most recent experience of the French farmers as to the cultivation of beet-root—for the food of stock and for the manufacture of sugar.

The breadth of its cultivation in France is 142,500 English acres, being much less than that of the potato. The departments in which beet culture is carried on to the greatest extent are those of the north, of the Pas-de-Calais, of the Somme, of the Aisne, &c., which furnish the greater part of the roots required for the sugar manufactories. The following are its principal varieties:—1. Field-Beet: long, rose-colour, growing above the earth; fleshy part veined with rose-colour. It offers two sub-varieties: the one flat-bulbed, short, and half sunk into the earth; the other long, and growing more above the ground. This variety of beet contains in general less nutritive principles than the other varieties, and especially less saccharine matter. In deep, wet, land, the crop is very abundant; it can therefore be only grown as food for cattle. A sub-variety has, however, been found by M. Payen and M. Vilmorin to yield greater proportions of sugar and and other proximate principles than even white varieties grown on the same soil. 2. The Sugar Beet: white, short, growing in the earth; flesh white. Two sub-varieties have been distinguished; the one with the neck green, is the Silesian beet; the other, with the neck of a rose colour, is in general richer in sugar. 3. The Yellow German Beet: long, yellow, grows above ground; flesh white, or lightly veined with yellow. 4. The Yellow Globe Beet: round shape, growing almost completely out of the earth; flesh white, or lightly veined with yellow; contains only a small proportion of sugar. 5. White-Yellow Beet: middle length, grows in the earth, flesh white, skin of a pale yellow colour. 6. The Long or Great Yellow Beet of Castelnaudary: long, grows much out of the ground; flesh and leaf-stalks deep yellow. This is the variety especially cultivated in the neighbourhood of Paris. 7. The Great Red Beet: long, grows much out of the soil; flesh and leaf-stalks red. In general, even for the food of animals, we should less consider the bulb of the roots, or even the quantity of their produce, than the amount of nutritive matter they contain. There is obviously every advantage in cultivating a variety which in the same bulb will contain more nutritive principles. On this account the generality of farmers agree in giving the preference to the Silesian beet, which contains more sugar and less foreign matters than the field-beet; and has also the great advantage of being one of those varieties that best resist the action of frost. If all rearers of stock are agreed as to the nutritive qualities of the beet, they are not equally so as to the influence it exercises on the production of milk in dairy cows. According to some authors, beet favours the secretion of milk; while others, on the contrary, think that it is very unfavourable for that purpose. Schwerz considered that feeding for two days only on this root was sufficient to diminish the amount of milk in a very striking degree. It maintained animals in flesh and good condition, a circumstance highly favourable in severe seasons. Potatoes and turnips

forced the milk, and beet the flesh; the latter being more favourable for fattening stock than potatoes and raw turnips are. This opinion on the but little favourable influence of beet on lactation is not participated in by all farmers. The Baron Crud remarks:—"After an experiment which I have conducted with the greatest care, and after the inferences which I have deduced from the results I have obtained in the employment of this root for the food of cattle, and particularly for that of dairy stock, I consider it to be wholesome, fattening, and milk-secreting; the milk given by the cows, partly fed upon it, being of an agreeable taste and flavour." We might here cite other parties in favour of the milk-yielding properties of the beet, of whose roots the rearers of stock, who may be regarded as excellent judges on this point, require an enormous supply for consumption by the dairy-stock which they rear. Horses in particular appear to be the animals to which the diet of the beet is most favourable. There are districts, as in the Palatinate for instance, where the horses fed almost exclusively on this root during seven or eight months of the year, and are maintained by it in a perfect condition even while employed in the roughest kind of work."

Upon the whole, then, there is, I think, every reason to induce the extensive cultivation of the beet root as food for stock. There is not, perhaps, so much encouragement to regard it for the sugar which it is capable of yielding; since, in this age of non-protection, the government rather discourage than otherwise the manufacture of home-grown sugar. That beet-root may be made into beer, and into wine, is generally known; for which purpose, as long as it is not made in quantities larger than is sufficient for the domestic use of the maker's family, there is no danger of the interference of the Excise. The hearth of an Englishman has fortunately been long sacredly preserved from the visits of the exciseman; and this state of freedom from his surveillance will ever, I trust, attend the difficult, but still free, operations of the English farmer.

THE SCIENCE OF MANURING.

BY THOS. ROWLANDSON, C.E., F.G.S.

It will be well, prior to entering into a dissertation on manures, to take a brief review of the opinions, past and present, which have more or less been held on the actions of those substances which, when applied by the husbandman to the soil in order to induce extra fertility, are known under the generic name of manures; in doing so it will not be out of place to notice briefly their historical progress, as well as the physiological circumstances attendant on their use, and other natural phenomena connected therewith, previously to entering on a more detailed explanation under separate heads.

Although we have no historical account as to when or how extraneous substances were first used in order to induce greater or renew the fertility of soils, it may fairly be supposed that the excrements of domestic animals were first applied to that purpose; the fact of a greater luxuriance of herbage being invariably found surrounding the spots occupied by the droppings of animals, would naturally be suggestive of their use on tillage lands, especially when such became exhausted by repeated cropping (the most probable routine) in primitive arable husbandry. It may be questionable whether irrigation or manure, in the common acceptation of the word, was first used as a fertilizer in eastern and warmer climates; natural causes, moisture, and cold, would long retard the introduction of the former mode of manuring into northern and colder countries. The greater exuberance of vegetation developed in the vicinity of springs or rills of water in tropical countries would naturally be suggestive of the utility of water as a fertilizer whenever husbandry had advanced so far with the eastern nations as to render arable cultivation an object of attention in conjunction with their prior and more primitive pastoral employment. The non-necessity for housing domestic animals throughout the greater part, if not the whole of the year, in warm countries, would at the same time prevent that accumulation of litter and excrements which are constantly found in and about the buildings erected by the northern farmer to protect his stock from the severity of the winter's blast; in the latter case such accumulations would gradually become a nuisance, and might probably, as in the virgin soils of America, be carried away to pollute the nearest stream, instead of being applied to its legitimate purpose, viz., the fertilization of the soil. The primative practice in tillage was, and is still, in rude countries the same as that adopted at the present day in the more backward districts of our own country, viz., breaking up old grass land and drawing crops therefrom until it ceased to repay the husbandman for the labour and seed expended. Such a practice is still to be found in

Wales, the west of England, Ireland, the Highland crofters, and, I am sorry to add, often to be met with in counties whose general character for farming is of higher standing in public estimation than the more backward districts here pointed out by name. Accident, or probably, as previously noticed, observation on the effects produced on herbage by the droppings of cattle, would probably be first suggestive of the use of the manure heaps for the restoration of fertility to an exhausted soil; in a primitive state of society the use of such heaps would be more or less modified, according to circumstances. If the homestead was situated amidst a great extent of virgin land of convenient access and easy tillage, it is most probable that the farmer would prefer, as the easiest mode of obtaining a crop, to break up new land rather than be at the trouble of restoring fertility to a previously exhausted field by the laborious process of carting thereon his manure heap. Wherever only a small amount of arable land was at the farmer's disposal in his immediate vicinity, the use of his manure heap would sooner or later be enforced upon him; for, even if he had a considerable quantity of arable soil at his disposal but situated at a distance, it would then only become a matter of calculation whether it took a greater amount of labour to draw the crop from a remote part, or to expend the same in spreading out the manure heap on his nearer but exhausted fields. With the wants of an increasing population, the manure heap would be more carefully attended to, and in the course of time, from its inadequacy in maintaining arable lands in constant fertility, there gradually became superadded thereto the use of certain earths and minerals, such as lime, marl, &c., the use of which is extremely ancient. Reasons will be subsequently given to show that it is very probable that the recently discovered phosphorite strata of the green-sand formation was used by British farmers whilst the Romans were in possession of the country.

Farm-yard manure, including urine, marl, chalk, and lime, were the only substances used as manures up to a very recent period. The introduction of bones not being a century old, whilst they can scarcely be said to have come into general use more than thirty years; with advancing chemical knowledge, added to the high price which bones at one time obtained, a mode of economising them was, and has since been, extensively and advantageously adopted, viz., by partially dissolving them in muriatic or sulphuric acid, and known generally under the denomination of superphosphate of lime. At a subsequent period the nature of the advantages derived from dissolving bones in acid will be taken into consideration. Almost concurrently with the introduction of the use of bones into husbandry, saltpetre, as a top-dressing, became prevalent, but has been for some time, without any good reason being assigned for its discontinuance, fallen somewhat into desuetude; probably the true reason is to be found in the fact, that nitrate of soda, from its cheapness, became substituted for nitrate of potash (saltpetre). Within a very few years guano, or the dried excrements of tropical marine birds, obtained from islands on the coast of Peru, Chili, Patagonia, &c., has become extensively imported as a manure, so much so that the annual importation now exceeds 100,000 tons; added to which there are sold about 100,000 tons of a spurious substance, manufactured for the purpose of vending in imitation of, or mixing with, the genuine article. As three hundred weights are generally applied to the acre, it is not an unfair calculation to assume that upwards of a million acres of land in the United Kingdom are annually dressed with real, mixed, or spurious guano, for which the agricultural community pay not less than one million and a half sterling per annum, and probably half a million more for bones, superphosphate of lime, various manufactured and mixed manures, together with salts of ammonia prepared from the liquor obtained from the gasworks; from the latter sources perhaps a quarter of a million of acres of land are annually manured. Nightsoil from towns has been wholly left out of the preceding calculation, though it is to be hoped that at no very distant period that substance, as well as the sewage of all large towns, will be profitably applied to purposes of husbandry, instead of, as at present, polluting our streams, and making them a constant receptacle of filth; thus perverting rivers, intended by nature to assist in renewing a fresh and invigorating atmosphere to our close and pent-up towns, into sources of disease, and disseminators of pestiferous miasma. That the sewage-water of towns could be most profitably used for purposes of husbandry has long been the opinion of the writer. In advocating the subject some years ago the difficulty occurred to him, how far, if the sewage water of our large towns were applied to irrigating purposes, would the salubrity of the surrounding country be affected; would it be calculated to engender a miasmatic influence similar to that found in "the Campagna," on the banks of the Po, in Italy, the low, swampy ground about the mouths of the Nigra, in Africa, and other marsh lands in tropical countries? That we are not in this country likely to be attacked with such terrible fevers from living near marsh lands, where vegetable matter is undergoing decomposition, as prevail in warmer climates, I am prepared to admit; but that we are entirely free from such attacks, though, in a much more modified form, is disproved

by the existence of agues in the fens of our eastern counties. It may be asserted that drainage has greatly lessened the frequency and intensity of agues in those counties where it formerly existed; and that, therefore, a perfect system of drainage, carried on in connexion with irrigation by means of sewage water, would be free from noxious influences. Such reasoning might probably be found correct had we only to do with ordinary vegetable matters, such as are held in solution, suspension, or carried down with the water which finds its way into low, marshy districts. Of a much more complex nature are the matters carried off in the sewage water of towns, containing as it does so large an amount of animal and vegetable matters, more or less in a state of decomposition. Could it, however, be capable of proof (which I much doubt) that, on the score of health, sewage water may be used with impunity, there would still remain the serious drawback of its offensiveness to the olfactory organs—an objection which alone would, in a great majority of cases, entirely prevent its use. It would, therefore, be a great desideratum if some means could be devised by which sewage water could be rendered free from offensive smell both during and after use, and also innoxious in a sanatory point. That there are many deodorizing and disinfecting substances that will accomplish these ends, I am quite aware, several of which are patented. To all practical purposes they are, however, useless, in consequence of their high price. What is wanted is something that will cost only a small sum, be a perfect disinfectant and deodorant, and, at the same time, will not be detrimental, but, if possible, add to the fertilizing properties of the fluids, &c., to which it is applied.*

Seeing that, when a plant was burned in a close vessel, the great bulk of the residue left consisted of carbon, it was by no means an unnatural inference to conclude that, by some unknown means, the growth of plants was aided by absorption of the carbonaceous parts of pre-existing plants, held in solution whilst in a state of decay; and although it was known that pure charcoal was insoluble, yet it was found that certain black-coloured substances, principally composed of carbon, existed in soils which, though insoluble of themselves, were soluble in alkalis, in which soluble form the carbon was supposed to be absorbed through the spongioles of the roots, and subsequently became assimilated into the vegetable organism. These carbonaceous substances in soils, which were found to be soluble in alkalis, were known under the varied titles of humus, humic acid, geine, geic acid, apotheme, crenic acid, &c., &c. The striking action of lime on soils abounding in decayed and decaying vegetable substances, such as peat, &c., was constantly referred to the circumstance that the lime combined with the insoluble vegetable substances in the soil, thus rendering them soluble, and, consequently, into the most favourable condition for absorption by plants. No theory, however, was ever raised on so baseless a foundation. If this theory had been correct, all soils abounding in vegetable matter such as described ought to have been of inexhaustible fertility; yet in practice this is not found to be the case. It is true, the friends of the humus theory may state that, in order to convert inert vegetable substances in soils into an active state—in other words, to produce fertility—some alkali must be present to render the otherwise inert carbonaceous matter soluble. Conceding, for argument, the justness of this conclusion, it must be clear that, if this were the true theory of the mode by which plants are fed, it ought to be found, as a natural sequence, that a fresh application of lime on a vegetable soil should be succeeded by a luxuriant crop, in consequence of the supposed additional solubility of the vegetable substances existing therein, when that alkali was present in abundance; yet such is found by experience not to be the fact: for, although it is well known that excellent crops are frequently obtained by a *first* liming from soils abounding in vegetable matter, more particularly if at the same time the surface has been pared and burned, a second liming immediately succeeding the first is not attended with any striking fertilizing effects, but, on the contrary, presents all the aspects of an exhausted, overwrought soil. If this theory was tenable, there exists no rational argument why as good crops should not be obtained at the second application of lime as by the first, as will be shown when I come to the consideration of the use of lime in agriculture. The humus theory is entirely opposed to facts, as a slight examination would easily have shown. It is well observed by Liebig that, if the humus theory had been correct, bogs and barren morasses ought to form the most fertile soils; instead of which, they are the most barren, not being capable of yielding a crop of the most ordinary kind, that will repay cultivation (if we except rye and buckwheat—perhaps also oats), until it has been limed, which converts these soluble vegetable substances into insoluble compounds, in place of soluble ones, as will be shown subsequently. It was originally contended by the humus theorists that all the alkalis converted inert and insoluble vegetable sub-

* Pxperiments making by Mr. Mechi and others in sub-irrigation, and the important investigations of Professor Way on the absortive power of soils, will probably soon lead to results of a practical character.

stances in the soil into soluble ones. It may here, however, be mentioned that in this opinion they were widely wrong. In chemistry, potash, soda, lime, and magnesia are termed alkalis; yet, for the sake of convenience, and also for some general properties connected with each class, the two former substances are more emphatically termed alkalis, whilst the two latter are classed amongst earths, or as they are sometimes called, alkaline earths. With humic acid, the action of these two sets of alkalis is diametrically opposite. With one set—potash, soda, ammonia, &c.—humic acid forms exceedingly soluble compounds, of a deep brown colour; with the alkaline earths—such as lime, magnesia, barytes, &c.—it forms very insoluble compounds. The absorption of carbon in a soluble form, by means of alkalis, through the roots of plants, is rendered to a great degree improbable. It remains to be shown how the carbon which forms in so eminent a degree the bulk of the solid portions of plants becomes assimilated. This can only be done by means of the roots and leaves.

Plants acquire their food by means of their roots and leaves. Whatever difference of opinions may exist with respect to the relative degree of importance played by the respective parts, as regards the absorption and assimilation of the carbonaceous parts of plants, there can only be one with respect to the manner in which the inorganic constituents are absorbed—viz., by means of their roots, and that in a soluble form only.

The function of the root consists in absorbing water, and soluble substances contained therein, adapted for assimilation by the plant. There can be little doubt but at the same time an equal volume of carbonic acid accompanies the absorption of water. This water is subsequently drawn through the plant, and exhaled by the leaves; so that, in a moist soil, and in the presence of sunshine, a constant circulation is kept up from the root to the leaves, during which the living organism of the plant assimilates a portion of the water, carbonic acid, and earthy matter necessary for its full development. It is not, however, by means of the whole surface of the root that this absorption of moisture takes place, this office being, perhaps, exclusively confined to those delicate terminations termed spongioles; in order to prove which, Senebier took a radish, and placed it in such a position that the extremity only of the root was plunged in water. It remained fresh for several days. He then bent back the root, so that its extremity was curved up to the leaves. He plunged the bent part in water, after which the plant soon withered, but recovered its former freshness upon relaxing the curvature, and again plunging the extremity of the root into water. It may be well to remark that the delicate terminals of roots termed spongioles contain a greater proportion of azotized matter, as compared with its other solid constituents than any other part of the plant, in consequence of which it has been supposed, and probably correctly so, that one of the causes of infertility of bog earth arises from the chemical action which takes place between the humic acid of the soil and the azotized substance of the spongioles, thus in a great degree paralyzing its most important function. As a corroborative proof of such an action taking place, it may be mentioned that, if bones containing gelatine are dissolved in sulphuric or muriatic acid, sufficiently diluted so as not to decompose the gelatine, on decanting the fluid containing the gelatine into a solution of humic acid in an alkali, it will be found that the mixed fluids will become converted into a mass of jelly. By cultivation, the humic acid in bogs is gradually changed into insoluble mould.

It was first shown by Priestley that when a branch of a shrub was carefully placed in a pneumatic glass vessel containing atmospheric air and carbonic acid, that carbonic acid was absorbed by the leaves during the presence of sunshine, whilst at the same time an equal amount of oxygen was evolved. This experiment has been repeatedly performed by many naturalists, and all agree as to the fact, though a difference of opinion exists with regard to the medium by which it is accomplished; it is, however, generally attributed to the minute pores of the leaf, termed stomates; there are some, however, who consider that office is performed by the hairs which are found, more or less, to exist on leaves.

Many circumstances occur which serve to show that some of the most important functions of vegetable economy are principally dependent on the leaves; in fact, it may with safety be averred that the development of fresh woody fibre, the fruit, &c., cannot proceed without the aid of leaves; amongst other examples, it may be stated that if the leaves are stripped from a plant before the fruit has commenced ripening, the fruit will fall off and not ripen; if a branch be deprived of leaves for a whole summer, it will either die, or not increase in size perceptibly; any increase of size may probably be attributed to the fact that the delicate green bark found on young shoots performs the functions of the leaf in a minor degree; in this respect some plants, such as many of the cactus tribe, may be termed all leaf, or, at all events, such portions as are above ground, this part of the plant being frequently composed of one continuous mass of green fleshy substance. The general phenomena of the growth of vegetables from the seed to the

fruit is well described by Professor Lindley, in his excellent work, entitled "The Introduction to Botany," which I shall here take the liberty of extracting at length :—

"I. If we place a seed (that of an apple, for instance,) in the earth, at the temperature of 32 deg. Fahr., it will remain inactive till it finally decays; but if it is placed in moist earth, some degrees above 32 deg., and screened from the action of light, its integument gradually imbibes moisture and swells; the tissue is softened, and acquires the capability of stretching; water is decomposed, and a part of its oxygen, combining with the carbon of the seed, forms carbonic acid, which is expelled; nutritious food for the young plants is prepared by the conversion of starch into sugar;* and the vital action of the embryo commences; it lengthens downwards by the radicle, and upwards by the cotyledons,† the former penetrating the soil, the latter elevating themselves above it, acquiring a green colour by the decomposition of the carbonic acid they absorb from the earth and atmosphere, and unfolding in the form of two opposite roundish leaves. This is the first stage of vegetation; the young plant consists of little more than cellular tissue, only an imperfect development of vascular and fibrous tissue being discoverable, in the form of a sort of cylinder lying just in the centre; the part within the cylinder at its upper end is now the pith, without it the bark, while the cylinder itself is the preparation for the medullary sheath, and consists of vertical tubes passing through and separated by cellular tissue.

"The young root is now lengthening at its point, and absorbing from the earth its nutriment, which passes up to the summit of the plant by the cellular substance, and is in part impelled into the cotyledons, where it is aerated and evaporated, but chiefly urged upwards against the growing point or plumule.

"II. Forced upwards by the current of sap, which is continually impelled upwards from the root, the plumale next ascends in the form of a little twig, at the same time sending downwards, in the centre of the radicle, the earliest portion of wood that is deposited, and compelling the root to emit little ramifications; simultaneously the process of lignification is going on in all the tissues, by the deposit of a peculiar secretion in layers within the cells and tubes.

"Previously to the elongation of the plumule, its point has acquired the rudimentary state of a leaf; this latter continues to develope as the plumule elongates, until, when the first internode of the latter ceases to lengthen, the leaf has actually arrived at its complete formation; when fully grown, it repeats in a much more perfect manner the functions previously performed by the cotyledons; it aerates the sap that it receives, and returns the superfluous portion of it downwards through the bark to the root, tubular tissue at the same time appears between the medullary sheath and the bark, thus forming the first ligneous stratum, a part of which is incorporated with the bark, the remainder forming wood.

"During these operations, while the plumule is ascending, its leaf forming and acting, and the woody matter created by it descending, the cellular tissue of the stem is forming, and expanding horizontally, to make room for the new matter forced into it, so that development is going on simultaneously both in a horizontal and perpendicular direction. This process may not inaptly be compared to that of weaving, the warp being the perpendicular, and the waft the horizontal formation. In order to enable the leaf to perform its functions of aeration completely, it is traversed by veins originating in the medullary sheath, and has delicate pores (*stomates*), which communicate with a highly complex pneumatic system extending to almost every part of the plant.

"Simultaneously with the appearance of woody matter, the emission of young roots, and their increase by addition to the cellular substance of their points, take place. They thus are made to bear something like a definite proportion to the leaves they have to support, and with which they must of necessity be in direct communication.

"After the production of its first leaf by the plumule, others successively appear in a spiral direction around the axis at its growing point, all constructed alike, connected with the stem or axis in the same manner, and performing precisely the same functions as have been just described; at last the axis ceases to lengthen, the old leaves gradually fall off, the new leaves, instead of expanding after their formation, retain their rudimentary condition, harden, and fold over one another, so as to be a protection to the delicate point of growth, or, in other words, become the scales of a bud. We have now a shoot with a woody axis, and a distinct pith and bark, and of a more or less conical figure. At the axil of every leaf a new growing point has been generated during the growth of the axis, so that the shoot, when deprived of its leaves, is covered from end to end, with little symmetrically arranged projecting bodies, which are the buds.

"The cause of the figure of the perfect shoot being conical is, that as the wood originates in the

* It is scarcely to be supposed that the conversion of starch into sugar terminates here; it is more probable that the grape sugar thus formed is converted subsequently into carbonic acid.

† Seed leaves.

base of the leaves, the lower end of the shoot, which has the greatest number of strata, because it has the greatest number of leaves about it, will be the thickest; and the upper end, which has had the fewest leaves to distend it by their deposit, will have the least diameter. Thus, that part of the stem which has two leaves above it will have wood formed by two successive deposits, that which has nine leaves above it will have wood formed by nine successive deposits, and so on, while the growing point, as it can have no deposit of matter from above, will have no wood, the extremity being merely covered by the rudiments of leaves hereafter to be developed.

"If at this time a cross section be examined, it will be found that the interior is no longer imperfectly divided into two portions, namely, pith and skin, as it was when first examined in the same way, but that it has distinctly two internal perfect concentric lines, the outer indicating a separation of the bark from the wood, and the inner a separation of the wood from the pith; the latter, too, which in the first observation was fleshy, and saturated with humidity, is become distinctly cellular, and altogether or nearly dry.

"III. With the spring of the second year and the return of warm weather vegetation recommences.

"The uppermost, and perhaps some of the other, buds which were formed the previous year gradually unfold, and pump up sap from the stock remaining in the store about them; the place of the sap so removed is instantly supplied by that which is next it, and an impulse is thus given to the fluids from the summit to the root; new sap is absorbed from the earth, and sent upwards through the wood of last year; and the phenomenon called the flow of the sap is fully completed, to continue with greater or less velocity till the return of winter. The growing point lengthens upwards, forming leaves and buds in the same way as the parent shoot; a horizontal increase of the whole of the cellular system of the stem takes place, and each bud sends down organizable matter within the bark and above the wood of the shoot from which it sprang, thus forming on the one hand a new layer of wood, and on the other a fresh deposit of liber.

"In order to facilitate the last operation, the old bark and wood are separated in the spring by the exudation from both of them of the glutinous, slimy substance called cambium, which appears to be expressly intended, in the first instance, to facilitate the development of the subcortecal tubular tissue; and, in the second place, to assist in generating the cellular tissue by which the horizontal dilation of the axis is caused, and which maintains a commuication between the bark and the centre of the stem. This communication has, by the second year, become sufficiently developed to be readily discovered, and is effected by the medullary rays. It will be remembered that there was a time when that which is now bark constituted a homogenous body with the pith; and that it was after the leaves began to come into action that the separation which now exists between the bark and pith took place. At the time when the latter was indissolubly united they both consisted of cellular tissue, with a few spiral vessels upon the line indicative of future separation. When a deposit of wood was formed from above between them, they were not wholly divided the one from the other, but the deposit was effected in such a way as to leave a communication by means of cellular tissue between the bark and the pith; and, as this formation, or medullary ray is at all times coetaneous with that of the wood, the communication so effected between the pith and bark is quite as perfect at the end of any number of years as it was at the beginning of the first, and so it continues to the end of the growth of the plant.

"The sap which is drawn from the earth into circulation by the unfolding leaves is exposed, as in the previous year, to the effect of air and light, is then returned through the petiole* to the stem, and sent downwards through the bark, to be from it either conveyed to the root or distributed horizontally by the medullary rays to the centre of the stem.

"At the end of the year the same phenomena occur as took place the first season; wood is gradually deposited by slower degrees, whence the last portion is denser than the first, and gives rise to the appearance called the annual zones. The new shoot or shoots are prepared for winter, and are again elongated cones, and the original stem has acquired an increase in diameter proportioned to the quantity of new shoots which it produced, new shoots being to it now what young leaves were to it before.

"IV. The third year all that took place the year before is repeated; more roots appear, sap is again absorbed by the unfolding leaves, and its loss is made good by new fluids introduced by the roots and transmitted by the alburnum or wood of the year before; new wood and liber are formed from matter sent downward by the buds; cambium is exuded; the horizontal development of cellular tissue is repeated, but more extensively; wood towards the end of the year is formed more slowly, and has a more compact character; and another ring appears, indicative of this year's increase.

"In precisely the same manner as in the second and third years of its existence will the plant con-

* The stem of the leaf.

tinue to vegetate till the period of its decay, each successive year being a repetition of the phenomena of that which preceded it.

"V. After a certain number of years the tree arrives at the age of puberty. The period at which this occurs is very uncertain, depending in some measure on adventitious circumstances, but more upon the idiosyncrasy, or peuliar constitution, of the individual. About the time when this alteration of habit is induced, by the influence of which the sap or blood of the plant is to be partially diverted from its former course into channels in which its force is to be applied to the production of new individuals rather than to the extension of itself; about this time it will be remarked that certain of the young branches do not lengthen, as had heretofore been the wont of others, but assume a new short stunted appearance, probably not growing two inches in the time which had been previously sufficient to produce twenty inches of increase. Of these little stunted branches, called *spurs*, the terminal bud acquires a swollen appearance, and at length, instead of giving birth to a new shoot, produces from its bosom a cluster of twigs, in the form of pedicles, each terminated by a bud, the leaves of which are modified, for the purposes of reproduction, grow firmly to each other, assume peculiar forms and colours, and form a *flower*, which had been enwrapped and protected from injury during the previous winter by several layers of imperfect leaves, now brought forth as bracts. Sap is impelled into the calyx through the pedicle by gentle degrees, is taken up by it, and exposed by the surface of its tube and segments to air and light; but having very imperfect means of returning, all that cannot be consumed by the calyx is forced onwards into the circulation of the petals, stamens, and pistils. The petals unfold themselves of a dazzling white, tinged with pink, and expose the stamens; at the same time the disc changes into a sacharine substance, which is supposed to nourish the stamens and pistil, and give them energy to discharge their functions.

"At a fitting time, the stigmatic surface of the pistil being ready to receive the pollen, the latter is cast upon it from the anthers, which have remained near for that particular purpose. When the pollen touches the stigma, the grains adhere by means of its viscid surface, emitting a delicate membraneous tube, which pierces into the stigmatic tissue, lengthens there, and conveys the matter contained in the pollen towards the ovules, which the tube finally enters by means of their foramina.

"This has no sooner occurred than the petals and stamens fade and fall away, their ephemeral but important functions being accomplished. The sap which is afterwards impelled through the peduncle can only be disposed of to the calyx and avary, where it lodges. These two swell and form a young fruit, which continues to grow as long as any new matter of growth is supplied from the parent plant. At this time the surface of the fruit performs the functions of leaves in exposing the juice to light and air. At a subsequent period it ceases to decompose carbonic acid, gains oxygen, loses its green colour, assumes the rich ruddy glow of maturity; and the peduncle, no longer a passage for fluids, dries up and becomes unequal to supporting the fruit, which at last falls to the earth. Here, if not destroyed by animals, it lies and decays. In the succeeding spring its seeds are stimulated into life, strike root into the mass of decayed matter which surrounds them, and spring forth as new plants, to undergo all the viscissitudes of their parent.

"Such are the progressive phenomena in the vegetation, not only of the apple, but of all trees which are natives of northern climates, and of a large part of the herbage of the same countries, modified, of course, by peculiarities of structure and constitution, as in annual and herbaceous plants, and in those the leaves of which are opposite and not alternate; but all the more essential circumstances of their growth are the same as those of the apple tree.

"In hot latitudes there exists another race of trees, of which palms are the representatives; and in the north there are many herbs in which growth by addition to the outside is wholly departed from, the reverse taking place; that is to say, their diameter increasing by addition to the inside. As the seeds of such plants are formed with only one cotyledon, they are called mono cotyledonous; and their growth being from the inside, they are also named endogens. In these plants the functions of the leaves, flowers, and fruit are in no wise different from those of the apple; their peculiarity consisting only in the mode of forming their stems."

Such are some of the physiological phenomena attending the growth of vegetables; and it is presumed that the reader will be prepared by the above extract and the preceding observations, to understand that the nutriment of plants can only be conveyed through the roots and leaves, it now remains to be seen whether as much inorganic matter can be conveyed in a soluble state (for all experiments show that the spongioles of roots reject everything presented to them in insoluble forms) into plants as are required for their perfect development.

Upwards of a century ago Hales proved that plants evolved moisture from the leaves, which property has frequently and appropriately been termed "vegetable perspiration." In order fully

to satisfy himself on this subject, this accurate observer took, on the 3rd July, 1724, a sunflower, in order to ascertain the quantity of moisture imbibed and perspired. For this object he experimented on a plant 3½ feet high, which had been planted in a garden-pot for this express purpose whilst young. In his own words it is stated: "I covered the pot with a plate of thin milled lead, and cemented all the joints fast, so as no vapour could pass, but only air through a small glass tube nine inches long, which was fixed purposely near the stem of the plant, to make a free communication with the outward air and that under the leaden plate. I cemented also another short glass tube into the plate, two inches long and one inch in diameter. Through this tube I watered the plant, and then stopped it up with a cork. I stopped up also the holes at the bottom of the pot with corks. I weighed this pot and plant morning and evening for fifteen several days, from July 3rd to August 8th, after which I cut off the plant close to the leaden plate, and then covered the stump well with cement; and upon weighing found there perspired through the unglazed porous pot two ounces 'every twelve hours' day, which being allowed in the daily weighing of the plant and pot, I found the greatest perspiration of twelve hours in a very warm dry day to be one pound fourteen ounces; the middle rate of perspiration one pound four ounces. The perspiration of a dry warm night without any sensible dew, was about three ounces; but when any sensible though small dew, then the perspiration was nothing; and when a large dew or some little rain in the night, the plant and pot were increased in weight two or three ounces. N.B.—The weights I made use of were avoirdupois weights. I cut off all the leaves of this plant. and laid them in five several parcels, according to their several sizes, and then measured the surface of a leaf in each parcel by laying over it a large lattice made with threads, in which the little squares were half of an inch each; by numbering of which I had the surface of the leaves in square inches, which, multiplied by the number of the leaves in the corresponding parcels, gave me the area of all the leaves, by which means I found the surface of the whole plant, above ground, to be equal to 5,616 square inches, or 39 square feet. I dug up another sunflower, nearly of the same size, which had eight main roots, reaching fifteen inches deep and sideways from the stem. It had besides a very thick bush of lateral roots from the eight main roots, which extended every way in a hemisphere about 9 inches from the stem and main roots. In order to get an estimate of the length of all the roots, I took one of the main roots with its laterals and measured and weighed them, and then weighed the other seven roots with their laterals; by which means I found the sum of the length of all the roots to be no less than 1,448 feet."

And supposing the periphery of these roots at a medium to be $\frac{10}{16}$ of an inch, then their surface will be 2,286 square inches, or 15-8 square feet; that is, equal to $\frac{2}{5}$ of the surface of the plant above ground. If, as above, twenty ounces of water at a medium, perspired in a twelve hours' day, *i. e.*, thirty-four cubic inches of water (a cubic inch of water weighing 254 grains), then the thirty-four cubic inches, divided by the surface of all the roots, is=2,286 square inches; *i. e.*, $\frac{34}{2286}$ is=$\frac{1}{67}$; this gives the depth of water imbibed by the whole surface of the roots, viz., $\frac{1}{67}$ part of an inch. And the surface of the plant above ground being 5,616 square inches, by which, dividing the thirty-four cubic inches, viz., $\frac{34}{5616} = \frac{1}{165}$, this gives the depth perspired by the whole surface of the plant above ground, viz., $\frac{1}{165}$ part of an inch. Hence the velocity with which water enters the surface of the roots to supply the expense of perspiration is, to the velocity with which the sap perspires, as 165:67, or as $\frac{1}{67}:\frac{1}{165}$, or nearly as 5 to 2.

The area of the transverse cut of the middle of the stem is a square inch; therefore the areas on the surface of the leaves, the roots, and stem, are 5,616, 2,286.1.

The velocities in the surface of the leaves, roots, and transverse cut of the stem, are gained by a reciprocal proportion of the surfaces.

	Area of	Velocity.	Or as
Leaves	5,616	$\frac{1}{5616}$	$\frac{1}{165}$
Roots	2,286	$\frac{1}{2286}$	$\frac{1}{67}$
Stem	1	1	34

Now their perspiring thirty-four cubic inches in a twelve hours' day, there must so much pass through the stem in that time; and the velocity would be at the rate of thirty-four inches in twelve hours, if the stem were quite hollow. In order, therefore, to find out the quantity of solid matter in the stem, July 27th, at 7 a.m., I cut up even with the ground a sunflower; it weighed three pounds. In thirty days it was very dry, and had wasted in all two pounds four ounces; that is, $\frac{3}{4}$ of its whole weight. So here is a fourth part left for solid parts in the stem—(by throwing a piece of green sunflower-stem into water, I found it very nearly the same specific gravity with water)—which filling up so much of the stem, the velocity of the sap must be increased proportionally, viz., $\frac{1}{3}$ more (by reason of the reciprocal proportion), that thirty-four cubic inches may pass the stem in twelve hours; whence its velocity in the stem will be 45⅓ inches in twelve hours, supposing there be no circulation nor return of the sap downwards. If there be added to 34

(which is the least velocity) ¼ of it=11¼, this gives the greatest velocity, viz., 45¼. The spaces being as 3:4, the velocities will be as 4:3 : : 45¼:34. But if we suppose the pores in the surface of the leaves to bear the same proportion as the area of the sap vessels in the stem do to the area of the stem, then the velocity, both in the leaves, root, and stem, will be increased in the same proportion.

"From July 3rd to August 3rd I weighed, for nine several mornings and evenings, a middle-sized cabbage plant, which grew in a garden pot, and was prepared with a leaden cover, as the sunflower. Experiment 1st: Its greatest perspiration, a twelve hours' day, was 1 lb. 9 oz.; its middle perspiration 1 lb. 3 oz.=32 cubic inches; its surface 2,736 square inches, or 19 square feet; whence, dividing the 32 cubic inches by 2,736 square inches, it will be found that a little more than the $\frac{1}{86}$ of an inch depth perspires off its surface in twelve hours' day. The area of the middle of the cabbage stem is $\frac{100}{156}$ of a square inch; hence the velocity of the sap in the stem is, to the velocity of the perspiring sap on the surface of the leaves, as 2,736 : $\frac{100}{156}$: : 4,268 : 1, for $\frac{2736 \text{ by } 156}{100}$=4268. But if an allowance is to be made for the solid parts of the stem (by which the passage is narrowed) the velocity will be proportionably increased. The length of all its roots 470 feet, their periphery at a medium $\frac{1}{22}$ of an inch, hence their area will be 256 square inches nearly; which being so small, in proportion to the area of the leaves, the sap must go with near eleven times the velocity through the surface of the roots that it does through the surface of the leaves. And setting the roots at a medium at 12 inches long, they must occupy a hemisphere of earth 2 feet diameter; that is, 2.1 cubic feet of earth. By comparing the surfaces of the roots of plants with the surface of the same plant above ground, we see the necessity* of cutting off many branches from a transplanted tree; for, if 256 square inches of root surface was necessary to maintain this cabbage in a healthy natural state, and upon digging it up, in order to transplant, half the roots be cut off (which is the case of most young transplanted trees), then it is plain that but half the usual nourishment can be carried up through the roots; which will also be very much diminished on account of the small hemisphere of earth the newly-planted shortened roots occupy; as well as the loose position of the newly-turned earth, which touches the roots at first but in few points. This (as exemplified by experience) strongly shows the great necessity of well watering new plantations.

"July 27th I fixed an apple branch (3 feet long, ½-inch diameter), full of leaves and lateral shoots, to a tube 7 feet long, ⅜ diameter. I filled the tube with water, and then immersed the whole branch as far as over the lower end of the tube into a vessel full of water. The water subsided 6 inches the first two hours (being the first filling of the sap vessels), and 6 inches the following night; 4 inches the next day, and 2½ inches the following night. The third day, in the morning, I took the branch out of the water and hung it, with the tube affixed to it, in the open air; it imbibed this day 27½ inches in twelve hours. This experiment shows the great powers of perspiration; since, when the branch was immersed in the vessel of water, the 7-feet column of water in the tube, above the surface of the water, could drive very little through the leaves till the branch was exposed to the open air. This also proves that the perspiring matter of trees is rather actuated by warmth and so exhaled, than protruded by the force of the sap upwards*."

It now remains to be shown whether the evaporation through the leaves is adequate to account for the admission of a sufficient amount of inorganic substances indispensably necessary for the due development of a plant.

If we take the illustration of the cabbage plant, it will be seen that its average daily evaporation of twelve hours to the day amounted to 1 lb. 6 oz. avoirdupoise, or 9,625 grains; which, if continued at the same rate for ninety days, 866,250 grains of water would be evaporated. If this water only contained so small a quantity of inorganic matter in solution as 0.2 per cent., it would be equivalent to the absorption of 1,732½ grains of mineral substances; which would be about equal to the mineral matter found in a cabbage weighing 10 lbs.—assuming the inorganic materials found in the cabbage to form 2½ per cent. of its entire weight, according to this proportion its inorganic ash would weigh 1,750 grains. There is, however, every reason to presume that on fertile soils, such as would be capable of raising single cabbages of 10 lbs. weight, there would be found in solution in the water conveyed from the soil to the plant a greater per centage of inorganic substances than is

* The necessity here alluded to by Hales must appear a still more important one to the planter of the present day, now that it is known that plants only receive their radicle nutriment by means of the delicate terminations known as "spongioles;" which, from their fragile nature, are generally injured or destroyed in transplanting. It may be well to point out here also the beautiful adaptation of means to the end in the greater evaporating surface displayed by the leaves in proportion to the absorbing surface of the roots, by which means, a partial vacuum being thus created in the body of the plant, the moisture surrounding the spongioles is forced forward through the roots by the pressure of the atmosphere.

* As observed in a previous note, the flow of the sap upwards must follow as a natural sequence, the evaporation of moisture from the plant through the leaves in a similar manner to the ascent of water by an ordinary pump.

here assumed, viz., 0.2 per cent., in which case the surplus would serve to engender a more expanded growth, or possibly be excreted*.

Having shown the mode by which the inorganic constituents of plants are obtained, it will be well once more to glance at a few experiments made for the purpose of illustrating the mode in which carbonic acid is absorbed.

Dr. Gilly found that grass leaves exposed to the sun in a jar for four hours produced the following effect:—

At the beginning of the experiment there were in the jar—		At the close of the experiment there were—	
Of nitrogen	10·507	Of nitrogen	10·507
Of carbonic acid	5·7	Of carbonic acid	·37
Of oxygen	2·793	Of oxygen	7·79
	19·000		18·667

By this it will be seen that the carbonic acid was replaced by oxygen, the latter being formed by the decomposition of carbonic acid, which is composed of carbon 1, oxygen 2 parts, or by weight in the proportion of 6 carbon to 16 oxygen. The difference of the quantities in the above experiment may be accounted for by the assimilation of a portion of oxygen into the vegetable organism. The decomposition of carbonic acid here noticed is principally to be attributed to the presence of light; for "If," says De Candolle, "two plants are exposed, one to darkness and the other to the sun, in close vessels, and in an atmosphere containing a known quantity of carbonic acid, and are removed at the end of twelve hours, we shall find that the first has diminished neither the quantity of oxygen nor of carbonic acid; and that in the second, on the contrary, the quantity of carbonic acid has diminished, while the quantity of free oxygen has increased in the same proportion. Or, if we place two similar plants in closed vessels in the sun, the one in a vessel containing no carbonic acid, and the other in air which contains a known quantity of it, we shall find that the air in the first vessel has undergone no change, while that in the second will indicate an increase of oxygen, proportioned to the quantity of carbonic acid which has disappeared; and, if the experiment is conducted with sufficient care, we shall discover that the plant in question has gained a proportionable quantity of carbon. Therefore, the carbonic acid which has disappeared has given its oxygen to the air and its carbon to the plant; and this has been produced solely by the action of the solar light."

In order to show that the green parts of plants when exposed to the sun decomposed carbonic acid, De Candolle placed in the same cistern two inverted glasses, of which one (A), as well as the cistern itself, was filled with distilled water, and had a plant of water mint floating in it; the other glass (B) was filled with carbonic acid. The water of the cistern was protected from the action of the atmosphere by a deep layer of oil. The apparatus was exposed to the sun. The carbonic acid in the glass B diminished daily, as was obvious from the water rising in it; and at the same time there rose to the top of the glass A a quantity of oxygen, sensibly equal to the quantity of carbonic acid absorbed. During the twelve days that the experiment was continued, the mint plant remained in good health; while, on the contrary, a similar plant, placed under a glass, filled with distilled water only, had disengaged no oxygen, and exhibited manifest signs of decomposition. The same experiment having been tried, only employing oxygen in the place of carbonic acid, no gas was disengaged in the glass that contained the mint plant.

Seeing that the presence of carbonic acid is indispensable to the growth of plants, it has been thought plants would grow more luxuriantly in an atmosphere containing a larger per centage of this gas than that found in common atmospheric air. To the supposed greater abundance of carbonic acid in the atmosphere has been attributed the gigantic growth of the equisitæ, ferns, &c. of the coal period, experiments made by Dr. Daubeny and Mr. Hunt, with the object of ascertaining whether an increased amount of carbonic acid in the atmosphere surrounding plants tended to their more luxuriant development have been rather negative than otherwise. Great difficulties, however, occur in making such experiments, it being almost impossible to maintain all the conditions which ought naturally to exist, such as a free circulation, &c. Saussure found that in the sun, an atmosphere of pure carbonic acid gas, or even air containing as much as sixty per cent., was destructive of vegetable life; that fifty per cent. was highly prejudicial; and that the doses became gradually less prejudicial as they were diminished. From eight to nine per cent. of carbonic acid gas was found more favourable to growth than common air. This, however, was only in the sun: any addition, however small, to the quantity of carbonic acid naturally found in the air was prejudicial to plants placed in the shade.

There are other physiological circumstances connected with the growth of plants to which only a passing allusion can here be made, as they are not of great economical importance to the farmer, such as the decomposition of water and assimilation of hydrogen. Also, whether nitrogen is absorbed and assimilated from the atmosphere in any other form than that of ammonia, the latter point is settled for all practical purposes by the facts daily seen, viz., that increased fertility invariably follows an application of nitrogenized substances; and it is only with the practical part of the matter that we have to deal. The preceding somewhat lengthened introductory observations will prepare the reader more fully to understand the *rationale* of the application of manures, whether they are procured from the farmyard or by the use of extraneous substances—such as guano, gypsum, &c., &c. Before leaving the subject, it may be mentioned that some experiments have been made which show that light may be divided into calorific and chemical rays; that the blue rays produce a chemical whilst the red rays produce a calorific influence; for a full account of which, the reader must be referred to Mr. Hunt's Poetry of Science.

* For an account of experiments on the radicle excretions of plants, see Mr. Gyde's, of Painswick, prize essay in the "Highland Transactions."

ON SOWING TURNIPS.

There is not a more difficult subject in the whole range of agricultural science than the critical seasons for sowing crops. We may read over volume after volume and calendar after calendar and we shall find very little rational information. A writer under the head "Crops" may give certain dates for sowing the seed; or a calendar may say, Francis Moore like, "On or about this time sow Swede turnips;" but there is nothing like any tangible information to be obtained as to the exact time in each locality for sowing any particular crop, nor the consequences of any violation of the rule.

We say in each locality; for it is an anomaly with which the agriculturist has often to contend, that a good season in one district of our island is a bad one in another—a good period of the year on one of our soils, and the reverse on some neighbour's soil in the same parish. In Scotland, for instance, you may sow turnips, it appears to us, almost as soon as the winter frosts have left the soil, and the spring seed time is over; swedes may be sown even in April, and with decided advantage; but sow them in Yorkshire before May-day, and they will be mildewed and covered with insects and filth in September; while the first week in June is a favourite and common season in the midland and southern counties. At the last meeting of the Bolsover Agricultural Society a report was presented on the turnip competitions. There were four competitors in swedes; the earliest were sown the 24th of May, the latest the 14th of June; the weight of the first sown was however the greatest.

Again, in white turnips there is a vast range. In Scotland white turnips are often sown in May. Mr. Logan, who opened a discussion on turnip growing before the Highland and Agricultural Society of Scotland, sows them in the second week in May; whereas, if sown in Yorkshire, say before the third week in June, they become prematurely ripe and turn sticky and yellow in September, pricking up red small leaves as if in a dying state.

Thus much may be said for seasons in general; but there is undiscovered knowledge far in advance of this. It is not yet attained; but the indications of its existence are too palpable to be mistaken. Who has not seen a full fortnight's difference in the stage of a plant between a Saturday's turnip sowing and that of the following Monday? Nay, who that has paid ordinary attention to farming matters cannot often mark the place where the morning's sowing ended, and that of the afternoon began, a month after either?

We believe there are other circumstances than the mere day of the month which ought to determine nearly the whole question—we mean the *temperature* and consistency of the soil. We all know that wheat requires a different temperature to turnips—that even barley and wheat are not in this respect in equal physical circumstances; but who knows the proper one for either? We have often seen a half field of turnips sown before a shower, beautiful, healthy, and luxuriant; while after one they have been small and stunted, and grew slowly, although all treated otherwise in exactly the same manner. Did not the rain by evaporation reduce the temperature of the soil? and might not the thermometer sometimes help the farmer as much as the barometer in hay-time?

We want the subject investigated. It should be done by many farmers at once, and in different localities. Let the date of sowing each crop be entered, the state of the soil as regards moisture, friability, &c., and including *temperature*; let this apply to every kind of crop sown on a farm, say for ten years. Then let all be compiled by some person of mental capabilities and practical knowledge adequate to the task, and some very valuable and striking, not to say astonishing, results we are persuaded would follow.

We have made our observations as if the whole question had reference to turnips alone; not because it is so, but because turnip growing is now occupying the attention of some one-half of our farmers, and therefore it is likely to be more impressed and more intelligible; but who does not know that there are critical periods in the sowing of wheat, of barley, of oats—nay, of every cultivated crop? If wheat is sown before October it will look better, indeed, than that sown later; but it will become winter proud, will exhaust its vital powers before winter, will receive from it a proportionally greater shock, and will be a failing crop to a greater or less extent.

Thus we know how barley may be influenced both in fineness of sample and quality of produce. Taking the 21st of March as the best seed time for, say the centre of this island, a fortnight later will take off in ordinary seasons fully a quarter (8 bushels) per acre; whilst instead of the pure, bright, mellow sample, it will show one coarse, dull, flinty, and high coloured. It has had to struggle with circumstances opposed to the development of those qualities sought for in barley by the maltster.

But circumstances will often arise to defy a farmer always sowing at the very best time. He cannot, moreover, sow all in one day; and the best precaution he can take is simply to have all his work in that state of forwardness to enable him at the fittest moment to lay hold on the opportunity.

What plans are available? We have been told by a highly creditable farmer that he once had barley in the sack, grown, and in the sack again in three months. It was sown in pared and burnt grass land some time in *June*, first thoroughly steeped in water almost to germination; a very hot summer followed; but it was reaped and thrashed (partially) in September, within three months of its being in the sack.

When the difficulties of the season are to be overcome we always find it best accomplished by an extra dose of manure: a slight dressing of guano, 1½ to 2 cwt. per acre of the best Peruvian, will generally compensate for a bad season; and when a late, unfavourable, or difficult season occurs, it should never be neglected.—Gardeners' and Farmers' Journal.

LONDON FARMER'S CLUB.

"THE INJURIOUS EFFECTS OF COPYHOLD TENURE ON THE CULTIVATION OF THE SOIL."

The usual monthly meeting of the members took place on Monday evening, May 3, at the Club Rooms, Bridge Street, Blackfriars: subject for discussion, introduced by Mr. W. Fisher Hobbs, "The Injurious Effects of Copyhold Tenure on the Cultivation of the Soil." In the absence of Mr. Thomas, the chairman for the current year, the chair was taken by Mr. R. Baker, of Writtle.

The CHAIRMAN said the question for discussion was one which, of course, concerned them as farmers. All persons who had money which they desired to invest in land, or the improvement of the soil, must feel that most beneficial effects would result from the emancipation of copyholds. The investment of money in copyhold land might be described as the sinking of it, seeing that the remuneration was so inadequate. The chief benefit was derived by the lord of the manor or the steward. He would not enter into the subject further, feeling convinced that it would be amply illustrated by their friend who had undertaken to introduce it.

Mr. HOBBS then proceeded as follows.—Mr. Chairman and Gentlemen: It has been from the first one of the chief objects of this Club to remove any impediments to the improved cultivation of the soil. The subject which we have so long advocated here—I allude to that of Tenant-right—is now, I believe, generally admitted to tend much to that result. Notwithstanding the little support given to us elsewhere, I am convinced the discussion alone of that question has been attended with much advantage, as I believe there are few practical men who now deny the utility of its object, and few wise ones who would go to work without some such security ensured to them. I hope you will not consider me starting quite wide of my subject; for the one I am about to introduce this evening I consider in many respects very similar to the one I have already referred to; and I should wish them to become, by our efforts, still better understood. The want of a proper and general tenant-right has, and does still in many districts, retard the progress of improved cultivation—the want of a general enfranchisement of copyholds does the same. Both seek that same security, freedom of action and sense of justice, without which few of us will be inclined to make the best use of his "talent." Like the tenant-right, the copyhold question has long been before the House of Commons. Evidence equally ample and satisfactory has been taken on both subjects; measures have been proposed to meet their objects, but at present little has come of them. Let us then here, by fully discussing this question of copyholds, show up the great impediment it causes to the improvement of agriculture, as well as the absurdity of maintaining any longer so gross a relic of a bygone age. Within the last few years much good has been done for agriculture through the agency of evidence taken by parliamentary committees. Men of character, ability, and long experience, have so afforded information which otherwise might never have been made public. Most of you, I am sure, must be acquainted with that collected on "agricultural customs," and supplied mainly through the agency of this club. That given on the proposed enfranchisement of copyholds is equally valuable, and I propose availing myself of it to-night, in my endeavour to demonstrate to you "the injurious effects of copyhold tenure on the cultivation of the soil." I do not consider it within the province of my subject to go into the history or origin of this kind of tribute; my duty rather being to attack the evil as it exists. It is evident enough, however, from what we gather of some of them, that these customs belong to an age and a state of society long since passed away. If you come, indeed, to examine very closely into them, you will find that certain of these fealties approached very nearly on actual barbarism; an exercise of revolting brutality on the one hand, and of most humiliating and pitiful submission on the other. Look, for instance, to what is now—in Wales more particularly, I believe—compounded for under the title of "boot money," a charge, that is, which buys off the lord's privilege to put his booted-leg in the tenant's bed with his wife on the night of their marriage. But many of these grosser claims have gradually been allowed to elapse. As it is, you are no doubt all aware that this tenure depends on the payment of certain fines or the performance of certain services to the lord, as well as in the observance of certain rules and regulations, varying in different localities; the effect of which is directly to prevent the best use being made of the property. I will, however, with your permission, read some extracts from the evidence I have referred to, which may give you a better idea of the obnoxious character of these fines, fees, and services, as well as of their injurious effects on the cultivation of the soil. The first I will call your attention to is the examination of W. Blamire, Esq., a commissioner under the Tythe Commutation Act, as well as being one of the enclosure and drainage commissioners. This gentleman, as you will see, has had considerable experience in matters connected with copyhold tenure, though his observation of its effect has been, I believe, chiefly confined to the north of England. The first question put to him which I shall take is—

Do you know whether arbitrary fines are assessable on the death of the lord as well as of the tenant?—Generally on both.

Are you aware that there is also a fine of one year's value

very common in those manors on a temporary alienation by way of mortgage?—Certainly.

And two years' value on the death of a tenant or an alienation?—Yes.

Do you know that in many of those manors there are payments of lords' rents, and smaller sums?—In all the manors that I know of, annually.

Do you know that in many manors there are also services performed; for example, so many loads of coals taken to the lord's house, so many pecks of oats for his horses, and so many days' reaping?—They are various; but there are services in all manors subject to arbitrary fine, that I know anything of.

Are they of the description that I have mentioned?—Yes, and of other descriptions, such as mowing; they are very general.

And in many manors payments of geese and cocks and hens exist, do they not?—I do not know that those are enforced now; they were enforced at one time.

Are those services very troublesome to the tenant to pay, and very unprofitable to the lord to receive?—Unquestionably. The tenant is bound to appear to render his service at a moment's notice. He is sent to overnight, and however pressing his own work may be, he must leave it, and go to work his boon-day.

In working his boon-day, reaping corn, for instance, does he do it in a way that is very profitable to the lord?—No, certainly not.

But it is very painful and annoying to himself, is it not?—It is a great inconvenience to himself, and the value of the labour given to the lord is of very little consideration.

In most of the manors does the timber belong to the lord?—Generally; I think invariably.

There are generally heriots payable on the death of a tenant, are they not?—Generally.

The best chattel or the best beast?—Often the best live heriot.

Do they follow them off manors generally?—Yes, always.

To your knowledge, does not the payment of those services, and the other matters which you have mentioned, form a great impediment to improvements?—They are very annoying to a tenant, without being of a proportionate value to the lord.

Do not you find that they prevent drainage and several other improvements which might be carried on if the lands were enfranchised?—No tenant of copyhold land subject to arbitrary fine can reasonably be expected to drain or improve his land, not having the entirety of the soil to himself.

Do you not think it would be a great advantage, not only to the tenant but to the public, if the means were given for the tenant to lay out his skill and capital on the land, without being subject to the tax of a fine?—Most unquestionably.

Are you enabled to state, from your position as a drainage commissioner, that the applications for drainage loans are very few in districts where the copyhold tenure and arbitrary fines prevail, compared with those where the lands are enfranchised?—We have no certain knowledge of the extent of the copyhold lands in the kingdom, and therefore I can only answer that question by stating that I believe some counties contain a greater quantity of copyhold land subject to arbitrary fines than other counties. Numbers of people come to me to consider and negotiate as to a loan for the purpose of the drainage of their lands. They all object to borrowing money for the drainage of their copyhold land, on the ground that it would be idle to expect them to improve it for the benefit of the lord; and that has been the objection taken; not now, but ever since I recollect anything about copyhold land, that no man would improve it, unless under peculiar circumstances, seeing that the lord would be benefited upon a renewal, and his fine increased by the extent of the improvement. Of late a great many proprietors have stated to me their unwillingness to borrow money for the drainage of their lands on those grounds; and I am disposed to believe, from the small number of applications which have been made from particular counties in England, which I believe to be full of copyhold lands, subject to arbitrary fines, that that is really so. I took out of our drainage list a few counties, showing the number of applications received from each county, and the sums that have been asked for, and showing also the larger number of applications that have been received, and the amount of money asked for from counties where I believe that the same impediment does not exist. I do not know that it is of any value, because the extent of arbitrary copyhold in each county is unknown. There is a great deal of copyhold land in Suffolk, and from that county we have only had one application for a loan, and that a small one. From the county of Rutland, in which I believe there is a great extent of copyhold land, we have not had a single application; from the county of Essex very few; from the county of Norfolk very few; from the county of Cambridge scarcely any; whilst from Northumberland we have had a great number, and from Yorkshire also. I do not know that there is any force in that observation, for I am not fully aware of the relative extent of copyhold lands in the different counties in England; but coupling that striking difference in the number of applications with the statements that are continually made to me as to the unwillingness to drain any lands excepting freehold, I should fancy that there must be some force in it, though I am not prepared to say that there is.

Do you think that if the copyholders were in a position to lay out money in draining, that the increased value per acre would be very large?—Very large indeed; assuming that the lands require draining, the expense would amount to about £5 an acre, and the charge upon a terminable annuity to repay that would amount to 6s. 6d. per acre; whereas it is quite clear that in very few cases would the return be less than from 12 to 20 per cent. I am sure that I know a great number of estates at the present moment of which the rental is supported solely from the increase in the value resulting from the drainage of the lands beyond the sum required to pay the annual instalment.

Do you, on the whole, think that both the lord and the tenant of the land would be materially benefited by the enfranchisement contributing to the improvement of the land?—Most unquestionably; the tenant would be very largely benefited, and the lord would not be damnified, if the enfranchisement was calculated upon an equitable and fair principle; and the public would be amazingly benefited, if it be the fact that the copyhold lands of England are very much worse cultivated, strikingly so, than the freehold lands of the kingdom.

Do not you know, from your knowledge of districts where the arbitrary fine prevails, that the lands are worse cultivated?—Formerly they were; I have not been in the habit of seeing many lands of late years; but I have every reason to believe that the cultivation has not improved, and of my own knowledge I know that some years ago they were very much less well cultivated.

Have you any reason to believe that a change has taken place?—Quite the contrary; I believe that the difference becomes more marked than it ever was.

You may gather from the evidence of Mr. Blamire alone how little likely the due progress of agriculture promises to be where copyhold tenure is found to exist. Look, for

instance, at the most common mode of estimating the fine. The more capital you expend, the more labour you employ, the more skill you display—in short, the more you improve the estate, and the greater benefit you confer on the neighbourhood and the public, the more I fine you. A "fine" inducement certainly in these hard times for any man wishing to do his best in the labour of his vocation. In the southern parts of the country, I believe, the services mentioned, the ploughings, work at harvest time, and so forth, are not very common. Had they, indeed, been more generally required, I think the whole system must have long ere this been abolished. I do not wonder, however, at their not being often called for, as one may very easily imagine the style in which such work would be performed—the naturally unwilling spirit in which it would be set about—and the slovenly manner in which it would be got over. The same, in fact, may be said of many kinds of copyhold fines or service, frequently not worth enforcing, and tending only to create ill-feeling amongst those who are unfortunate enough to come within its action. It is now generally admitted that you can have no proper foundation for good farming without efficient drainage; and yet only notice how great an obstruction to this most necessary operation copyhold tenure is found to be. See what a Drainage Commissioner says, in the evidence I have just read to you. Numbers of people come to me, to consider and negotiate as to a loan for the purpose of drainage of their lands. *They all object to borrowing money for drainage of their copyhold land*, on the ground that it would be idle to expect them to improve it for the benefit of the lord. Take the evidence of Mr. Stewart, again, the Secretary to the Commission, and equally high authority:

Do not you know that, in many cases, even agricultural land is allowed to remain in a comparatively valueless state on account of being copyhold tenure, where the tenant cannot lay out money without being taxed, and where an arbitrary fine is demanded of him?—There is no question of that.

And here, more especially as to the drainage, he says:

I may say that, only this morning, I had a particular instance brought to my notice, showing the way in which agricultural improvements are obstructed. A person came to me to ask what the state of the bill was; and he said that he was positively deterred from draining and from making use of the lands that he has, because he could procure no enfranchisement; and he stated that he believed that feeling to exist to a very great extent. I have no hesitation in saying, that enfranchisement is one mode by which the value of the real property of this country may be greatly increased; and that appears to me, with great submission, to be a legitimate exercise of the legislative power.

The impediment, indeed, goes beyond this; for, at a subsequent examination, Mr. Stewart mentions the case of a gentleman who could not drain his freehold, from its being so mixed up with copyhold. Considering the nature of his tenure, he did not think it advisable to improve one, and was thereby prevented from touching the other. This brings me to the consideration of another of the improvements in husbandry, and the bar that copyhold property offers to its adoption. I shall take my case here from the evidence of Mr. Aglionby, the zealous promoter of the present bill. He states:

For instance, I know in my own case that the lands held under a freehold tenure, and under a copyhold tenure, adjoining to each other, being frequently in very small strips, with not room enough for a plough to turn, the tenants in former days levelled the fences; and between the two it is now very common, when the lord has to assess a fine, on death or alienation, for the person who is admitted and has to pay the fine to set him at defiance, and say, "Show me the land: I will not pay your fine." The result is very often either that the lord has to come to some compromise, and so to reduce that which he is fairly entitled to rather than go to law, or to inflict upon the tenant all the disadvantages and expense of a bill of discovery in Chancery, to find out the land that the lord is entitled to. In recent days I felt that so strongly that, before I came to the manors, I recommended my father to bring an action against a tenant who had removed a fence of that description, for a forfeiture. It was tried at the assizes at Carlisle, and a verdict was immediately obtained, on the ground that, by the ancient law, it is a forfeiture to remove a fence on copyhold land. I had no wish or inclination to enforce the forfeiture. I only did it to prevent that which the tenants had almost claimed as a right—namely, to mix their lands for the purpose of creating difficulties to the lord; and when it came up to the court for judgment, I appeared and said, "We have no wish to enforce the verdict, and to proceed to judgment." That was only for the sake of an example; and provided landmarks were put up to distinguish in future, judgment would never be demanded. I effected that which I desired, in order to show the tenants that they could not arbitrarily mix their lands, to the detriment of the lord; and at the same time I did not wish to enforce the forfeiture. They had the land marked out: but the difficulty still remains—that a tenant is not allowed to remove a fence; and this is a very great impediment to cultivating the land to any great advantage.

Again, with timber the customs are very variable, though in many districts, it appears, a claim for the whole is made by the lord; so that a tenant may render himself liable to action or ejectment even by cutting down a tree for a gate-post, without a license. Then the removal of an old building and the erection of a new one, *however superior* in *value* or *utility*, is "waste;" in other words, an infringement of the fealty—an offence which may subject the tenant to an action at law, just as the evidence I have quoted shows he may be for grubbing up a hedge-row. It is hardly necessary for me to tell you how great an impediment this is to improved cultivation. For good farming it is necessary to have good buildings, adapted to the uses of machinery, as well as for the economical feeding of stock, and production of manure. On copyhold property this is next to impossible. I have felt, and still feel, the serious effects of this myself, and I am sure there are many in this room who can also vouch for the existence of the evil. It is not sufficient that the tenant is denied the power of bringing his land into the best state of cultivation, but he may not even keep the best stock on it—I allude of course here to the "*heriots*" taken on

death, the lord having the power to take any animal he chooses to select! There are many instances on record of the gross injustice and fearful loss sustained by this system. Some of you no doubt recollect a notorious case, in which the Heriot seized—a celebrated race-horse—far exceeded the value of the estate he stood on. Mr. Muskett mentions it in his evidence, and as he also advises a means of enfranchisement, I shall here read one or two questions and answers from him, on this point, to you:—

You recommend, whatever else is done, that heriots and other things, timber for instance, should be immediately enfranchised, and freehold quit-rents?—The free rents.

What interest has a man, who has a life interest, in enfranchising a heriot?—I am now speaking not from experience, because we have no heriots; but I apprehend that a man would have some interest in enfranchising a heriot: supposing it is the best animal or the best horse, and £20 would be the fair value, if that man held a horse worth £1,700 or £1,800, which was the case with Smolensko, I apprehend he would be very glad to enfranchise it, because the man who dies pays the heriot, and therefore it is of more importance for them to be got rid of by those who live; the heriot in the case I am alluding to was far beyond the value of the whole estate, yet he could not forfeit the estate.

In some manors I am told the heriots are compounded for at a certain fixed sum; while in the majority they yet remain for the selection of the lord. The heriots in some cases not being confined to live stock, but extending to any piece of furniture, or even plate, he may choose to fancy. Any memorial of past services—any token of esteem—presented to the late tenant, and that his family may have a natural wish to preserve, perhaps, above everything else, may be taken from them, under the sanction of this arbitrary law. Mr. Cuddon gives so striking an instance of this that I shall make no apology for here reading it to you:—

Is there any other point upon which you would make any suggestions?—I do not remember that there is any other point now. I have to observe as regards heriots, that in my experience gentlemen of respectability will not buy heriotable property; it is well known that such is the case; or if they do, they put it into the name of a trustee.

"Supposing a person of property wishes to buy a copyhold estate which is heriotable, is it a common thing to have recourse to evasion?—Sometimes. Speaking of heriots, a case happened to myself as a trustee, having also a very small personal interest; I am a trustee for infants, as the lord of the manor, in which manor a copyhold estate is subject to render to the lord on the death of the tenant the best chattel. The copyhold tenant himself was but a trustee; but he happened to be a county magistrate, and a gentleman of considerable property; a few weeks ago he died, and I, as trustee only, am entitled for the heriot to a handsome piece of plate presented to him for some public services rendered to the county. I am but a trustee for infants, and what am I to do? I have no right to give away the money of my infants; the heriot has fallen due, though he himself was a trustee, and what am I to do in such a case as that? Supposing I give him up his heriot for £30. It is well known that this heriot is due, and what right have I to allow him to pay £30 when he ought to pay £70? It remains unsettled to this moment, and I have suggested that a professional man should say what should be done between both parties as the only means of settling the matter.

Within a recent period great efforts have been made to improve the dwellings of the poor, and duties have been taken off materials to facilitate that object; while a laudable example has been set us in the highest quarter as to what might be done. But here again copyhold declares that within its precincts there shall be no such improvements—no such step to bettering the social and moral condition, the comfort and value of the labouring man:—wretched clay-walled hovels or boarded cottages, badly thatched and inconveniently placed, too commonly designate the nature of the tenure on which they stand. I can speak from experience myself on this point, for I have now several of these cottages most awkwardly situated, and that from their very appearance, as well as inconvenience, I am anxious to remove; such, however, is the condition of the manor in which these small properties are situated that I cannot enfranchise. Mine, though, is not a solitary case; for in many districts you may easily ascertain, in passing through villages, where the copyhold exists. It has been said you may know an estate in chancery by the look of it: generally speaking, you may identify copyhold buildings quite as readily. The inferior condition of these dwellings, and the evident want of comfort about them, tells forcibly enough with how little persuasion a man may be induced to leave such a home for the neighbouring beer-shop—a *nuisance* which I had the honour some months since of seeking your aid to abolish.

On the general expenditure of capital I shall take one extract more. The Committee, referring to enfranchisement, ask Mr. Cuddon if

It would afford great facilities to a tenant for improving his land by the outlay of skill and capital?—No question about it? but now if he lays out £500 upon a piece of fine arbitrary land he gives about £100 to the lord, and consequently can expect but little profit for himself.

I really think, gentlemen, I need not go further into this evidence to prove my case, "The injurious effects of copyhold tenure on the cultivation of the soil." To make the land thoroughly productive, we are expected to do a variety of things, many of which our own experience shows us to be indispensable to profitable farming. An increased *outlay of capital* to begin with; but no outlay on copyholds, says Mr. Cuddon—you would not be justified in expending it, with fines that would eat up all the profits. *Thorough drainage of the land*, as the foundation of what you are going to do; but there is no drainage on copyholds, says the evidence of the Drainage Commissioners. The *removal of hedge-rows* and all waste on the land; but you must not remove hedge-rows on copyholds, says the law. Here "waste" means just the reverse; and so prefers old tumble-down buildings to new ones, and any old stand-still system to improvement in any shape whatever. In the words of Mr. Aglionby, I think, and I believe you

will agree with him, "That it is monstrous in these days of improvement and civilization that such customs should be allowed to continue." An evil of this kind is, of course, an injury to all. The lord gains nothing by the exercise of a right (allowed him in a bygone age, when he had the power of a tyrant, and the tenant the position of a serf), but which enfranchisement would fully secure to him. The cultivator of the land, I think I have shown you, has nothing to *gain* but all to *lose* by it, and the labourer stands by idle when he might be profitably employed in bringing the land to its best uses. Everybody, in fact, suffers but the *steward*, whose fees, with contingent expenses, frequently amount to a large per centage of the fine itself; indeed, in some cases, to considerably more. I must do these gentlemen, however, the justice to say, that many of them appear as anxious as any of us to assist in facilitating a system of general enfranchisement. Confining my remarks to the question as it stands on the card, I think my task ends with proving the evil. With permission of the Chairman, however, I would suggest that members be encouraged to speak to the *remedy* as well as the *disease*. For my own part, from all I have observed, I think enfranchisement must be more or less *compulsory—always*, I should say, on the *lord* (of course under proper valuation) when demanded by the tenant; and with the *latter* on *death* or *alienation*. In introducing this subject to you, I have had a double inducement to do so. Knowing the extent of the evil, I considered we should only be doing our duty in giving all the support we could to the advocates of the measure now before Parliament. Further than this I have had the promise of assistance from several members of the Club, some of whom I have the pleasure of seeing here this evening; they, I am sure, from their extensive experience in the management of landed property, will be able to speak intimately to the injurious working of copyhold tenure in their several districts; while in introducing the subject to you I have thought it better to confine myself to a general outline of the evils of the system. In their report the members of the Parliamentary Committee agreed to the following suggestions, which, in conclusion, I beg to submit might come not altogether inapplicable as resolutions on the same subject from this Club. I here offer them for your consideration:—

That copyhold and customary tenures are frequently a bar to the application of skill and capital, an impediment to the improvement of the land, injurious to the public, and inconvenient to the lord as well as the tenant.

That it is highly desirable for the interests of lord, tenant, and public that the entire enfranchisement of these tenures should be effected as soon as practicable on equitable terms, due regard being had to the rights and just claims of all parties.

The Secretary, Mr. Corbet, said he had received the following paper from Mr. T. W. GRAINGER, of Stretham Grange, Ely, which, in compliance with the rules of the club, he would read to the meeting:—

Copyholds are distinguished, as far as my experience goes, in the following ways, viz.—

Manors—Fine arbitrary.

Manors—Fine certain.

In manors fine arbitrary the lord takes upon death, or alienation, a fine of the value of a year-and-a-half or two years' rent, and in cases where heriots belong to the manor, the lord claims a right to seize any chattel belonging to the tenant, whether in or out of the manor. In some cases, there is an understood price, which the heriots will be compounded for. Heriots are only taken at a death. In manors fine certain the lord only takes a fine of the amount of a year's quit rent upon death or alienation—in fact, fine certain manors are nearly equal to freehold.

Fines arbitrary have a great tendency to check improvements in agriculture; for the lords of manors, although very careful to find out and make their tenants pay for dilapidations or waste, never think of assisting their tenants in making permanent improvements; but, on the other hand, anxiously take advantage of any improvement their tenants may make. This, consequently, has a tendency to check all improvements in claying, underdraining, and other things of an expensive character.

But it acts more unfairly in the Isle of Ely, where copyhold tenants have improved their lands by permanent Parliamentary taxes (in some cases of eleven shillings per acre per annum for embanking and artificial draining), the lord not contributing one shilling towards the improvement, although the rental of the land is increased from 15s. per acre to 40s. per acre, and which increased value they take advantage of at the first opportunity.

Fines arbitrary are in a great measure the reason why there are not better cottages for the labouring poor, every one having a great objection to build upon land with such a tenure, and very often freehold land cannot be obtained for the purpose.

As in all other bad cases, one evil brings on another. So it is with the stewards' fees, which in small copies are very heavy, often being double or treble the lord's fine; and in fine certain manors, the lord will take his fine of sixpence or ninepence, whilst the steward will take for his fees from four to six pounds. There is another evil: the stewards are trying to establish the splitting of copies. For instance, if a man leaves a copyhold estate of fifty acres to five children, the steward does not charge one set of fees, but five sets of fees; and if, at a future time, one of the children should buy up the four shares of his brothers, the stewards try to charge five sets of fees, although all the fifty acres are held by one person, as they originally were. This unsatisfactory state of things might be remedied by the lord receiving the value of his interest in the shape of a rent-charge; and it would, I should think, be more convenient to both parties (it would at least be to the tenant) than a money payment as an enfranchisement.

I am aware that a contrary view was taken by some of the witnesses before the Copyhold Commissioners; but, it must be borne in mind, they were lords or stewards of manors, and would therefore be somewhat *ex parte*, as nearly all of them were.

Mr. BEADEL said he had perhaps seen as much of the working of the copyhold system as almost any gentleman in that room. There could be no doubt of the truth of Mr. Hobbs' remark that it was a gross relic of a bygone age, and one of the strongest evidences of that was to be found in the fact that lords of manors had ceased to urge many of their grosser rights. The great complaint was that the lord of the manor differed from any other individual in this country; he was the only man who

had right without corresponding duties. He had a right to prevent the carrying out of improvements, although he himself was not benefited by such a course. He had no right of his own to discharge, and without increasing the value of the property himself, he took care on the first opportunity to interfere with improvements made by others. He should be sorry to make any remark which might be construed into a declaration that the lord of the manor ought not to be compensated for giving up his undoubted right; all he desired was that the legislature should step in and remove the obstacles to enfranchisement which might be done without injury to the land (Hear, hear). As regarded the operation of the law, he might mention that he was himself interested in some copyhold property, for which three trustees had been admitted, and whenever any change was made he had to pay three sets of fines (Hear, hear). Lords of manors bowed to no authority but custom; whatever happened to have been the custom was law. That was a strange state of things, under which the lord could seize what was thirty or forty times the value of the estate itself (Hear, hear). One would have supposed that the common law would have prevented him from seizing a heriot worth more than the fee simple of the property from which it arose; and indeed the judges had now decided that a fine at the will of the lord should be limited to two years' improved value of the property. He had known cases in which, from death or alienation, the lord had received, within 10 years, more than double the value of the property. Surely that was a state of things which required a remedy. Wise and good legislation would repeal a law which pressed so heavily on a great number of individuals, and which was, moreover, injurious to society generally. There was one remarkable peculiarity. In most cases a master paid his own servants. The lord of the manor, however, was an exception to this rule. Not only did he make the tenants pay the fine which was due, but he also made them pay his own lawyer in all the legal proceedings connected with it (Hear, hear). The tenant had frequently to pay from £5 to £6 in fees to the steward; and that was an additional reason for seeking to get rid of the copyhold law. Of course that *quæstio vexata*, how the stewards were to be compensated if the present system were abolished, would have to be settled; but they might rely upon it that those gentlemen were able to protect themselves (cheers).

Mr. SHAW said he felt that the Club was greatly indebted to Mr. Hobbs for bringing this subject forward; for although it had been discussed for the last twenty years, and had been under the consideration of many parliamentary committees, that progress had not been made which they must all desire to see. The evils of the copyhold system were, he thought, pretty well understood; and the only reason why a remedy had not been provided was, he really believed, that there was a vast and inherent difficulty in dealing with the subject (Hear, hear). Those who had an interest in receiving fees might well be expected to oppose any alteration, but on the part of numbers there was a general and earnest desire that the mischiefs arising from copyholds might be remedied. The great difficulty was to lay down anything like a general rule with regard to copyhold estates. He would put it to his friend, Mr. Beadel, with all his knowledge of the subject, whether, if he was called upon to frame an act of Parliament which would apply to the whole country, and to the vast variety of tenures which prevailed, he would not feel some hesitation in undertaking the task (Hear, hear). The great reason why the copyhold system operated to the prejudice of agricultural improvements was this, that not only was there an absence, in a great degree, of that security which was essential to a successful course of improvements, but a man might be called upon every now and then to pay for effecting improvements. (Hear, hear.) That evil, however, was not confined to copyholds. Only the other day, while he was going over a large farm in Gloucestershire, the tenant told him that he unfortunately held under a Dean and Chapter, and that the tenure under which he held operated as a discouragement to improvement; inasmuch that when the lease was periodically renewed, the fine would be increased in proportion to the improvement, thereby making him pay upon the capital expended. It was true that the evils of copyhold were very great, but he believed that evils equally great were to be found under other kinds of tenure. In the case of church lands, of corporate lands, he would go further, and say, in the case of entailed estates (Hear, hear) the evil was almost as great as in that of copyhold (Hear, hear). It was not so arbitrary; but in other respects there was little difference. As they were told that the whip of free trade was to stimulate the tenant farmer, he hoped it would stimulate the parties who had a voice in this question, and that the object which their friend Mr. Hobbs had in view would speedily be attained.

Mr. TATTERSALL said there could be no doubt in the mind of any one at all conversant with the subject that the present state of the copyhold tenure produced most injurious effects, but the settlement of the question was not more difficult than that which had already been effected with respect to tithes. It was only necessary that the question should be discussed by bodies like that, and when every one saw the nuisance there could be no doubt that it would be removed. He was inclined to think that the most effectual weapon against such a system was ridicule; argument there could be none, and he hoped that some eminent literary man would take up the subject of copyhold tenure as Mr. Dickens had dealt with that of the Court of Chancery (Hear, hear). With regard to heriots, he might mention that at Epsom, only last year, Sir Gilbert Heathcote had two valuable race-horses seized under the present law; a compromise was proposed, and the matter eventually settled. He trusted that the present state of the law would not much longer remain a blot on the social system.

Mr. SIDNEY said the origin of copyhold tenure was not without interest, and might be traced back to times when, the land being of very little value, the owner was happy to let it in exchange for some such services as were still found in Germany and other parts of the continent. By degrees the

tenure, which was at first from year to year, became confirmed, and the payments were settled by law. In order to obtain an amelioration of the system, it was absolutely necessary that there should be discussion and union. It would not do for farmers to allege that they had no personal interest in the matter. In his opinion, agriculturists would obtain a settlement of the question, if they applied themselves to the work practically.

Mr. TRETHEWY thought it must be self-evident that any property under an uncertain tenure was cultivated to a great disadvantage. He was of the opinion of those who thought the subject a difficult one, and he was supported in that view by reference to the bill to which Mr. Hobbs had alluded. He was struck with the fact that there were no specific duties to be fulfilled by those who conducted the valuation. There was no system whatever. The valuers were simply to ascertain the interest of each party, and to make their award accordingly. The difficulty was greatly increased by the different classes of tenures. He did not, perhaps, take the same view of the subject of copyhold land which came under the description of fine certain, as some of those who had spoken. He was inclined to think that copyhold property, with fine certain, was about as good property as any that could be mentioned. It had been said the steward's charges were in some instances very excessive. The paper read by Mr. Grainger, in condemnation of the system, put those charges at something like four or six pounds. The charges would be the same, or very nearly the same, upon a large property as upon a small one; it would be much more expensive to resort to a lawyer. He was not disposed to think that copyhold property under fine certain was a very great evil; on the contrary, he thought it a desirable kind of property. Allusion had been made by Mr. Shaw to some church lands in Gloucestershire. He did not know the tenure of those lands, but some of the property was held on exceedingly favourable terms; and held under the description of copyhold. Now those gentlemen offered the advantages of a lease, to say the least; and he would put it to them, if a tenant occupying lands under a lease of that description was not in a better position than a man holding a lease of seven or fourteen years. There had been an act for some time to enable a person upon application to obtain enfranchisement.

A VOICE: If they could both agree.

Mr. TRETHEWY: Certainly; if they could both agree.

The CHAIRMAN said he had made twenty applications, and had invariably met with refusals.

Mr. TRETHEWY had known two or three lords of manors who had been willing to enfranchise, and the tenants, to a large extent, had not availed themselves of the opportunity.

Mr. B. WEBSTER said he would just mention one circumstance which appeared to him worthy of notice. When the enclosures of the New Forest lately came before the government there was found immense difficulty in regard to settling the different claims. This difficulty, contrary to all expectation, had been removed, and in a very easy and surprising manner, namely, by simply carrying the question to a county court. If that could be done so readily, he thought it inconsistent that when assembled together they should say this question presented insurmountable difficulties.

The CHAIRMAN said—As a practical man of business, he—like a great many more—had subjects of this nature often coming before him; and whether a property were leasehold, or whether it were held in reversion for life, or whatever might be its description, gentlemen could calculate to a very nice certainty, and find little difficulty in reducing them to any other description of property. Compensation was to be assessed and settled upon every description of property, and it had always been done in a very satisfactory manner. In an ordinary estate, held upon the ordinary system of copyhold, about five years' purchase compensated. A rate was afforded at what it was worth: if a live rate, at one sum; if a dead one, at another. There were many circumstances tending to the continuance of the copyhold system, but, in a period of civilization like the present, it could not be permitted. Copyhold enfranchisements would tend much to the benefit of all classes. Where a parish was copyhold and freehold, the latter was invariably taken for building purposes, whilst the copyhold remained unsold. Great injury arose to the tenants in the manor of the parish in which he lived, although it was held in what was called ancient domain. If a shovel of earth were removed from the waste land, the tenants of the manor were mulcted with very heavy fines. There was a species of marsh, of which he took a small portion, not half the size of that room, for which he was fined £25; rather than expose himself to the chances of a law-suit with a foe so formidable, he paid the money. He would put it to all present, whether if a new arrangement could be made upon such matters as these, it would not be better for all parties. The rights of the public were injured by the difficulty in solving the question; but the matter was before them, and Mr. Shaw had summed it up in a resolution, which would be placed before them.

Mr. HOBBS replied. He said he was quite sure they would hail the day when the bill now in contemplation should pass, as it undoubtedly would; because they all felt, and felt with him, that it would confer great benefits not only on tenants, but also on landlords, not only on themselves individually, but on the whole community (cheers). He had endeavoured to confine himself to a general outline of the evils of the system, and he was happy to find that the suggestions he had made had brought forward some very practical remarks. If he might be allowed to do so, he would read two letters which he had that day received, and which bore directly upon the subject. The first was from a very experienced friend of his, who has had a great deal to do with the management of copyhold property, in which he says—

"If the value of the lessee's interest in any copyhold property is valued and added to the value of the lessor's interest, the two valuations added together would not amount to the value of the property if taken as freehold; and no tenant would expend on leasehold property, or endeavour to improve it, as he would if the freehold belonged to him."

The second was from a solicitor of the highest respectability—

DEAR SIR,—The case of which we were yesterday speaking, in reference to the injustice and annoyance of copyhold tenure was this:—A man died, leaving a small estate, consisting of two small tenements and about *five* acres of land, to his wife for her life, and at her death to his nephew absolutely.

The estate is situate in a remote part of this county; the and is of fair average quality, and the whole of the property is freehold, except *one rood of the land*, and this small piece of copyhold cannot be identified by either lord, steward, owner, or any body else. The tenant for life died recently, and before she had been called upon to be admitted to this small piece of copyhold, and the nephew, succeeding to this among other property, was anxious to sell the estate to a near member of his family, and with the amount he realized under the will to emigrate to Australia. In this stage of matters, I was consulted on behalf of the brother, who was the prospective purchaser, and seeing the difficulty likely to arise from this small piece of copyhold, and that if the parties connected with the manor insisted on their rights, *two fines* and *two sets of fees*

could be demanded, I advised him to let me at once and fully explain the whole facts to the steward of the manor, and offer him the *entire* value (£10), of the rood of land, to perfect the title of my purchaser on the rolls of the manor.

Please bear in mind here that the *extreme* value of the land per acre, *as freehold*, would be £40. I doubt whether it would reach that sum.

Having obtained the authority of my client, I waited on the steward of the manor, and having explained the facts, he asked me—

	£	s.	d.
Two sets *of fees*, £7 7s. each.....	14	14	0
Two fines, 30s. each	3	0	0
	£17	14	0

I altogether refused these terms, and urged on him the *value* of the land as sufficient reason for such refusal. This was met by pointing me to the *difficulty* that might arise in my client's title *to the whole estate*, and the *obstruction* in the way of its conveyance at some future day, if the copyhold part were not taken up. Well knowing the force of this objection, I admitted it at once, but pleaded that such ground ought never to be taken in a case where the party was willing to give the lord and *steward* (for you see the *steward's* was the lion's share here) the *whole value of the copyhold*, and that it was indeed too bad to attempt to extort actually beyond that value by such means.

I *offered ten pounds*, but it was in vain. *Twelve guineas* was the lowest to which I could bring down their demand, and as this exceeded the value of the copyhold, I advised my client to take the conveyance of the freehold part of the estate only, which he has done, and must, therefore, run the risk of the seisure of the copyhold part—if the lord can find out which it is—and he is left in this happy position because he will not consent to pay for perfecting this copyhold title more than the whole copyhold is worth if the title were perfect!

Well may the country cry out for an alteration of the law. And depend on it there is nothing to be remedied that would afford more substantial relief to the agricultural interest, and to the country at large, than the sweeping away of copyhold tenure, unless, indeed, it be the destruction of that greater monster, the Court of Chancery.

He was happy to say he did not think there would be any difficulty in settling this question. The bill had passed the House of Commons with scarcely any difference of opinion. He believed there was a determination on the part of some of the law lords, with the assistance of the present Lord Chancellor, to investigate the subject very narrowly, and he hoped they would soon see the copyhold law blotted out from the statute book. He concluded by moving a resolution in the terms of the conclusion of the report of the committee, appended to his introductory speech.

Mr. SHAW thought it was not desirable for that club to adopt the resolution of any other body, however excellent it might be. He would propose the following as a substitute:—"That the effect of copyhold tenure is prejudicial to the cultivation of the soil generally, and it is highly desirable for the interests of the landlord, the tenant, and the public, that entire enfranchisement may be effected as speedily as possible." He left open the question of compulsion, because he did not very much approve of the word, and he thought it would not advance their object to insist upon the word being used.

Both the original resolution and the amendment having been seconded, after some conversation the former was carried by a majority of one, and a vote of thanks to Mr. Hobbs and to the Chairman respectively, terminated the proceedings.

THE CULTIVATION OF FLAX.

BY A PRACTICAL FARMER.

The cultivation of flax has within the past few years become a subject of great interest to British agriculturists. It has excited much attention in every part of the country as one of those crops likely to benefit the cultivator under the adverse system with which he has to contend in the cultivation of his ordinary corn crops. We highly commend our brother farmers on this point, and think they do well to keep on the watch; and we judge them to be in readiness to seize every favourable opportunity to secure a profitable crop of whatever kind. But, whilst we say this, we would also urge caution. It is very speculative to relinquish a common corn crop which is almost certain in its production, for one of which we know comparatively nothing, be its prospective advantages never so great. Times of great and long depression are sure to call forth speculations of this character: the result has been disastrous to thousands. It pains us to know that the cultivators of chicory, canary-seed, and turnip-seed, and like small seeds, have suffered most severely during this season, and that the cultivators of potatoes and flax have not as a class been remunerated. The price of the dried chicory-root has fallen from £27 10s. to £6 10s. per ton; canary-seed from about £5 10s. to £1 15s. per qr.; and turnip and other seeds, in all their varieties, in equal proportion. This is owing to speculative growth within a very short period. Potatoes and flax are of more general utility, and in consequent demand; but we fear the continued extension of their culture may ultimately prove very unprofitable. We entertain a high opinion of flax culture, and we believe that the efforts now making to bring into full development all its powers will end in its becoming one of the most general and most profitable of our cultivated crops. In accordance therefore with our original design, we, at this season (being the proper one for sowing) bring before our readers such information as we possess upon its culture and management as a crop; and in its preparation by the cultivator for the manufacturer.

We would first remind our readers that nearly all the raw material used in our linen manufacture is the produce of foreign countries, as is also the linseed crushed for its oil and oilcake. The Government returns show

that about £8,000,000 is annually paid to foreigners for flax, linseed, and oilcake, almost the whole of which is brought into home consumption; the exportation of linen and linen yarn being about two-thirds of the quantity produced, all the oilcake and oil being wholly consumed at home. Now, as we have a climate congenial to the growth of the flax crop, and a soil well-adapted to its culture, we think the employment of a large portion of our agricultural population in the cultivation and preparation of this crop for the manufacturer and the oil crusher, can be regarded in no other light than as a national blessing. The amount of expense incurred in manual labour alone, upon an acre of flax of average growth, taking it through all its stages, *i. e.*, sowing, weeding, pulling, watering, and grassing, lifting, and carting, and scutching will not fall far short of £6; the rent, rates, and seed to about £4 more. This appears a heavy outlay, but if such a large cost in labour can be abundantly repaid in the crop, no one will demur to it; besides, we have greater facilities for its culture than formerly, both in the diminution in the price of labour and the scientific appliances brought to bear upon it. In the latter, we have full confidence; we augur much from Mr. Dickson's machine, and other inventions and discoveries both in the preparation and manufacture of this valuable crop.

The produce of the flax crop in money value, if we are to credit the accounts given us by many respectable cultivators (and we see no reason to doubt their correctness), is very great. Many instances are given showing a nett profit varying from £12 to £30 per acre. We think the average yield of an acre of flax will be about 7 cwt., and the produce of seed about 20 bushels. This we think a rather low average. The price of good useful flax per ton is about 60s., and the seed about 6s. per bushel. At these prices the flax will be worth £21 per acre, and the seed £6; total, £27; thus leaving a nett profit of £17 per acre, taking the costs at £10 per acre, as stated. Now, it must be borne in mind that to produce this profit the cultivator must be provided with every convenience; otherwise he must sell his flax straw to the "retter," or waterer and scutcher; and herein lies the difficulty. We trust that in every district parties will be found to undertake these departments upon reasonable and equitable terms, and thus encourage the culture of this most valuable and much-required crop. Scutching mills are required in every district suited to flax culture, and will form a profitable business.

Soil, and its preparation for the seed.—The soils best adapted for the growth of flax are the strong alluvial loams, the light clayey loams, and the free and open loams of every kind; but it may be advantageously grown on all soils of open texture and of moderate fertility, under suitable preparation and rotation of cropping. The finest barley land is admirably adapted to its culture, but the strong and adhesive clays are unsuitable, as are also dry gravels, or lands liable to drought, or being "burnt up." The lighter marly soils, or those having a mixture of sand, appear to agree best with the habit of its growth, and to produce the finest texture in its fibre. The preparation of the land, and the course in the rotation best suited to the flax crop, will mainly depend upon the quality of the soil. On soils of inferior quality we would take the flax crop, first, in any stage of culture or rotation. On the thinner soils—immediately after grass; this to be broken up in the autumn or winter, to allow time for the decomposition of the grassy sods. On soils of stronger texture—after clover, seeds, turnips, or other green crops. And on all good soils—after a corn crop succeeding a green crop, fed off. Our object is to secure a good flax crop of such a kind as will yield a fibre of the finest texture and quality. For this purpose it must not be allowed to grow too coarse, nor must the crop be too luxuriant. The finest flax will make occasionally £160 per ton, the coarse not more than a third of that price. This is worthy of every consideration in its management, and the soil and mode of culture must be arranged in such manner as to produce, if possible, this satisfactory result. The usual ploughing having taken place, the only object is to produce a fine and highly-pulverized tilth of moderate depth (on thin soils the deeper the better); prior to sowing it should be rolled down with a common field roller; the seed should then be sown broadcast by a careful seedsman, so as to scatter it most evenly over the surface, and then to be well harrowed in to about one inch in depth, taking care to leave no clods. Drilling is not considered so good as broadcast, but we think a more equal distribution of the seed might be made with the drill, by taking out the coulters, and raising the spouts so as to allow a distribution under the frame-work, the wheels indicating the next line to be taken, or a marker might be attached to denote it.

Seed.—It is desirable, if not necessary, to give attention to the choice of seed. We know that in every other department of farm practice much depends upon the choice of seed. We also know that varieties do exist in the flax-plant. Von Thaër says, "There are two sorts of flax; one bearing seed-vessels which burst with a report, when, after ripening they are powerfully dried by the sun's rays; its thread is fine, short, and pliant: and another, which requires thrashing to separate the seed. In Germany the latter variety alone is cultivated, the former not being considered profitable." He also names perennial flax, which he kept "growing for six years in full vigour," and produces much longer and firmer stems; but its thread is coarse brown, and not easily separated, hence this species of flax has never continued long in favour with any one." We can merely suggest that care be taken to select the seed from a stock known to have produced a crop of requisite quality and fineness of growth.

The quantity per acre.—This will vary according to

the soil. If sown thin it will put forth branches at about one foot in height of its growth; this will cause it to produce more seed, but very seriously detract from its value as a flax crop. Every seed ought to have but one plant or stem, and that to grow perpendicularly, so as to produce the greatest quantity of fine long fibre; if heavy or laid it will be coarse and strong. About two-and-a-half bushels is generally thought sufficient. This again must depend upon the peculiar state of the soil at the period of sowing; if in beautiful order we think it would suffice, if otherwise add a corresponding quantity. It should be sufficiently thick to prevent branching—sufficiently thin to prevent its becoming laid, or even if possible bending downward to any extent. We hope the judgment of our readers will achieve the happy medium. The proper time for sowing is about the middle of April, or it may be done from March to middle of May.

Subsequent management and preparation.—There is no crop which will better repay the most careful attention of the cultivator, and few that in reality require such constant and undeviating care. The Flemish farmers are admirable patterns in this respect; their skilful attention to the management of this most valuable plant is beyond all praise; and the price they realise in the market is far beyond that attained by others; indeed, we depend upon them for the fine sorts of flax; and it is their management alone that produces it so fine in quality, their soil and climate being in no peculiar way adapted to its culture. The crop requires the most careful hand-weeding and cleanly culture, and on the first weeding it may be very advantageously sown with clover or grass-seeds, which are seldom known to fail under this course, and is but little injured by the pulling, which will now shortly take place. This season must be carefully attended to, as the quality of the flax very much depends upon the time of pulling. The difficulty is to decide upon the relative state of the seed-balls and the flax-stalks. If it is pulled *too early*, much seed is consequently lost; but if delayed for only a short time *too long*, the quality of the fibre is greatly deteriorated. The seed must give way to the fibre. Perhaps the best way is to let the flax be fully out of flower, the seed-balls well formed or set, and seed turning brown, and the flax-stalks yellow beneath, though green at top; it is thus in a good stage for pulling, and, as we think, with the greatest profit to the grower. The process of pulling should now be carried on as rapidly as circumstances will admit, and is done by the puller taking hold of a moderate quantity, near the top, as it stands, and carefully drawing it up so as to keep the root ends even; it is then tied by a few straws of flax into convenient sheaves or bundles, and set upright in the field like corn. If tied securely, and the root ends kept even, it is in a proper state for the next process, which is that of rippling, and also for subsequent scutching—though most probably the rippling process will require it to be untied. This had better be avoided if practicable.

The Rippling should always take place in a barn or shed, as the bolls should be kept dry, and on being taken off should be carried to a loft or granary, and spread thinly out; the green or unripe bolls will thus have an opportunity of further ripening their seeds without fermentation. The rippling is thus performed: The machine contains a row of upright teeth so adjusted as to take off the seed, leaving the fibre uninjured. The rippler takes a handful; he spreads the top out like a fan, and gently throws it over the teeth, at the same time drawing it through. The seed-balls being thus separated from the straw, it is re-adjusted for the next process, which is that of *steeping*, and the seed-bolls are taken to the loft, to be there winnowed or partially cleaned, to promote their drying more readily and equally, and thus prevent the necessity of kiln-drying. The slower it is in drying without injury, the better, as the seed will imbibe more juices from the husk. The Flax Improvement Society of Ireland say, that the rippling should take place in the field simultaneously with the pulling, and "that the flax ought not to be allowed to stand in the field, if possible, even the second day: it should be rippled as soon as pulled, and carried to the water as soon as possible that it may not harden. The next process is that of watering or retting. This process requires great care. Clear river-water should be used—spring water will not do so well, if at all. Pools should be made of convenient size and shape—the oblong shape is best. The flax is so placed that the root-ends should be lowest, and all in regular layers—the whole covered and pressed so as to be kept under water, and as the fermentation proceeds additional weights may be required, just to keep all down till it ceases; it should not sink to the bottom, and is best kept from light and air. A favourite plan in Flanders is to set the sheaves or bundles upright in the water, so particular are they to preserve purity; and they take every precaution to arrange their tanks in such a manner that no earth can be worked into them by rain; nor do they think it quite right to use the same tank twice in the season, their aim being to give a beautiful colour to their flax, and they are well paid for their attention. The common or ordinary mode of steeping or watering flax is, to place it at once upon pulling and rippling in a neighbouring ditch, and cover it with grass sods; and much as we prefer the best practice in all cases, yet we do not hesitate to recommend the adoption of this ordinary mode, if no better is at hand, or readily attained. In about ten days, or from eight to fourteen days, it will be sufficiently steeped, according to the state of the weather and water. This requires great attention, as a few hours makes a great difference, and the change is frequently very rapid; it must be often examined,

and so soon as the woody part will freely pull from the fibre without injury it is considered to be sufficiently "rotted," and must not remain in steep any longer, or it will speedily pass into decomposition. The lifting from the pools or steeping-places must be done as quickly as possible, and should be done by hand, and not with fork. The sheaves or bundles, when taken out of the water, should be set up to dry in convenient rows or stooks, or, if the weather is fine and settled, may be untied and spread on grass lands to dry, being occasionally turned with a long rod or fork-shaft. When well dried it is again very carefully tied up and brought into the barn, or otherwise secured for future operation. It should never be kiln-dried—it destroys the rich oily property of the flax. There will be no injury from repeated turnings, if properly performed. The last operation, to prepare it for the manufacturer, is that of scutching or breaking—and as this, in fact, is a part of its manufacture, we recommend every grower to take his produce to the nearest scutching-mill, where he will get it better prepared for sale, and at less cost than in all probability he can possibly do on his own premises.

We fear we have too much condensed our observations upon this subject; but we hope the outlines of culture and management we have given will be of service to many of our readers in preventing needless outlay, and in leading them to make further and more minute enquiries. More information will thus be gained than can be given in an ordinary paper of this kind. We commend to their reading the Report of the Committee of the Royal Society for the Promotion and Improvement of the growth of Flax in Ireland, and the articles in *Morton's Cyclopædia of Agriculture*, entitled, "Flax Culture," and "The Agriculture of Flanders."

ON THE BENEFICIAL INVESTMENT OF CAPITAL.

England is now entering on one of its periodical fits of moneyed plethora. Consols are touching par, and the Bank has reduced the rate of discount to two per cent. Perhaps, before long, the Three per Cents. will be "paid off." In plain English, some 10s. per cent. will be deducted from the dividends. Capitalists are anxiously looking about for new channels of investment, and the projectors of schemes are preparing bait for that king of the gudgeons, honest John Bull. Railways will take no longer. The country is so closely reticulated with them, that there is scarcely room for more; and were it otherwise, speculators have been pricked with the hook too recently and too severely, to rise at that fly again, for the present.

Where shall a portly, respectable, middle-aged gentleman, who has more money than he knows what to do with—and yet wishes to make more—find a safe and profitable investment? *Shares* in established, dividend-paying railways are recovering from that portion of the late depression which arose from panic consequent on the bursting of the bubble. We know those who bought then, and have sold now at a handsome profit, who regret that they have sold, for they are still rising. The rise, however, will soon attain the limits of safety. Railway *debentures* are now put, in many trust-deeds, in the same category with consols and mortgages. They were yielding a snug five per cent., but the companies are availing themselves of the present abundance of money to reduce it to three-and-a-half per cent. Which way shall our moneyed friend turn? Shall he dabble a little in mines? Mining has some rich prizes and many blanks; and if a general debtor and creditor account were opened, to mining operations in the aggregate, the profit would be found to be a minus quantity. If, moreover, the history of some of these tempting "wheals," whose prospectuses are now before us, could be traced for the last half century, it would be found to be this:—They have come out periodically, like the swallows, in the sunshine of abundance of money; they have always come out with the most brilliant prospects—an extensive and valuable set secured, lode cut, rich stones broken—nothing wanting but more powerful engines and additional capital, to realize magnificent profits. Like the swallows they depart when winter makes his appearance in the form of tightness in the money market, or a panic. They depart without having made a dividend, reserving all their brilliant prospects for more prosperous times.

But gold mines. Surely they must pay! Here is a new field for enterprise! Not less than thirty gold companies for Australia and California; some to work the wet diggings; some to bring water to the dry diggings; some to wash gold; some to amalgamate gold; some to buy gold; some to work the quartz veins; some to purchase the auriferous quartz of those who work it, but cannot make a profit of it themselves; some to stamp it, and separate the gold on the spot; some to bring it to this country to be separated where labour is cheaper. There was a farrier, or horse leach—it was before the days of veterinary surgery—who concocted his favourite drench, which was a cure, according to his own statement, for every malady which horse-flesh and cow-flesh is heir to, by putting into it all the "jimcracks as ever he could think of," on the principle that "*some* of them must do good." So amidst all this variety of projects for rendering gold a still greater drug than it is, some of them, it is argued, must pay. But when you inform your broker that you wish to invest, and ask his advice which to select amidst this perplexing variety, he shakes his

head; and when a broker shakes his head at shares, we may be certain that, as in the celebrated case of Lord Burleigh, there is something in it. So perhaps, after all, we may buy gold too dear. Foreign loans are invariably in the market when it is difficult to make good interest at home. At the present time there are many of the monarchies and republics of the world whose finances are in that state in which the loan of a few millions would be very acceptable. But with Spanish, Pennsylvanian, and other non-dividend paying bonds in their desks, and with continental Europe in its present unsettled state, capitalists, we should think, will look twice before they take a slice of a foreign loan. There remain only those joint-stock companies which are formed for commercial or manufacturing objects. They are generally in disfavour, though there are some objects to which we think that they might be legitimately and safely applied. Where then shall poor persecuted capital find a resting place for the sole of her foot? We do not hesitate to reply in the purchase and improved ment of land. While the purchase of land pays but 3½ per cent., the purchase and improvement of unimproved land, if the land be judiciously selected, and the improvements properly conducted, pays more than 5 per cent. There is a host of evidence to this effect.

Our present Premier declared, at the meeting of the Royal Agricultural Society, at Liverpool, in 1841, that there is no bank in the whole country—no investment so safe or so profitable, as that in which even borrowed money may be invested underground in our own soil. He has repeated similar opinions since at other agricultural meetings. A large farmer in Berwickshire remarked to Professor Johnston—"I drain a certain number of acres every year, and I find myself always repaid at the end of the third year. If I have spare capital, therefore, to go on for three years, I can gradually drain any quantity of land by the repeated use of the same money." Mr. Pusey, than whom there is no higher authority in practical and scientific agriculture, published, about a year ago, a pamphlet with the title of "What ought Farmers and Landlords to do?" It might also have been entitled "What ought Capitalists to do?" "Nothing struck me so much," he says, "as the varied means possessed by the owners of land in England for raising the productiveness of their estates. In no country are those means so various. Scotland and Flanders are monotonous in contrast with England. In none has so much been effected; and, after ten years' labour, the same thing still strikes me as forcibly. I know no other safe investment in which moderate expense produces so large a result of profit as many of those permanent improvements of land."

The improvements which Mr. Pusey recommends to his brother-landlords as so profitable are the following: Draining, the removal of useless fences, the diminution of four-footed game, the application of burnt clay to stiff land, that of marl or clay to light land; boning of pastures, chalking, irrigation, the breaking up of grass land, the improvement of farm-buildings, warping, and the management of manure. The expense of draining, which will add from one sack to one quarter per acre to the produce of much of our wheat land, Mr. Pusey does not estimate at more than £3 the acre. We give the preference to an outlay of £5 or £6, having no great faith in the permanency of very cheap draining. At present prices, this outlay will add from 20s. to 40s. to the annual returns, with no additional expenses than the mere trifle for harvesting, thrashing, and marketing the additional produce. The removal of useless fences, he proves to be equal, in many districts, to an addition of 10 per cent. to the area of the farm, and he urges the removal of hedgerow timber, even at the present low price of timber, as affording the sinews of war for carrying on other improvements. The diminution of four-footed game he very properly designates as perfectly costless; and with regard to its money value to the tenant he considers it equivalent to more than 5s. an acre, or 25 per cent. on land rented at 20s. the acre.

Burnt clay is shown, on the authority of Mr. Baker, of Writtle, and by numerous other witnesses, to cost, on the strong lands of Essex, about 40s. the acre; and to improve the first grain crop 20 to 25 per cent. In Bedfordshire it increased the produce by ten bushels the acre, or in money, at the present price of wheat, £2 10s. But the most successful instance was in Worcestershire, where the cost of burning was 42s. an acre, and the produce—first, a crop of vetches, fed off; and then, 45 bushels per acre of wheat. This, at 7s. 5d. the bushel, for which it was then sold, amounted to more than the fee-simple of the land on which the improvement was effected, and which had previously been valued at 7s. 6d. the acre. With wheat at 40s., this crop was equal in value to 30 years' purchase of the land. We must pass by the wonders wrought by Mr. Blake, in Somersetshire, by draining and liming, and hasten to the boning of pasture land in Cheshire, "by which many a poor and honest, but half-broken, farmer has been raised from poverty, and many a sinking family saved from ruin:" the cost, £7 to £8 the acre; the profit, "at least 300 per cent., enabling three cows to be kept where one fed before, and making land cheaper at 30s. than at 10s. in its native state." Chalking costs less than £3 the acre, adds greatly to the quantity and quality of the produce, is practised extensively in Dorsetshire, Hampshire, and on the Lincolnshire Wolds, but not on those of Yorkshire or on the South Downs, where Mr. Pusey thinks that it is much needed. We may add, that the claying and marling of Norfolk, which, in conjunction with high-farming, has raised its poor soils from a rye-growing to a wheat-growing district, and increased their rental tenfold under equal conditions as regards the price of produce, is in many cases nothing more than chalking, either with chalk from the solid rock, under the name of marl, or with transported and fragmentary chalk from the super-

ficial deposits, under the name sometimes of marl, sometimes of clay. Permission to break up poor pasture is regarded, Mr. Pusey says, by occupiers as a boon even with the present prices of grain; and, under proper after-management, he thinks it a boon which may be safely conceded. Warping, though an admirable process, is only practised with much success on two rivers—the Ouse and the Trent; but the formation of catch-water meadows is of more general application. It costs £3 an acre, and the profit attending the outlay varies from thirty to fifty per cent. The farm-buildings are in many counties grossly deficient, and to build them anew is beyond the means of most landlords. Here then is a chance for men who have capital to invest. Let them sell out of the funds, and purchase, under good advice, land capable of improvement wherever they can find it. Such land is letting now at 8s. to 12s. the acre, and in many cases at lower rents. It requires an outlay in draining, chalking, marling, or claying, and improved buildings, of about ten pounds the acre. To a tenant possessing skill and capital to give effect, by good cultivation, to these permanent improvements, it may be made worth from 20s. to 25s. an acre at once. This is one mode in which the present glut of capital may be turned away from bubble schemes into agricultural channels with equal advantage to the moneyed and agricultural classes. There are others to be considered hereafter. T.

BEET-ROOT SUGAR.

Root, fibrous, and oleaginous crops form a succession in the open country, where the immediate vicinity of markets is not an element in the calculation. Amongst these, in connection with wheat, the farmer can choose where the demand is insured. In order, however, to have a sure basis before he changes his system of crops, the farmer requires to have all doubts removed as to the certainty of the demand for the more expensive products. Of late years the value of the fibrous crops has become better appreciated than it formerly was. The consumption of linen has very much increased: both as an article of luxury and of common use flaxen textures have multiplied, and yet there is room for further supplies. Our foreign importations increase from year to year. They were for flax—

1841.....	66,910 tons.
1845.....	70,916 „
1849.....	90,333 „
1850.....	91,145 „

If the average value be taken at but £40 per ton, there is an opening for the home farmer to the extent of £3,600,000 in this article alone, which, at the rate of half a ton per acre, would occupy nearly 200,000 acres at a most remunerating price.

No crop is, however, so dependent on the nature of the rotations in which it is grown as flax; and where it becomes, as in Belgium and Holland, the dominant crop of the system, it restricts seriously the choice of crops. It so happens that no crop is a better preparation for flax than beet-root, since it leaves no stubble behind it, the imperfect decay of which is injurious to the flax.

Respecting the cost of growing flax, and the average yield, much valuable information is annually circulated by the Royal Society for promoting the Growth of Flax in Ireland. It would appear to be the custom in Ireland to grow flax on the wheat or other corn stubble, without manuring afresh. Under such circumstances, the yield will not prove very heavy. The following results of actual cultivation give only 960lbs to the Irish acre; consequently much below half a ton. After a late, wet crop, with the precautions usual in flax-growing countries, half a ton per acre is not a heavy crop.

AFTER POTATOES IN 1849, FOLLOWED BY WHEAT IN 1850.

Ploughed in Autumn.	Ploughed in Spring.	Stones of 16lbs. per Irish Acre.	Price.	Total Amount.
			s. d.	£ s. d.
Once.	Once.	70	7 6	26 5 0
Once.	Once.	50	6 6	16 5 0
	Twice	73½	7 0	25 14 6
	Once.	70	7 0	24 10 0
Once.	Once.	54½	8 3	22 9 7½
Once.	Once.	53	8 0	21 4 0
Once.	Once.	66½	6 9	22 8 10½
Once.	Once.	49	6 6	15 18 6
	Once.	52½	7 9	20 6 10½
				195 2 4½

Average, nearly 60 stones to the acre.

The cost per acre is shown by the following statement, drawn from the same valuable publication.

"In spring, 1851, having well pulverized and cleaned the land, I proceeded, in the month of April, to sow it with one barrel (of 3½ bushels) of Riga seed to the acre, according to the instructions of the Royal Flax Society; and the harvesting of the crop was performed under the directions of a practical instructor from the north, sent down especially for this district. Its intermediate culture only consisted in carefully weeding it, which was rather a tedious operation; and, in August, it was pulled and stacked on the Courtrai system: part I sold in the unthrashed straw, seed and all; and from part I took the seed, with flat mallets made for the purpose, and disposed of the seed to the Messrs. Drummond, seedsmen, Dublin. The straw was sold to Mr. Carleton, of Waterford, to whose fair dealing and prompt payment I bear a willing testimony. I subjoin an account of the expenditure and receipts;—

To ploughing and harrowing an Irish acre twice ..	£1	0	0
Picking, 4 girls, at 5d.	0	1	8
Rolling before and after sowing, and harrowing after	0	4	0
Cost of one brl. of seed	2	8	0
Sowing, ¾ of a day	0	0	7
Weeding, per acre	0	5	0
Pulling, binding, and stacking ditto	0	10	8
Housing ditto	0	1	7
Rent, poor rate, and county cess	2	5	0
	£6	16	6

Which, for 5A. 3R. (omitting odd perches), is ..	£35	16	7½
Thrashing, rebinding, winnowing, and sifting seed	2	1	0
Cost of delivering straw in Waterford	3	11	8
Cost of carriage of seed by rail to Dublin, and cartage	1	15	4
Total expenditure on 5A. 3R.	£43	4	7½
RECEIPTS.			
By 8 ton 7 cwt. 14lbs. of unthrashed straw, at £4 per ton	£33	8	6
By 8 ton 12 cwt. of thrashed straw, at £2 10s. per ton	21	12	6
By 81½ bushels of seed, at 7s. 6d. per bushel ..	30	11	3
	£85	12	3
Deduct expenditure	43	4	7½
Balance to profit on 5A. 3R.	£42	7	7½
Or nett profit, per acre, of	7	7	4

"In contrasting this profit with that of any corn crop, it must be borne in mind that it was grown on a wheaten stubble; and I would ask, what second crop, at present prices, would bring out so good result, after all expenses?"

Into the cost of growing wheat it is here needless to enter: the subject has been exhausted for every situation and for every soil. An average crop of 40 bushels will be considered by all farmers a good return even in favoured localities, and as prices now do not exceed 5s. per bushel, the maximum return for wheat at the nearest market is £10 per acre, the straw of course going into the stable and cattle yard. But it is well known that more than half the kingdom is below this estimate as to the yield.

Wheat is upon this calculation less remunerating on the average than flax. But there is a crop, beet, which surpasses both in the quantity as well as in the profit it returns, and which is adapted to alternate with the other two in a manner which causes each of the three to promote the success of the others.

The place in the rotations of crops which is commonly ascribed to beet, is after the grain crops. Mangold-wurtzel was originally grown as a supplementary crop on the fallow, and its surprising yield first attracted notice in that capacity. With the increased demand for meat and dairy produce, consequent on the growth of population, the beet has ceased to be a leading crop in the vicinity of large towns. Yet from the various causes that have been mentioned, meat is so low in price as to cause an apprehension with regard to the value of this crop.

The cost of growing beet has been estimated as amounting to £6 2s. 2d. per acre, without rent.

MANGOLD WURZEL CROP ON A WHEAT STUBBLE.

Rent	£2	0	0
Tythe, poor rate, &c.	0	10	0
30 27-bushel carts of manure—carted, filled, and spread	1	0	0
One 12-inch digging, at 2d. per rod	1	6	8
Or, one trench ploughing with two ploughs, 14s.			
Two scarifyings in spring	0	4	0
Two harrowings and rollings	0	3	6
3 cwt. superphosphate of lime	1	4	0
Seed and drilling	0	3	3
Three deep horse hocings, with Garrett's horse hoe	0	3	0
Two hand hoeings, singling, &c., at 3s. 6d.	0	7	0
Pulling, topping, filling into carts, stacking, thatching, and earthing 30 tons (by contract)	0	9	0
Carting	0	12	0
	£8	2	2

The return for this outlay is stated to be 30 tons per acre, valued at 9s. 6d. per ton, and leaves a loss at that price which has to be charged against manure.

It is therefore clear that if the manure could be produced without stock, and 9s. per ton secured for the beet root, a profit instead of a loss would accrue, amounting to the saving effected in diminished capital invested, risk of life and of markets, cattle sheds, attendance, &c.

This profit the manufacture of sugar promises to ensure to the farmer in the following manner:—According to the most improved method of heating the beet for the manufacture of sugar, the process of extracting the saccharine matter can be spread over the whole year, whereas it was formerly compressed (like the cane sugar) into some months following the harvest. The benefit which the manufacturer derives from the change, is in his requiring less plant than formerly. In this improvement the producer participates, for every facility renders the market more accessible than before.

The seed has hitherto been drawn from Silesia for the production of the white or sugar beet; a flattering testimonial to the farmers of that country, who first devoted themselves to the perfecting of what has proved so profitable a product. The seed is either sown broadcast, in drills, or in beds for transplanting; the last method being most in use in severe climates, where the spring is retarded by heavy snows. But the most important portion of the farming process consists in the fact, that the factory returns nine-tenths of the weight raised to the soil in refuse, which consists almost entirely of fibrine and albumen. The scientific farmer will not be long in divining that a rotation of crops which allows of the return of these elements to the soil, is one which protects him against exhaustion, and which ensures his power of raising his soil to the highest capabilities.

The sugar beet neither attains the size nor is so hardy as the mangold-wurtzel; it may therefore be safer to calculate on 20 tons to the acre than on 30 tons, which is the yield of the mangold-wurtzel on the best farms. We are thus brought to the following calculation:—

20 tons of sugar beet, at 13s. 4d. per ton	£13	6	8
Cost of production as above, less £2 4s. for manure	3	18	2
	£9	8	8

The ground which needs no manure but the refuse from the factory for the beet, ought to be manured for flax with turf ashes if possible, and should of course be manured for the wheat. With liquid manure turnips can, as usual, be taken off as stubble crop, and the chances being that on well formed grounds the produce of beet will average more than 20 tons, there is little boasting in assuming the sugar beet to be a crop yielding £10 per acre. But now comes the serious part of the question. How is this market to be secured to the grower—a market which makes him master of his rotation, empowering him to select the choice of crops?

The former calculations have shown that our continental neighbours have had the start of us in this interesting field. The manufacture as well as the cultivation of the root comes (as the name of the root, *mangel*

wurzel, or root of scarcity, indicates) from Germany. The name should denote that the root prevents scarcity *(lucus a non lucendo)*, and it is amusing that the French farmer terms it "Disette," or "famine," meaning of course thereby, that it puts an actual famine out of the question.

We are happy to state that the manufacture has at length followed the plant which, we believe, was first introduced by the celebrated Count Rumford.

A German gentleman, the head of an establishment which last year produced three thousand tons of sugar of remarkable quality, has patented the improved process by which this great return has been obtained, and is now in treaty with a company to carry out the manufacture on a very extensive scale in England and in Ireland. The undertaking is no longer a speculation, for it is proposed to erect a *fac-simile* of the successful German factory, and to work it precisely in the same manner. A capital of £60,000 is considered sufficient to produce 3,000 tons per annum. Hence, if £50,000 be invested in buildings, machinery, &c., the actual cost of manufacturing becomes a small item, probably not exceeding £6 10s. per ton. The duty will make this £16 10s., but as the quality now made is equal to white Havannah, for which £36 10s. is the market price, a remainder of £20 is left to purchase the beet and pay a dividend.

If the quality of saccharine matter extracted and crystallized did not exceed 5 per cent., or 1-20th of the weight of the root, the price of 13s. 4d. per ton would be equivalent to £13 6s. 8d. per ton of sugar stuff. The manufacturer's profit would, in that case, be £6 13s. 4d. per ton; but the improved processes for extraction bring out more than 8 per cent.; hence the manufacturer, after paying a good price for the root, and returning the refuse to the soil, may look forward to a profit of nearly £10 per ton of sugar. The remuneration is sufficiently high to ensure the success of the project with the English public, especially as we are told that it will appear under the auspices of influential parties.

PERIODICAL RAVAGES OF INSECTS ON GROWING CROPS.

It is one of the utterly inexplicable circumstances which often so puzzle those who have to do with *life*, that, without apparent cause or warning, in some years, the turnip, the wheat, the hop, or the bean crop becomes the victim of some devastating insect. The gardener finds the same difficulty. His most flourishing plants in a few days wither and die: the root, the stem, the leaf, or the flower suffers, he knows not why nor wherefore, beyond that some insect has, for some reason or another, commenced an attack.

And what is more remarkable, it is an insect peculiar to the plant he cultivates. To all others in his greenhouse it is perfectly innocuous. He is perfectly startled to see his gooseberry-bushes stripped of their foliage in a few days, and his promising crop annihilated, while not one of these caterpillars will injure a flourishing currant-bush, surrounded by destruction. How comes this visitation? how this fine, minute, and sensitive discrimination? A florist imports an African or West Indian plant. He places it in his greenhouse. It is fine and healthy; but one day he discerns on it an *aphis* never before seen in England. How did it come? Or a hop-planter sees his hop-bines grow with unusual promise and vigour: in a night, they are covered with the terrific smother-fly.

The past season has been one of east winds; and we have been told more than once that we might expect to see a vast quantity of insects—"the east wind always does bring them." This idea may easily have originated from the once miraculous visitation of locusts being so induced: "And the Lord brought an east wind upon the land all that day and all that night; and when it was morning, the east wind brought the locusts" (Ex. x. 13). Could an east wind bring the West Indian aphis? Impossible. Lost as many theorists are in these difficulties, they found it easier to invent a theory—to weave a frail spider's web—than investigate nature; and here they set up a convenient system of equivalent generation, as if life could clothe inanimate matter spontaneously, to serve a purpose, by some accidental or ordained law! And yet, where would that man be consigned who would even urge that a cow or a sheep, a horse or a pig, had sprung up spontaneously, because there was too much grass. They would startle at one animal growing up without a parent, but would not scruple to assert it of a myriad!

But the Jamaica aphis, the hop smother-fly, and the black caterpillar are due to no such causes. They all had parents. In some years, their progeny might find a congenial season; and in that or the next, they might be found abounding in countless and irresistible numbers, spreading dismay and devastation over thousands of broad acres, and setting at defiance the best efforts of man.

We know not whether the *east* winds of 1852 may or may not be followed by any special insect visitation; but we are certain of this—that the bean-plant is now suffering from the ravages of the bean-weevil in a very serious degree. We have entered few fields where they are altogether absent. The insect is the *curculio crinata*, or bean-weevil;

and though the havoc it commits is very easily visible in the shattered and perforated boles of the bean-plant, when—say some two to four inches above ground, the insect itself is very difficult to detect; for, though it contrasts sufficiently with the green verdure of the beans, it shrinks and drops rather than jumps to the ground, and upon the grey soil it is almost impossible to discern it, for it lies completely still. Hence in the mornings and evenings, just at sun-rise and before its mid-day activity is attained, or on a cold and cloudy day, when it is sluggish, it may be detected on the leaf; but in bright sunshine it is almost impossible to find one visible in a field ever so infested. If, however, the observer will stand perfectly still, they recover in a few moments, and make for the plants. On them they can be readily seen, and when they leave, as they will do on the least movement, the eye may follow their stealthy concealment, and thus they may be detected.

Now, though entomologists seem utterly puzzled to attempt any cure, or, at any rate, any means of arresting the ravages of the insect, we do not think the farmer need utterly despair. In 1830 they committed sad ravages on the beans, in 1844 they did the same, and in 1852 they seem to be again at work with very determined vigour. They seem, therefore, to have something like a range of ten or eleven years, on an average.

Though the insect itself is uninjured by almost any application—their hard boring cases being a very important defence—they are often starved by a very efficient dusting of the plants with lime, especially when the sun is on the plants, so as to make it adhere. It has two good effects: it condenses the wounds of the plant, and so prevents its utter destruction from the loss of its juice; and it also renders the plant so unpalatable as to induce the insects to seek at once a place suitable for depositing their eggs, and dying. We have always found it to be a rule, that when an insect's food was withdrawn, its remaining stages of existence were invariably hastened; and if this is the case with the bean-weevil, as is very probable, a dusting of lime may very easily save a crop, as we believe it has frequently done.

But we are not without evidence of means of prevention. The insect always eats the bean plant when the latter is young. Like the turnip flea-beetle, which only attacks the cotelydon leaves, or the aphis, which sucks only the juice of the tender and recent shoots, the bean-weevil will only injure the beans when they are so small as we have described. Hence their ravages commence with the month of March, and usually end with that of April. Beyond that time they usually do little damage, if they are at all visible; and here the great resource of the farmer is *winter beans*. We lately went over the farm of Mr. Smith, of Humburton, and while his spring beans were suffering most fearfully from the weevils, his winter beans were entirely unhurt. They were too old for the weevils at the time they were afloat, and in the autumn the weevils were not there to injure them. Now, considering that the winter bean is also generally free from the bean-aphis or "dolphin," it is very desirable to cultivate that plant.

Nor let it be forgotten to sow it in ridges. They deepen the soil for the bean or deep-feeder; they facilitate the horse-hoe, and so make a sort of fallow. They should be sown twenty-five to twenty-seven inches apart, and the constant operations of horse-hoeing would generally stave off the attacks of any insects, as not only would some be buried, but the rest would be so disturbed and annoyed as probably one way or other to promote their flight or destruction.—Gardeners' and Farmers' Journal.

VEGETATION IN THE ARCTIC REGION.—"It was in a patch of burnt woods in this vicinity that, in the year 1820, I discovered the beautiful Eutoca Franklinii, now so common an ornament of our gardens." On the 6th of July, at the Pine Portage on Clear Water River, they found "Lonicera parviflora showing a profusion of rich yellow, tinged with red, and fragrant flowers, and gathered ripe Strawberries for the first time in the season." "At Fort Simpson," Sir J. Richardson says, "Barley is usually sown from the 20th to the 25th of May, and is expected to be ripe on the 20th of August, after an interval of 92 days. In some seasons it has ripened on the 15th. Oats, which take longer time, do not thrive quite so well; and Wheat does not come to maturity. Potatoes yield well, and no disease has as yet affected them, though the early frost sometimes hurt the crop. Barley, in favourable seasons, gives a good return at Fort Norman, further down the river; and Potatoes and various garden vegetables are also raised there. The 65th parallel of latitude may, therefore, be considered as the northern limit of corn-crops in this meridian. Wheat does not reach beyond the 60th." It is curious to find that in October, 1836, a pit sunk in a heavy mixture of sand and clay, to the depth of 16ft. 10in., revealed 10ft. 7in. of thawed soil on the surface, and 6ft. 3in. of a permanently frozen layer, beneath which the ground was not frozen. At length, at Fort Good Hope, on the Mackenzie River, Sir John Richardson reached, in parallel about 67 deg., the latitude in which even the hardiest garden vegetables could not be productive. "A few turnips, radishes, and some other culinary vegetables, grow in a warm corner, under the stockades; but no corn is cultivated there, nor do potatoes repay the labour of planting." Some of our garden inhabitants, however, struggle on as far as latitude 68 deg. 37 min.; for there, in the valley of the Mackenzie River, Sir J. Richardson found the Red Currant, Rosa blanda, Kalmia glauca, Nardosmia palmata, and Lupinus perennis.—*Compiled from Sir J. Richardson's Arctic Searching Expedition.*

CULTIVATION OF TURNIPS.

We last month alluded to the quantities and weights of turnips per acre, and showed what a vast mass of misconception existed as to the bulk per acre of a crop of turnips, because it was a crop less usually tested by the scale than one of wheat, of oats, or of barley; in which cases, the result was generally accurately ascertained. But how very much further will the *quality* of a turnip crop be influenced than its quantity, and at what a distance is the majority of farmers from even approximating towards this fact! They have neither the power nor the opportunity. They see a crop of turnips or corn: it is good, or bad, or middling. If the latter, it will be so many bushels per acre; but, how much food-producing or fat-producing matter it has, is a matter of utter conjecture. An acre of turnips of the same size and weight goes generally for an acre, and is so reckoned by farmers and valuers; but experience has long ago taught us that there is all the difference in the world between one crop and another as regards the production of absolute food in the animals fed upon them. We happen to have two classes of land: one worth 40s. per acre, and another worth 20s.—the one a fine siliceous soil on a gravelly subsoil; the other, a blowing sand on a grey or yellow sand subsoil. And we find that sheep fattened on the one class of soils—of the same calibre and character—always exceed those in weight fed on the other. The turnips are better. Now, the difference between rich and poor soils is simply this: the former contain more in number or greater in quantity of the elements necessary to grow crops, either by existing more abundantly in the soil itself, or in the soil being deeper, and hence having a larger supply *per acre* for the use of the plant.

Hence manures also may affect the proportions of certain elements in which the real agricultural value of a plant consists. Thus, Boussingault found a great difference in the different kinds of manure on wheat grown at Hermstadt.

Unmanured soil produced wheat containing....	9	per cent. of gluten.
Manured with cows' dung..	12	,,
,, sheep's do. ..	23	nearly.
,, bullocks' blood	35	,,
,, urine.....	36	,,

Mr. Lawes' more recent experiments on beans gave a similar result; not, indeed, between any kind of manure as compared with no manure at all, but mineral as compared with ammoniacal. The per-centage of nitrogen in the dry matter of beans was thus found:—

Beans grown by mineral manure..	4·77 per cent.
,, ammoniacal do ..	5·11 ,,

His researches on turnips subsequently made are more in point, and on these he says—

"The per-centage of nitrogen in the dry substance of the produced bulb by mineral manures alone is 1·52; by the addition of rape-cake, which contains, besides a large amount of carbon, a considerable quantity of nitrogen, we have 1·91 per cent.; by ammoniacal salts, supplying abundance of nitrogen but no carbon, 2·86 per cent., and when to this exclusive nitrogenous supply rape-cake is superadded, we have 2·33 per cent."

This was about the amount of our knowledge as to actual experiment. Professor Johnston, indeed, had showed that the *oil*, for instance, in a quantity of flour might vary according to the manure, as far as from 1.4 per cent. to 2.7 per cent. from the wheat grown by Mr. Burnett, of Glenarm; but Lord Blantyre has tested the application of manures and their effects on crops by the scale as to their *fattening results*. He manured some land for turnips in the following proportions per acre:—

No. 1 had 20 tons of farm-yard manure.
No. 2 had 4 cwt. of Peruvian guano.
No. 3 had 10 tons of dung and 2 cwt. of guano.

The turnips were Skirving's purple top yellow, and the turnips with guano alone showed during the season somewhat more luxuriance than the rest; but little or no difference could be perceived when the crops came to maturity. A number of two-year-old cattle—being a cross between short-horns and Caithness—were selected and divided into three lots of seven each, and were weighed to begin with, being supplied with turnips *ad libitum*, and afterwards hay and a decreased supply of turnips, but ultimately a small allowance (2lbs.) of oilcake was added. The quantity of turnips consumed was as follows:—

	Tons	cwt.	qr.
Lot No. 1.—Fed on the turnips grown with dung alone consumed 3 acres 2 roods and 27 perches, weighing.....	96	14	1
Lot No. 2.—Fed on turnips grown with guano alone consumed 3 acres 2 roods and 4 perches, weighing	96	13	1
Lot No. 3.—Fed on the turnips grown with guano and dung consumed 3 acres 2 roods and 11 perches, weighing	96	10	0

The experiment commenced on the 21st of Oct. and continued till the 10th of March, and the re-

sults gave the following live weights of the animals:—

Lot 1 increased	2,538lbs.
Lot 2 increased	2,318lbs.
Lot 3 increased	2,435lbs.

Showing an increase on the lot fed on turnips grown with farm-yard dung alone of 220lbs. of live weight.

Lord Blantyre says, by his agent, in the essay to which the prize was awarded by the Highland and Agricultural Society of Scotland, "Assuming 6-10ths as equal to the dead weight, we have 132lbs., estimated at 5d. per lb., equal to 55s. as the increase in money value on the lot, or an average of 7s. 10½d. for each beast, and there being 3 acres 2 roods and 27 perches of turnips consumed by this lot, the advantage in favour of the dung-grown turnips is equal to about 15s. 7d. per acre."

But there is another element—*the cost*. This is the real agricultural criterion after all. On this he says, "Assuming the other expenses of the turnip crop grown with the different manures to be equal, the cost for dung in this experiment is, at 5s. per ton, £5 per acre, for guano £2 per acre, and for half dung and guano £3 10s.; so that unless the subsequent crop made up the difference of cost, a loss of £3 per acre minus the 15s. 7d. per acre gained in feeding, as shown above, will give the results of growing turnips with dung instead of guano for feeding cattle."

Our own impression is, that as the difference between the cattle fed on the turnips half dung and half guano was but 103lbs. live weight, or 171lbs. of meat, and as they consumed 4 cwt. 1 qr. less turnips, we should always prefer the addition, and spreading the manure over as much land as possible, and adding a small quantity of guano rather than manuring with either alone.—Gardeners' and Farmers' Journal.

LOUGHBOROUGH AGRICULTURAL SOCIETY.

The usual quarterly discussion of this Society was held at the Bull's Head Assembly-room, Loughborough, on Thursday, the 25th of March last. The subject for discussion was—"The present relations of Landlord and Tenant, and how they may be improved for their mutual benefit and the public good." The Vice-President of the Society, S. B. Wild, Esq., presided, and was supported on the right and left by Messrs. G. Kilby, G. B. Paget, C. Stokes, T. B. Miller, J. Buckley, M. Shield, R. Burrows (Ruddington), J. Henson, W. J. Ward, W. F. Ella, C. Bosworth, C. W. Wood, W. Lee (Barrow), J. Ashby,—Carver, jun. (Ingarsby), W. Whattoff, H. Humphrey, &c., &c.

The cloth having been removed, and the healths of "The Queen," "Prince Albert, and other members of the Royal Family," and "The President of the Society" (C. W. Packe, Esq., M.P.), drunk with the usual honours, the Chairman called upon Mr. Allen, of Thurmaston, to open the discussion.

Mr. Allen, in doing this, observed that, at present, a tenant in this part of the country was not entitled, on quitting his farm, to any compensation, after having reaped a crop, for those expensive improvements which were available for a course of years—for instance, for liming, marling, &c., and also for those temporary improvements of more limited duration, such as the use of artificial food, which were not expected to be repaid in the feeding and fattening of stock, but from the future enrichment of the soil in co-operation with artificial manures, there being increased crops in a course of tillage ordinarily extending over a period of four years. It was evident that no farmer would think himself safe in incurring this outlay in those materials, and finding himself liable to instant ejectment, without remuneration for those disappointed expectations which had induced him to incur so heavy an expense. Any interruption to this necessary confidence on the part of the farmer in bringing out the most productive powers of the soil, must be a loss to the owner, inasmuch as the capabilities of his estate were not properly developed by the tenant, whose skill, industry, and employment of capital were cramped, while the public in general suffered from the national loss which resulted from individual short-comings, particularly to the good of the people. The additional advantage from an improved relationship between landlord and tenant would necessarily result in the employment of more labour, and the consequently increased comforts of the poor would diminish local taxation. All, therefore, that was wanted was, that the law should establish, in the absence of agreement to the contrary, that unexhausted improvements should be paid for to the outgoing tenant according to fair valuation, instead of being, as they now were, forfeited. In the present state of the law, the landlord, who was tenant for life, had it not in his power, however much he might wish it, to indemnify an enterprising tenant for the improvements he might think it desirable to make. This placed the tenantry in this country certainly in a mitigated degree, but still something in the position of the tenants of the encumbered estates in Ireland, which Parliament had been called upon to redress. Again, as the law now stood, the proprietor sued the tenant (and properly) for dilapidations; was it not therefore fair that the tenant should also sue for his unexhausted improvements? And he (Mr. A.) knew of no means better calculated to promote and preserve that harmony which should exist between landlord and tenant, as the fair and well-understood pretensions of both. In conclusion, the speaker hoped that those who succeeded him, and who were practised in the rights between outgoing and incoming

tenants, would state the difficulties they had to encounter for want of a more equitable system of tenant-right (Hear, and applause).

Mr. C. STOKES expressed the pleasure he had in once more meeting his fellow-members at their quarterly discussion, and his conviction that no object was more desirable to be accomplished than a just and equitable tenant-right. He then spoke of the security given to the capital of the tenant-farmer in Norfolk and the Wolds of Lincolnshire, and the consequently improved culture of the soil in those districts; contrasted that security with the yearly tenancy system of the Midland Counties, where, for instance, if a tenant-farmer put five tons of lime upon his land, and reaped one crop, he received no return for his lime, which it was well known did not cease to benefit the land for eight or ten years after (Hear, hear). Though the bargain between landlord and tenant was a private transaction, and no man had a right to interfere, he strongly recommended tenants, when they took a farm, to be well satisfied that it was worth the money they were taking it for; but if they did take it for more money than it was worth, not to grumble about it for ever afterwards (cheers and laughter).

Mr. G. KILBY said he was glad their subject for that day was framed in the manner it was on the card—being convinced that none of them (though they might be only tenant-farmers) wished to consider their own side only (Hear, hear); in the long run it would be found that their interests were identical, and that they must work together. He believed that they had but little to expect from any others but themselves (Hear, hear); and they must look to themselves. In taking farms, they must look to their own interests, and try to make as good bargains as they could. The relations between landlord and tenant were very defective indeed, particularly where capital had been expended which the tenant had not received the benefit from. It was this that kept many tenants in their farms, and prevented their farms being returned upon the hands of the landlords (Hear, hear). The custom in this neighbourhood of taking farms from year to year, without the tenant having the right of compensation for unexhausted improvements, had a tendency to prevent improved cultivation of their farms and the making of those improvements they otherwise would make (Hear, hear). The object of tenants had been to get hold of all the land they could, without sufficiently thinking of the conditions; but it behoved them *now* to secure perfect remuneration for unexhausted improvements on leaving their farms (cheers). They found the laws respecting these things were generally *on one side*—that of the LANDLORD—which was very natural, considering *who* made those laws, and that they were made at a time when the tenants were little better than slaves, while their landlords were like tyrants; and, even now, the tenants were not entirely free men. But let them show their landlords that the tenants were free men as much as they were free gentlemen (Hear, hear). He could not say he had very great faith in getting legislative enactments. He doubted whether they would gain anything from that source; and his advice was, to look to themselves (Hear, hear). After canvassing the merits of leases and a system of corn-rents, Mr. K. declared his opinion to be in favour of a just and equitable tenant-right. He then alluded to the Landlord and Tenant Act passed in July, 1851, and read some of the clauses: that Act, though a very trifling one, yet granted the principle which they had not before—that buildings, machinery, &c., erected by a tenant on his farm could be removed, providing he had erected them with the written consent of his landlord. Thus if a tenant, by the written consent of his landlord, erected a pig-stye, he would be at liberty to take it away (laughter). But in this Act the landlords had not forgotten their own interest: they carried the law of distraint a little further, and secured to the landlord the power of seizing upon the crops of the tenant before his rent became due, if other parties were making seizures. They must agitate—as other parties did—and if they did not agitate now, they would not get justice as long as they lived (Hear). The occupiers of land were all suffering now from the alteration in the laws of import duties; but that suffering was not general throughout the agricultural interest, for where the landlords did not reduce their rents, they were benefited by Free-trade (Hear, hear). They must have a general system of tenant-right, for without it the tenant-farmers could not produce more than they did now; and with the population of our little sea-girt isle increasing by thousands and thousands, they would become more and more dependent for their bread upon foreigners (applause).—Mr. K. concluded, amid loud cheers, by glancing at the history of their quarterly discussions since they were established just ten years ago.

Mr. G. B. PAGET observed that it was just eight years since he had introduced the present subject to their notice, and it was a matter of congratulation that the subject had been since attracting such increasing attention; evidencing that the shoe was pinching somewhere. It was exceedingly difficult to ascertain what remedy to apply to the evils of which they complained, yet they were certain that there was great wrong somewhere, and that some remedy must be applied to that wrong. The Act of Parliament mentioned by Mr. Kilby had done something in laying down the principle that an executor might give compensation to an out-going tenant for improvements; a right which executors had not before, however they might wish to give such compensation (Hear, hear). If tenants made bad terms it was their own fault: he was convinced that in these times, where the landlords had the power, they were willing to grant tenant-right. What they wanted from Parliament was an Act which should enable landlords (who were the tenants for life) to bind their successors to those arrangements which they made with their tenants, whereby the tenant got security for those improvements that were for their mutual benefit (Hear, hear). He saw great difficulties in a legal enactment going further than that, owing to the different customs prevailing in different counties; and had they gone to Parliament twenty years ago for an Act such as some now wanted, it would bind them to all the old fashioned modes of agriculture.

Mr. W. Wright, of Barton, then made a few remarks upon the different customs of Nottinghamshire and Leicestershire, to show that the tenant-farmers of the former county had overcome many of the difficulties under which their brethren of Leicestershire now laboured.

Mr. R. Burrows, of Ruddington, contended that the law might go further in tenant-right than Mr. Paget had mentioned, and yet leave it sufficiently indefinite as to allow for the peculiar customs of different counties. He considered the late Act referred to as childish, and objected to the tenant having to get the written consent of the landlord for what he wished to erect on his land. The tenant ought to be at liberty to erect any foolish thing he liked, and ought to be able to claim compensation for what his buildings and improvements were worth to the land, and for no more; that would be the proper check upon him, as he would not then lavish his money upon useless things (Hear, hear). Mr. Burrows humorously concluded his speech by remarking that the natural effect of the law of distraint was to make people believe that landlords were not capable of looking after their property like the rest of the world (although they were naturally secured by land being more difficult to run away with), but must be protected by special Act of Parliament; and (quoting our quaint friend Tom Healey, of Ashwell), by observing that "landlords were receiving *commercial rents*, but retained *feudal notions*," which they must get rid of, and *let commercial notions go hand-in-hand with commercial rents* (Hear, hear.)

Mr. G. B. Paget then proposed the health of the Chairman, which was drunk in a most hearty manner.

The Chairman replied at some length, stating his hearty concurrence in that modern axiom, worthy to be added to the wise sayings of antiquity—"Property has its duties as well as its rights." He also expressed himself in favour of tenant-right, though it would be difficult to make a general enactment on the subject which would not in some cases injuriously affect the landlord; but if that were accomplished, he thought a well-digested system of tenant-right would be preferable to leases (Hear). The worthy Chairman concluded with some allusions to the Model Farm, which we omit as not bearing very closely on the topic of the day, and being short of room.

Mr. C. W. Wood observed that the longer and further they carried their retrospect of what the law had done between landlord and tenant, the more convinced would they be of its being one-sided legislation, throwing all power into the hands of the landlords, totally regardless of the interests of the tenants; and this continued until the Reform Bill gave a little power to the other side. Since the year 1815, the rent-roll of this country had been increased to the amount of between £10,000,000 and £12,000,000, which had come out of the pockets of the tenants. If only half of that sum had been distributed amongst the tenants—£5,000,000 a year—he reckoned they would be in a rather different position to what they were now. It was an absolute right—a strict principle of justice—that the out-going tenant should be remunerated for his unexhausted improvements. But this they would not get while they played at shuttle-cock and battledore with their candidates as they did—making speeches in favour of tenant-right at their meetings, and then going and shaking hands at the hustings with candidates who would not carry out their wishes in the least (Hear, hear, hear). If a man went into a house which wanted draining—which let the wind and water in over his head—what would he say to the landlord who told him he might go to Swithland, and get some slates to repair it himself? Yet the tenant-farmer was told he might have a few tiles to drain his land; and he must do it well—must make a good job of it. And then, what did he get for his good job? Why, perhaps, notice to quit at the end of six months; the landlord forgetting to reimburse him for his outlay, but not forgetting to raise the rent of the next tenant for that very outlay (Hear, hear). If they submitted to this, they deserved all they received. He thanked God he was not a tenant-farmer: if he were, he would not submit to it for one hour (Hear, hear).

The business part of the meeting concluded with the adoption of the following resolution: "That it is the opinion of this meeting that a legal tenant-right, which would secure to the occupier an equivalent for the unexhausted improvements he has made upon his land, would be for the mutual benefit of the landlord, tenant, and the public."

THE CULTURE OF MANGOLD-WURTZEL, OR BEET-ROOT; OR, "ROOT OF SCARCITY"—"MANGEL-WURZEL."

BY A PRACTICAL FARMER.

"He giveth his mind to make furrows, and is diligent to give the kine fodder."—Ecclus. xxxviii. 26.

The "root of scarcity"—we like this name, this German designation of this invaluable root; it is very characteristic. If the cultivation of any one particular root more than another will tend to prevent scarcity, it must be *this root*, this root of plenteousness rather than scarcity; for there is no root-crop cultivated for the use of live stock of equal weight and value, or managed at so little expense. It is with much pleasure we offer a few observations on its culture and management.

THE VARIETIES OF MANGOLD-WURTZEL.

There are several varieties of this excellent and

highly-productive root now brought into common cultivation. Those known to us are the long red mangold-wurtzel, the long bugle mangold, the long yellow mangold, the long red white mangold, the long red garden beet, the red globe mangold, the yellow or orange globe mangold, the white globe. We shall offer a descriptive remark or two on each variety.

The Common Long Red Mangold.—This is a very good prolific variety, and under proper culture will yield a crop of great weight per acre, possessing much nutritive value. It grows upright to the height of 20 to 22 inches, and of proportionate girth, and is of very hardy growth. The objection to this variety is that the roots throw out many smaller roots, but strong and fibrous fangs, which take firm hold upon the soil, and cause much difficulty in taking them up; and it also produces a superabundance of leaves. Its colour is a bright red, with a marble interior.

The Long Red Bugle Mangold.—This is a variety obtained by careful selection from the above-named sort, and is a vast improvement upon it; it produces a crop of greater weight per acre and of more nutritive value. It is much less exhausting to the soil; having but one tap root, it takes but little hold of the ground, and is readily taken up by the hand without the aid of any implement, so slight is its hold. It grows to the height of 20 to 22 inches, from one single root without fangs, of a proportionate girth, and in shape something like a cow's horn, of the breed called "long-horns." It is of a deep red colour, and beautifully marbled interior. The leaves are longer than the common variety, but far less abundant.

The Long Yellow, or Orange Mangold.—This is a very excellent variety. Its nutritive qualities are quite equal if not superior to the above-noticed varieties. Its growth is very similar to the first-named, but it does not produce equal weight per acre, and it is less hardy.

The Long White Mangold, or Sugar Beet.—This is chiefly grown from its more abundantly possessing those saccharine qualities necessary to the profitable production of sugar. It is not so well adapted to common culture. The produce is not equal to the other varieties, nor is it so hardy. The slightest frost in the field or fermentation in the heap will take away much of its saccharine principle or value. Its growth is very similar to the long yellow kind.

The Garden or small (long) Red Beet.—This is never grown for farm service or in field culture. It appears, however, to be the species from which all the other varieties have emanated, and has been long known; but the cultivated sorts of the present day cannot date beyond some 50 or 60 years. Von Thaër says: "It appears to me that the crossing of the deep red coloured garden beet and the white beet has given rise to all the existing varieties of this plant—some approaching to the former, and others to the latter species; and that from these, again, new varieties are continually produced, among which we now and then meet with individuals belonging to one or other of the original species." It is a small variety, growing about 12 inches in height, of proportionate girth, and is chiefly used for table or for pickling. The colour of the flesh is a deep red or lake, almost approaching purple, and the leaves partake much of red and purple.

The Red Globe Mangold.—This, from careful selection and good culture, has become a very superior variety, frequently yielding a greater weight of food, of equally nutritive value, than any other sort, hardy in its growth and nature; indeed so much so as to keep its quality for nearly a whole year in the heap or grave, if properly secured when taken up, and afterwards kept free from air and moisture. It has but one root without fangs, and produces much leaf.

The Orange, or Yellow Globe Mangold.—This is in every respect very similar in its growth and habits to the red globe. It is not so productive, but possesses more saccharine principle, and it is less hardy in its nature. The bulbs bury themselves deeply in the soil, are more fibrous than the red globe, and yield a still greater abundance of leaves. We do not think it altogether so well adapted for field culture.

The White Globe Mangold.—This variety is very similar in growth and character to the above kind, but is in every respect less productive, and therefore still less adapted for field culture.

Their Cultivation, Preservation, and Consumption.—The culture and preservation of this most valuable of root crops, and its subsequent mode of consumption, are of the highest importance to every stock farmer. It is to its proper and careful management that we desire to call especial attention, as upon this its principal value and utility depend. It is unlike most other root crops grown in this country—the vicissitudes of climate affect it much, and frequently the most careful attention can neither secure a crop nor guarantee its safety when obtained. If a good crop is fortunately obtained, and still further fortuitously secured against the winter frosts, its value to the grower cannot be too highly appreciated. The produce, under first-rate culture, is beyond that of any other root crop with which we are acquainted; and if carefully husbanded, and subsequently given into consumption with correct judgment, this vast amount of food is made of immense value, being equal in nutritive value to swedes, and superior to most varieties of turnips and other similar food. The crop ought to be so secured in the late autumn as to prevent or avoid fermentation in the pile or grave, and be given to stock only when the weather is becoming warm and genial, or in moderate quantity if warmly housed. The most fitting time for general consumption is from the beginning of March to the end of May.

THE CULTURE OF MANGOLD-WURTZEL.

The Soil.—The soils best adapted to the culture of mangolds are mild, open, friable loams. This root thrives best in all soils made to approach this character; and having as it were fixed a standard of profitable growth for itself, the aim of every cultivator should be to make the particular soil he cultivates

assimilate to that standard as nearly as possible. Be it a tenacious clay, he need not despair—*mangolds will grow well and freely on any soil properly prepared for their reception.* He must, by repeated workings and the application of every adventitious aid, aim to reach the standard. Be it loose or sandy, he must, by close working and compression, aided by *adhesive* claying and manuring, aim at this standard; for such it really is. We never saw a good crop of mangolds on any soil improperly prepared. We repeat, the standard to aim at is a *mild open loam*—the richer the better.

The Preparation of the Soil.—The land intended for a mangold crop should be in a fair state of cultivation and moderate fertility, not "out of root" or condition, or the quality of root will be bad as well as the crop. It should be ploughed as deeply as possible in the autumn, well worked or pulverized and cleansed, and then be laid up or ploughed up in trenches (the land, of course, being previously subsoil-drained). In the early spring, if the weather is dry and suitable, it should again be well worked, as judgment dictates, the aim being to bring it in, and keep it in, as open, mouldy, and highly-pulverized a state as possible till the period of sowing approaches; to this end, much care is required, as heavy rains may defeat the whole process. On the best loams it is customary to plough in the winter, and wait till any suitable time in the spring before proceeding to work and prepare it for the crop, which need not to be put in till late in the season. It must, however, be prepared as before stated. On poorer soils this course would be very injudicious.

The mode of planting, manure, seed, and subsequent management.—When the time of sowing has arrived—which on all the poorer soils will be about the middle of April, extending onward to other varieties of soils so far as the end of May—the whole power and appliances of the farm must be brought to bear upon this particular crop, as so very much depends upon the quickness and promptitude exercised in getting it in. Should the season prove dry and unsuitable, every prudent farmer will wait awhile for rain; but if favourable he will make all speed. We are favoured to occupy our open loamy soil of medium fertility, and our mode of putting in our mangolds is as follows:—The land being prepared by thorough pulverization, we proceed in about the second week in May to ridge it at about 25-inch intervals. This can best be done, and the whole process of ridging and manuring be carried on simultaneously, and most expeditiously, by adopting the following simple practice:—Set out about a dozen ridges; this may be done with any common plough having a sufficiently high mould-board or turner to throw up the soil to about ten inches in height, and it will only require one passage of the plough to each ridge to do this; the soil thus thrown out will rest on the unploughed land next to it, and after it is manured the ridge is completed by ploughing this back at such a depth as to insure a perfect ridge of requisite height; when these dozen ridges are thus prepared, the manure carts may commence their deposit by taking the four outermost rows or spaces, and the manuring to take place as rapidly as possible in order to give the ploughs a start; all the remaining rows should be taken or manured by sevens, *i. e.*, one row for the horses' road-way, one for each wheel, and two on each side of the carts; the men stand in the carts and spread the manure as equally as they can all over the rows, followed by lads to shake and distribute it carefully along the bottom of each row or ridge; when the four rows named are finished, the ploughs commence immediately to cover them up by ploughing the soil thrown out upon the manure, and at requisite depth to form, as just stated, a perfect ridge; the ploughs in passing down close up the manured ridge on one side the cart, and in returning up open out another ridge on the other side, and so on throughout the field; the manured ridges should be immediately rolled down with a heavy two-horse roller—thus the manure is covered up as soon as spread, the ammonia is retained, and evaporation prevented; to complete the whole properly it ought to be planted at the same time, and whilst the soil is moist and most easily managed either for drill or dibble. We prefer drilling to any other method of putting in the seed. We drill with a corn drill, having in our *seed-barrel;* our coulters are weighted according to the state of the soil; if fine we use no weights, and we leave the coulter tracks open, as the seed will be quite sufficiently covered in by the soil which falls in upon the coulter track. The young plants being of very tender growth will more readily find their way to the surface. In dry and ungenial weather, and our patience becoming exhausted, we finish all by rolling down as closely as possible and leaving it till rain comes, and even then it will often require looping of roller on the ridge-harrow.

Manuring.—About from 12 to 16 two horse loads of the best made manure the farm will produce should be applied per acre, and a moderate dressing of good artificial manure be drilled in with the seed. We apply three bushels of decomposed night-soil, mixed with three bushels of *pigeon* or *pig* manure, also reduced to powder, and such quantity of ashes—fine loam-coal ashes—dried road scrapings, ditch cleansings, or like matters, as may be required to distribute all equally; the more of these we can collect the better; and it is a very cheap and effective aid. Guano, superphosphate, rape-cake, or other similar appliances, will be amply repaid in the crop; and a slight dressing of these, along with farm-yard manure, to a fair extent suffice. We, however, aim to secure *great crops,* and to effect this may possibly adopt an expensive practice—we think not.

Seed.—This should always be selected from a good and well approved stock, and its growth tried before sowing; the variety should also be in accordance with the kind of soil: we object sowing the long varieties of mangolds on thin soils; we think the globe sorts are best adapted for them, and the thinner and poorer the soil the better and freer in growth should the sort

to be selected be. On the best soils we prefer the long varieties, and in making our selection for these we always aim to secure the largest and finest growing sorts, if known to be without extra roots or fangs. The long red bugle we have grown many years with great success. The seed in mild showery weather, or if the soil be moist, should invariably be steeped for several hours; indeed if steeped for *several days*, it will not be injured if sown on a damp soil, but its growth is thereby much quickened. Rain-water, or water infected with ammonia, should be used. The husk of the seed is hard, almost equal to the hawthorn seed, and requires this softening to promote its more speedy vegetation. Many seeds will yield more than one plant, some will produce four or five. From two to four pounds per acre is a fair seeding; two pounds if dibbled, four pounds if drilled. We like to have a superabundance of plants, they draw each other up; they can readily be singled, and the spare ones are of use in filling up vacant places. If the soil and weather is dry, and our patience will no longer hold out, we prefer drilling the seed in without being steeped; the steeped seed will vegetate, and if no moisture is in the soil will speedily die.

The subsequent management.—The young mangold plant is somewhat remarkable in possessing a stronger grasp upon the soil than most others of its class; it may, therefore, be advantageously hoed in the earliest stages of its growth. It ought to be done as early as possible, and no great danger need be apprehended, as the *roots* in loose soil will be found to have penetrated as far downward as the stems have risen or grown upward. Hoeing will make them grow much faster. As soon as they attain strength enough to bear handling they should be set out by hoe at about 12-inch intervals, on good loams and other rich soils; at 15-inch intervals on soils of medium fertility, and at 18-inch intervals on the thin and poorest soils, the whole being set out in ridges 25 inches apart; they would thus stand respectively 25 in. by 12 in., 25 by 15, and 25 by 18; this we think will give ample room for every plant; and here we would say that, with the view of economising both seed and artificial manure, we should dibble in the seed and deposit the manure under it by hand upon those soils requiring a thin plant.* As the setting out proceeds lads should follow the hoers, and carefully single out every plant, taking care that all their places are filled up by spare plants, and that their roots are set in straight and upright; damp or wet weather should be chosen for this operation, or much loss of plant will ensue, and it should be preceded by horse-hoeing and ridge-harrowing. We do not know a single plant more benefited by repeated stirrings than the mangold plant: to this end it ought to have very frequent horse-hoeing and ridge-harrowing, each to be followed if possible by hand hoeing, and these operations may be carried on so long as a horse can get along between the rows without doing harm to the crop. No tops must be taken off whilst growing: it retards the growth very materially; the leaves of this plant conduce to promote its prosperity more than that of most others; this may be learnt or seen in some measure from the formation of its leaf.

General remarks.—Much has been said and written respecting the relative value of the mangold wurtzel and the Swedish turnip, carrots, &c., as also upon the different varieties of the root itself, and many experiments have been tried both in their growth and in their application to the fattening of cattle, &c. These are necessarily from so many causes incomplete; nearly all will depend upon the quality as well as quantity produced; the varieties and sub-varieties are very many, and the comparative value of roots of the same variety grown within a few feet of each other vary greatly; the roots will derive nutritive value in proportion to the richness of the field or the precise spot upon which they are grown; the richness of the portion of soil or manure with which they come more immediately in contact, or the state of its decomposition, so as to render its virtues as food to the plant. Again, slight injuries will detract from their nutritive value; storms, drenching showers, &c., will frequently stagnate their growth for a time, and cause a "sturky" crop; neither will it be right to compare a good variety of long mangold with an inferior variety of globe mangold, or *vice versâ*, or the same with Swedish turnip, &c. This great desideratum cannot be arrived at except by long and repeated trials under the most minute inspection between the best varieties of either kinds, and grown with the greatest care, and under the nearest assimilating circumstances. The same holds good with respect to trials by animal feeding: the best *quality* of food is by healthy animals relished most, and upon which they will thrive fastest. Mangolds well stored, and having lost much of their watery particles, becomes admirable food; but if eaten fresh from the field they are too laxative. Swedes, on the contrary, are equally good, probably best direct from the field, and will generally take harm in the pile or grave—the slightest fermentation or heat destroys much of their nutritive value. Hitherto the mangold crop has been found to outweigh all others.

* There are many inventions for drilling in both the seed and manure at one time; we think this a truly good and legitimate mode of putting in this crop on the soils alluded to.

A POISON FOR RATS.—Mix twelve ounces of starch thoroughly, with eight ounces of cold water, and add forty ounces of boiling water. When by stirring the starch, jelly is formed, put into it an ounce and a half of phosphorus, and cover the vessel for a few minutes. Then mix the mass well with a spatula; when cold, add some powdered valerian root or aniseed. To preserve the paste, fill some small wide-mouthed jars with it, and close the jars carefully to prevent access of air. Dr. Hanle recommends that the paste should be spread on slices of bread, and these placed near holes through which the rats pass, taking care that they are constantly renewed as consumed.—*Annals of Pharmacy and Practical Chemistry.*

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Weekly Meeting was held at the Society's House in Hanover Square, on Wednesday, the 21st of April: present—Marquis of Downshire, Vice-President, in the Chair; Lord Camoys, Lord Berners, Lord Bridport, Lord Ashburton, Sir Matthew White Ridley, Bart., Mr. B. Almack, Mr. T. Raymond Barker, Mr. H. Raymond Barker, Mr. Hodgson Barrow, M.P., Major-General Buckley, Mr. Burke, Capt. Stanley Carr, Colonel Challoner, Mr. I. Church, Mr. Foley, M.P., Mr. Fuller, M.P., Mr. Gadesden, Mr. R. Norman Gales, Mr. Gaskell, Mr. Fisher Hobbs, Rev. C. E. Keene, Mr. Maddison, Mr. Majendie, Mr. Love, Mr. Rowlandson, Prof. Sewell, Prof. Simonds, Prof. Way, and Mr. Geo. Wood.

Silesian Beet-root.

Mr. Reeve transmitted to the Council six roots of White Silesian Beet, grown by him last year at Randall's Park Farm, near Leatherhead, in Surrey. These roots were of an elongated bulbous shape, the outer skin being light green from the neck to the middle, and yellowish white on the lower half. Their average weight was 7½ lbs. each. On being cut into halves, the fleshy part was found to be sound, sweet, and solid, very juicy, and of a yellowish white colour.—Mr. Raymond Barker stated that he had that morning been in conversation with Mr. Ewings, a member of the Society connected with the South of England, who was well acquainted with the circumstances under which those roots had been grown; and who had furnished him with the following information: The land was flat, and situated near the river Mole; it consisted of a stiff clay maiden soil, which had for many years remained uncultivated, until the year 1849, when it was once very deeply ploughed, and immediately drill-sown with the best picked White Silesian Sugar-beet seed at the latter-end of April. The plants were hoed out about twelve inches apart, and the crop treated in every respect like that of the Swede Turnip, excepting that no manure whatever was employed. The bulbs were taken up in the autumn and stacked. A portion of the last year's crop was presented to the Council at their December Meeting, in a perfectly solid state, and without having grown out or sprouted to any extent. The produce in favourable seasons had been from 28 to 30 tons per acre. It might be said, that, although these bulbs were so much larger in size than the smaller foreign varieties, they did not contain so large a proportion of saccharine matter; but whatever might be the value of those small rich beets to the sugar manufacturer, bulky roots of sound, sweet, juicy vegetable matter, such as those at that time submitted to the Council, were of essential importance and consideration to the tenant-farmer and rearer of young stock, in seasons like the present, when there was so great a scarcity of grass: and Mr. Reeve had himself found them, under these circumstances, an indispensable aid in maintaining his stock in healthy vigour.—Captain Stanley Carr remarked, that "Zucker Boden" (or sugar soils), was a designation given to certain soils in the Prussian province of Saxony, on account of their having been found to possess peculiar properties for promoting the production of saccharine matter in the beet. It had been thought that the phosphate of lime contained in those soils was one of the substances which tended to this result; but the exact cause of the properties in question had not, he believed, been yet fully ascertained. They were, however, connected with the particular variety of beet cultivated, and the size of its root. Three years ago, when Captain Carr was in the vicinity of Magdeburg, the sugar manufacturers were in the habit of purchasing their beet from the growers in that neighbourhood by weight; he found that they refused the large cattle-feeding varieties, but purchased at a high price those roots that were fine in the neck, yellowish-white in colour, and about 3lbs in weight.—Mr. Gadesden stated that, in consequence of Mr. Reeve's former communication to the Council on his culture of the White Silesian Beet, he had paid a visit to the Randall's Park Farm, for the twofold purpose of inspecting his store of roots and becoming acquainted with his mode of management. He found the roots in fine condition, and was informed that the produce per acre obtained last year was 38 tons 16 cwt.; his crop of mangolds having been 39 tons 13 cwt. The land on which the beet was grown appeared to be of a good useful character, bearing at the time of Mr. Gadesden's visit a very promising plant of wheat, and was stated to have had no manure upon it for four years. Mr. Reeve attributed his success in growing the White Silesian Beet to his thus not applying manure directly to the crop, and stated that when he had dunged for the beet, the bulbs proved small, had a large mass of "fuzzy" fibres, and gave but a small weight per acre, namely, from fifteen to eighteen tons; but that since he had put his manuring matter further off the beet crop, he had raised large fine roots of a great weight per acre. He regarded this circumstance as a discovery in the culture of this plant; and Mr. Gadesden considered that if Mr. Reeve's calculations were realized, it would be so, and a very important one. Mr. Gadesden was also shown the field which Mr. Reeve intended to sow with Silesian Beet in that week: the soil was a heavy clay, and certainly from its aspect not very promising. The rotation on this field had been clover-ley dunged, then oats, and last year beans; and the beet would now be put in without any manure. Mr. Reeve expected from that field, thus cultivated, a crop as large as he had derived last year; and should that be obtained, it would

in Mr. Gadesden's opinion be evident that no root deserves the attention of agriculturists more than the beet. The amount of saccharine matter in this variety was stated to be nearly seven per cent.; and since Mr. Reeve had raised the root in sufficient supply for his cattle he had found no need of resorting to the use of oil-cake. Mr. Gadesden found the live stock at Randall's Park Farm in fine condition. The beet was drilled in rows from 24 to 27 inches apart, and left 12 inches apart in the rows; and he thought the superiority in value per ton of the White Silesian Beet over the Mangold-Wurzel must be manifest to every one who, like himself, had personally inspected these results.—Mr. Fisher Hobbs wished the Council to understand that there was no novelty in this variety of Beet. It had been common in the Eastern Counties some few years ago, when experiments were in progress for the establishment of a beet-sugar manufactory until the Government put in its interdiction; and it bore a higher price per ton at that time than other varieties. The orange-globe beet, however, was found to yield a greater quantity per acre than the Silesian. He had himself tried various experiments on the subject, and derived one-quarter more in weight from the orange-globe than from the Silesian; and having had a visit from some distinguished French cultivators of Beet, they confirmed this superiority of the orange-globe, which they stated yielded a larger bulk of root, and in hot summers a greater proportion of sugar. On examining the bulbs then placed before the Council, it might easily be inferred that they had been grown in land containing much vegetable matter, from the great number of tap-roots formed at their base, a circumstance which it was well known led to great exhaustion of the land. No rule could be laid down for the exact manuring required by Sugar-Beet or Mangold under different circumstances.—The noble Chairman stated that at Mount Millick, in Ireland, a small red beet was preferred, of a more lusciously sweet nature than he had ever tasted in any other vegetable production. The ground for Mangold or Carrots was prepared in November, the long or short manure laid on it in winter, and the whole ploughed in or dug in the spring. —Capt. Stanley Carr remarked that it would give him pleasure to procure supplies of the small beet seed from Magdeburg for any of the Members of the Society residing in Ireland. — Colonel Challoner could grow on poor land, that would bear nothing else, as good carrots as any body could; but if the Silesian Beet, which had been grown by Mr. Reeve without manure, could be raised on such poor soils, it would be a great assistance to all sandy lands. He asked Mr. Hobbs his opinion on this point, being so well acquainted as he was with the different characters of the beet and carrot roots, and the conditions required for their successful cultivation.—Mr. Fisher Hobbs replied, that the Silesian Beet was liable to form tap-roots that would run into the earth like carrots; but the great object in the cultivation of the beet was to keep them from forming those tap-roots, which abstracted the chief amount of nourishment from the soil. Formerly it was common to take up beet with forks, on account of the attachment to the land which the penetration of these roots occasioned. His beets had now only one bulb, with a single tap-root to each—a circumstance which enabled the plant to gain little support from the soil, but enabled it, on the contrary, to derive its chief nourishment through its leaves from the evaporation of the soil and the atmosphere, and at the same time yield a more valuable produce in the crop.

Continental Statements on Beet Cultivation.—At the present moment, when Beet-culture is engaging so much attention, it may be interesting to know the opinions of distinguished French and German writers on those points connected with this crop to which reference has been made in this discussion. With this view, the following passages have been selected and translated into English, from the original languages of their respective authors:—

Dombasle.—Among those plants which are cultivated under the name of forage roots, or root plants, the beet is undeniably the most valuable; and it may be said with truth, that it holds among these plants the same position that lucerne does among forage plants. Generally speaking, it produces on an equal space of land double the weight of crop that can be obtained from potatoes, to which it is very little inferior in amount of nutritive matter. Beet has, however, over potatoes the very important advantage of being able to be given in considerable quantities to live stock in its raw state without producing any injurious effects or satiating the animals. It succeeds in every kind of soil, even in those of very moderate fertility, provided they have but sufficient depth of culture. The frequent return of the crop over the same ground does not diminish the amount of its produce; and it adapts itself with admirable facility to the efficiency and economy that attend on the employment of improved implements. Finally, the facility with which the roots are stored and preserved for future use, enables the rearer of stock to depend upon it, as upon a well assured basis, for the nourishment of his animals during eight months of the year. The introduction of beet culture into farm husbandry will accordingly soon produce that two-fold result towards which every well-directed effort of cultivation ought to tend, namely, to the increase of the live stock themselves, as well as to that of their manure.

Thaer (1810).—Mangold Wurzel, Burgundy Beet, Thick Beet, &c., of the Germans; Racine de disette, or root of scarcity or dearth (by a misconception of the word Mangold for Mangel) of the French; and Mangel Wurzel, or root of want (through a similar misapprehension) by the English; is derived, with all its varieties, either from the Beta vulgaris (red field Beet) alone, or from admixture with the Beta cicla (white sugar Beet). For I regard the difference made by botanists between the two species, as too unimportant, and in my opinion too indefinite, to lead to the establishment of a specific distinction between them. I believe all the varieties to have arisen by admixture of the pollen or seed-dust from the dark red garden Beet and the white Mangold, and individual varieties so established to have themselves again varied according to the predominating influence of the one or other of the original species. These different kinds of Beet, therefore, as is the case with so many other cultivated plants, are not to be determinately characterised, but they pass over one into the other

with an almost imperceptible gradation. The two varieties that stand at each end of the scale, are the dark red Beet-root so much earlier cultivated in our kitchen gardens, and the entirely white sugar Beet. Between these extremes, we have already the great long red Beet, the flesh-coloured, or marked with concentric flesh-coloured rings, the externally red and internally wholly white, the yellow, and the yellow and red mixed. The colour of the root often corresponds with that of the plant, or more frequently with that of the nerves of the leaves, which are more or less red or wholly green. From the seeds of any one single plant, varieties will result in the plants produced; but the wholly red, or the wholly white or yellow, are the most constant. The pale red Beet, under the same circumstances, grows to the largest size and gives the greatest amount of produce; on which account it is the one most frequently cultivated for cattle feeding. This variety, however, is divided into two sub-varieties:—1. That which grows with its bulb entirely in the ground; and 2. That which has a tendency in the course of its growth to draw its bulb out of the ground. I have reason, indeed, to believe, from my own experiments, that this tendency rests partly with the kind of Beet grown; but I have also found that the soil itself has certainly a considerable influence in producing the effect; for, on one occasion, I divided with a friend a portion of seed which I considered to be that of Beet growing above ground, but which in my case gave plants whose bulbs remained entirely in the ground; while my friend's, on the contrary, all grew out of the ground. My own land, however, was ploughed 10 inches deep, while my friend's was only ploughed shallow. The Beet that grows out of the ground will undoubtedly be better adapted for shallow soil, and be grown more profitably under such circumstances than the one that remains in the ground; but I prefer cultivating the latter kind in deep soil, chiefly for the reason that in such a position it will be less injured by autumnal frosts. The yellow and white sugar Beets have the advantage of being more solid, and in some degree more hardy in resisting frost; but especially, however, on account of the greater proportion of sugar which they contain, as we are assured by all those who have been engaged in experiments on the subject is found to be the case. They are, accordingly, now universally preferred for the manufacture of sugar and syrup, and perhaps also for the distillation of brandy; but for economical purposes they are not, on account of those qualities, to be placed in competition with those red varieties which yield so much greater a bulk of root. The Beet may be grown in every moderately moist soil which is strongly seasoned with manuring matter; but in sandy soils, when much rain has not fallen during the period of vegetation, the bulbs will remain small; and in light humus soils, lying low and moist, they will be watery and bulky, but inwardly hollow, and scarcely capable of being rescued from rapid decomposition. The soil, therefore, most generally adapted for the cultivation of Beet is a tolerably compact loam, in which, almost without exception, it thrives and attains much solidity. Accordingly, I make it a rule, that when I practise hoe husbandry on the heavier soils, I grow more Beet, and on the more sandy soils more Swedes. The Beet, to attain any considerable strength, requires a strongly manured soil, whether the manure be specially applied for the purpose, or left sufficiently rich in the soil, after taking off a previous crop. Fresh manure must be well incorporated with the soil by at least a double ploughing. The deeper the soil the better; and on shallow soil, if planted or sown on ridges, it will yield a great produce.

Sprengel (1832).—The component parts of the Beet-root vary very much according to the mixture of soil in which it is grown; those bulbs, for instance, that are raised with street manure, often contain twenty times as much nitre as those cultivated under ordinary circumstances. The bulbs grown in loamy soils which have not been freshly manured are generally found to yield the greatest proportion of saccharine matter.

De Candolle (1832).—With the exception of some fruits in which sugar effloresces in a crystallized state, this substance is present in the cells of plants in a liquid form; and it is even worthy of remark, that in them it develops or destroys itself with singular facility. Thus many seeds, such, for instance, as the Pea, include within them before maturity a saccharine matter, which, on their becoming ripe, is transformed into starch, and this starch again becomes saccharine matter on the germination of the seeds. Many other kinds of germinating grain are subject to similar transformations, and chemists themselves have at length succeeded in changing starch into sugar, but have not yet been able from sugar to re-produce starch; a circumstance which furnishes an argument in favour of those who think that the covering of the fecula is an organic membrane. The ripening of fruits offers analogous transformations. The stalks of the sugar-cane, which contain so large an amount of sugar before the flowering of the plant, contain much less as soon as that process has commenced; and in the cultivation of the Beet, we know that the quantity of saccharine matter varies much according to the particular time when it is drawn out of the ground in which it had been grown. We know that when removed too late it gives scarcely any sugar at all, and it is on this account that when we only draw the Beet bulbs in the south of France at the same date as in the north, we obtain from them scarcely any profit; but that when drawn two months earlier, we obtain from 3½ to 4 per cent. of their weight.

Scheubler (1838).—It is remarkable that the amount of sugar in the Beet-root indicates, according to the composition of the soil and the nature of the manure applied, great variations, to which in Beet culture particular regard should be had. Very rich clay soils are not adapted for the cultivation of the Beet, when the object is to obtain the largest amount of saccharine matter; the bulbs in such soil become watery, and yield but little sugar. Moderate clay soils, containing 50 per cent. of sand, were found by Hermbstaedt the best suited for this crop. Richly manured soils give a great produce per acre, but the roots in this case contain but little sugar. Beet strongly manured with horse or sheep dung often yields bulbs which do not contain a trace of sugar; but whose juice, on the contrary, is strongly impregnated with nitre. Moderate manuring with vegetable compost, and particularly with cow-dung, produces Beet-roots containing the largest amount of saccharine matter; these yield, under favourable circumstances, from 5 to 6 per cent. of crystallized sugar, besides syrup; at the sugar manufactory at Althaltensleben, the general average produce of sugar was found to be 5.58 per cent. Not less remarkable is it, that the saccharine properties of the Beet-root become considerably diminished when it is kept too long in store. The same bulbs which in October, November, and December gave a rich yield of crystallized sugar, when worked up in January were found to contain 30 per cent. less of sugar, in February 50 per cent. less, and in March scarcely a single remaining trace of that substance; an obvious proof that during the period of development in advancing spring a change goes on in their elementary constitution. The rapidity, too, with which the juice is worked up has likewise an influence on the amount of sugar it will furnish; for if the Beet pulp remains only two hours without being put into the press, though it may produce much syrup, it will yield very little crystallizable sugar.

Dumas (1843).—There exists a great number of varieties of

the Beet; but it is only from a few of those that sugar can be economically obtained. The following are the principal varieties cultivated in France, and they are here placed in the order of their richness in saccharine matter. 1. The white Beet of Silesia, pear-shaped, elongated. It is the best of all. It generally gives a juice, which is at the same time the purest and the densest, and consequently the easiest to work. There is a sub-variety of this Beet, of a rose-colour; this is very much appreciated in Prussia. 2. The yellow Beet of Castelnaudary. This variety can only be cultivated in deep soils; but when raised under favourable circumstances, it gives quite as much sugar as the preceding. 3. The red-juiced Beet. This variety ought to be discarded. It gives less sugar than the former; and its colouring matter both depreciates the character of the juice, and, towards the end of the season especially, can only with difficulty be removed from it. 4. Mangold Wurzel. These roots, which become enormous in size, and which give produce that weigh double and triple that of the preceding varieties, ought to be rejected; the great quantity of water they contain in proportion to the sugar would render the extraction of the latter too costly. The culture of the Beet is the object of the most minute attention of the growers, who, in Flanders, give the land from three to five ploughings, between each of which they pass the roller and the harrow, until the soil has become perfectly broken. Care also is taken that the manuring shall not immediately precede the sowing; for it has been ascertained that if land is to be well manured, the manure itself must at least have been fully prepared and well worked. We have equally acquired the assurance that Beet roots forced on folded land or soil too highly manured, are very ill adapted for the purposes of sugar manufacture. At a manufactory near Douai, more nitre than sugar was on one occasion obtained from the Beet roots, in consequence of their having been stored in a room containing much old plaster on the walls and ceiling. The seed germinates in eight days or three weeks, according to the moisture of the land or season. The young plant is attacked by an insect which devours the young leaves, and is very destructive in the middle of the day; the root also suffers from the ravages of white worms. Many farmers have grown Beet on the same land for five years successively, without any apparent injury; it would nevertheless be better to alternate its cultivation with that of Barley, for the purpose of avoiding the inconvenience of too recent manurings, which force the size of the bulbs, and cause them to become watery and soon liable to spoil in keeping. The preservation of the bulbs ought to constitute a part of the operations employed for the manufacture of sugar from this vegetable. In spite, however, of the minutest precautions which may be taken with this view, the Beet root is always found to be subject to alterations more or less considerable, and to lose its saccharine matter, both in quantity and quality, in proportion as the season advances. One process only can prevent these serious inconveniences; and it is that of immediately drying the bulbs as soon as the crop is taken up. Many experiments already made on this point by MM. Schutzenbach, de Lirac, Pelouze, and Peligot, lead to the hope that agriculture will some day enjoy immense advantages that have hitherto only been realized in part; and that Beet-root dried at little expense to the grower, and delivered into the markets like corn, may become the subject of an extended branch of industrial commerce at convenient times and places, and thus lead to the production of sugars at very low prices. If the age of the roots exercises a sensible influence over the proportion of saccharine matter which they contain, the circumstances of dryness or moisture in the land occasion on their part very considerable differences in this proportion. It results, indeed, from the observations of M. Mathieu de Dombasle, that the density of the juice of the Beet from the same piece of land increases sensibly up to the periods of dryness, and on the other hand decreases in a few days when the soil has become sodden by heavy rains. The difference is less considerable in fresh clay soils, than in light gravelly ones, which easily lose their humidity; but the differences are constant for all particular soils at corresponding periods. These facts ought not to surprise us; for it is evident that the evaporation taking place at the surface of the leaves under the influence of the sun's rays, must necessarily produce an actual concentration of the liquids contained in the whole plant, when its radicles do not find in the soil sufficient moisture to repair the loss occasioned by the evaporation proceeding from the leaves. When therefore the soil is moistened by a heavy fall of rain, the plant absorbs in a short time a great amount of water, and the size of the bulb increases considerably in a few days; but the bulb in this state is more watery than it was when under the influence of extreme dryness.

Koppe (1845).—There are many varieties of the Beta cicla altissima, distinguished by their colour, the shape of their root, and their size. For cattle feeding we choose the clear red, the yellow, or the white Beet; which grow high out of the ground, and attain a considerable weight when grown on a soil adapted for them. For sugar extraction we cultivate only the white Beet, or that with a reddish external skin, which grows only a little out of the ground, and in recent times is known as the sugar Beet. This Beet, as far as my experience has gone, is attacked by no insect. It is, therefore, advisable to grow Cabbages and Kohl-Rabi (Turnip-Cabbages) at the same time along with it, in order that when these suffer from insects, and in consequence yield but an inferior produce, the Beet may compensate for the loss sustained. The Beet requires a deep, rich, clay soil. It may, too, be grown on middle class soils when deeply and well cultivated. Inferior soils, however, should not be appropriated to Beet, as other kinds of hoed crops are better suited to them. If the double mould-board plough is well adapted for other crops requiring the hoe, when the land has a good subsoil, it is especially to be recommended for preparatory tillage in the case of the cultivation of Beet; and it is indispensable that the earth should be removed to the depth of from 8 to 10 inches, in order to produce a full crop. On my own farm the land is ploughed before winter from 10 to 12 inches deep, experience having proved to me that this deep loosening of the soil is one of the first conditions in the cultivation of the Beet-root. My adjoining neighbours on small holdings, with only a few exceptions, have not at present decided to adopt this plan; I have, however, not yet seen any good Beet-roots on their land. The Beets that sometimes stand from 12 to 18 inches out of the ground are easily injured by the frost. They do not, however, on that account, become, like Potatoes, wholly useless, but only lose their keeping properties. The crop of this kind of Beet should therefore be taken up immediately after the Potato crop. The White Beets, which are cultivated for sugar manufacture, have not the same tendency, as some of the red varieties grown for cattle feeding, to grow out of the soil. The upper portions, even of the sugar Beet, which have been exposed above ground during the period of their growth, are scarcely of any value for sugar extraction. Such plants, therefore, are only retained to yield seed for future crops as have shown little or no disposition to grow with their bulbs exposed. As the bulb of the white Beet is decidedly richer in sugar, and has a firmer fleshy substance, it accordingly suffers less from frost than the watery tall-topped kinds, especially while it retains its full foliage. The same plants that had stood a severe frost in my fields without being affected while their

leaves were on them, were at once injured by a frost of only half the intensity after they had been deprived of their leaves. The leaves of the Beet are indeed but a poor watery fodder for stock, and by no means so nourishing as green Clover. Beet-roots are best stored in heaps or stacks from 4 to 6 feet wide, in which they are so piled, in pent-house arrangement, that their heads are placed outwards. According to the given width of these stacks, the Beet-roots in the middle do not ascend higher than from 4 to 6 feet. To pile them higher is not advisable, in order that they may keep well. They easily heat when stacked, and in that case undergo a decomposition of their component parts, which is very prejudicial to their yield of sugar. The stacks may be kept from frost by a tolerable thatching of straw, firmly pressed down by a subsequent covering of earth. To prevent the straw becoming wet by rain, it may be covered with earth until required for thatching. The middle of the Beet heap should, however, be left as long uncovered as the frost will allow, in order that the roots may remain in contact with the air while at higher temperatures. If this circumstance is neglected, the Beet soon runs into decomposition, and this decay is far more to be feared than the frost. It being understood that the heaps are to be properly covered with straw, care must be taken before they are formed that no roots already frost-bitten be introduced into them.

Fresenius (1847).—The amount of sugar in the Beet varies considerably according to the circumstances of soil, manuring, climate, &c., under which it is cultivated; and various methods have been proposed and carried out for its extraction, of which the following is the most usual:—1. The roots being washed clean from earth are grated or reduced into pulp. 2. The juice is cleared from impurities by being boiled, with the addition of a little lime. 3. The clarified fluid is filtered through coarse bone charcoal, then concentrated by evaporation, filtered through finer bone charcoal, and lastly evaporated to the point of crystallization. 4. The concentrated solution is transferred from the boiling-pan to the cooling apparatus, where it is allowed to cool down to a temperature of between 122° and 131° of Fahrenheit; it is then brought into the crystallization cases, which consist of inverted conical vessels, provided below with an aperture that may be closed or left open as required, where, on cooling, the raw sugar separates itself in a crystalline state. On removing the stopper from the lower aperture of the crystallization vessel, the molasses or treacle flows down, and leaves the raw sugar in a dry state for the market. The juice of the beet contains, besides sugar, all the soluble component parts of the original bulb, particularly albumen, pectin, gum, salts with organic and inorganic acids, and malic acid. The process of clarification has for its object to remove as much as possible all foreign substances. Boiling, for instance, coagulates the albumen; lime precipitates the pectic and malic acids, as well as the phosphoric and silicic acids, magnesia, &c., while at the same time it enters with the sugar into a peculiar light combination, which is again decomposed by means of the animal charcoal. Before the latter circumstance was known, it was thought that lime alone ought not to be employed; and at a subsequent stage of the process sulphuric acid was added, with a view to saturate the lime in question. This, however, is now only done when, after the clarifying with lime, the fluid is found on testing to be too strongly alkaline. The former, usual course of proceeding, known as the German method, by which sulphuric acid was first added and then milk of lime, is now nearly if not wholly discontinued. By filtration through animal charcoal, the combination of the sugar with lime is suspended and the lime intercepted by the charcoal, the fluid at the same time becoming to a certain extent deprived of colouring matter, and freed from the insoluble compounds separated from the fluid by clarifying and evaporating processes. By evaporation a portion of the crystallizable sugar is converted into uncrystallizable, and every ingenuity has accordingly been exercised to curtail the evaporating process as much as possible. At present, heat is only applied through the medium of steam, and the process of evaporation is accelerated by maintaining a rarified space above the surface of the heated fluid.

Gasparin (1848).—Varieties of Beet. 1. The field Beet or scarcity Beet: fleshy substance of bulb varied with white and rose colour; outer skin red. This is the variety most commonly cultivated for the purpose of feeding cattle. One of its sub-varieties grows almost entirely out of the ground, to which it is only attached by its inferior radicles. This is the kind generally preferred on account of the facility of its crop. It contains much water and woody fibre. Mathieu de Dombasle considers it inferior to the white Silesian Beet in the proportion of 3 to 5 when equal weights are compared. 2. The common long yellow Beet: fleshy substance yellow; bulb elongated; outer skin of a clear yellow. It grows also above ground. It is highly esteemed by rearers of stock. 3. The yellow German Beet: bulb nearly globular; outer skin a deep yellow. It grows below the surface of the ground, and is a variety that appears to be preferred by many growers. M. Vilmorin informs us that, after comparative trials, M. Bailly, an extensive cultivator of Beet, has found this variety superior to all others. 4. The white Silesian Beet: bulb a little elongated, very large; outer skin and fleshy substance white. There is a sub-variety with a greenish neck, which is employed almost exclusively for the extraction of sugar. It becomes very bulky, but remains below the surface of the earth while growing. This Beet has been constantly shown by the experiments of M. Girardin to be the most productive of all the varieties grown. The white Silesian Beet is much richer in sugar than the field Beet, but contains less nitrogenous matter. M. Boussingault, having analyzed these two varieties from crops grown in 1838, found that in the dry state the field Beet had 1.70 per cent. of nitrogen and the white Silesian only 1.43, and in the ordinary state the former 0.21 and the latter 0.18. The field Beet therefore would, on chemical theory, be more advantageous for feeding cattle, and the white Silesian Beet more valuable for the purposes of sugar manufacture. Beet-root exposed to a temperature below that of congelation enters into decomposition. Its seed germinates and its vegetation commences when the temperature reaches 45° of Fahrenheit. We know from the researches of M. Decaisne, that what we call the root of the Beet, bears in its middle portion an elongated pith in the form of an inverted cone, the characteristic of a stem expanded by a cellular mass, and where the radicular part is surrounded and concealed by such expansion. In the greater number of cases, that part of the Beet which is raised out of the earth comprehends the small stem, and the part below the earth the true root. This mass increases gradually by the superposition of concentric zones, each of which is composed of materials perfectly identical throughout the whole of them; in such a manner, according to the observations of M. Peligot, that the quantity of sugar, at every age of the plant, is proportional to the bulk of the root and of the root-shaped stem. During the first year of the growth of the Beet, its stem increases in length, and becomes gradually more expanded and fleshy; each successive rank of its leaves tends, by the expansion of its fibres, to augment the number of the concentric zones: it is only in the second year that the herbaceous or woody stem elongates itself finally, and bears its flowers and seeds. The Beet is perhaps more indifferent than any other plant of its class, to the nature of the soil in which it is cultivated, provided that it

has depth without stagnant moisture; and if the management and manures are the same, the crops do not vary so much under different circumstances as might perhaps at first be supposed. The Beet, in fact, succeeds in every soil, excepting in those without tenacity, composed only of siliceous and calcareous sand, which are ready to dry up, and in which the plant experiences in consequence too frequent checks to its regular growth. M. Girardin has cultivated the white Beet in alluvial sands, humiferous or peaty sands, argillaceous sands, and calcareous sands; and the produce under these four different circumstances was found to be represented by the following numbers—59, 46, 48, and 34; the alluvial sand proved the best suited of these soils, and the calcareous sand the least so. Generally speaking, this plant prefers soils of an average consistence, rather tenacious than light, fresh, and enriched with manuring matter. Schwerz considers the Beet as less exhausting than the Potato; a crop of Barley after Beet having been found much finer than the one taken off the same field after Potatoes. Beet requires a good stock of manuring matter, of which, however, it borrows only a small amount for its own use; in other words, it should be cultivated on land in very good condition, but which it exhausts but little, especially if the leaves are returned as manure to the soil. Better than all the other roots, it succeeds in different climates, provided that no frost should set in during the period of its cultivation; its times of sowing and cropping may be advanced or retarded according to the particular mode of culture adopted; it is accordingly capable of adapting itself with great facility to arrangements connected with improved systems of husbandry. It is true that when we do not grow it for the purposes of sugar manufacture, its produce must be consumed on the farm, and that it offers but few resources for the alimentary support of man, although efforts have often been made to introduce it into the composition of bread. It is otherwise when it is grown in the neighbourhood of sugar-works, and becomes a produce immediately realisable. Under these circumstances the Beet crops will be sought for and purchased for ready money; they will assume all the extension of which they are capable; and the cultivation, being required to furnish produce of indisputable character, will no doubt arrive eventually at the highest degree of perfection attainable. Grown, however, in districts remote from manufactories, the Beet will no longer occupy more than a few fields on the farm, for the purpose of supplying additional fresh food for cows and pigs; and it will only be found on lands a little more extended in possession of rich and first-rate agriculturists, where, however, it will be limited by the proportion its cultivation ought to bear to the other forage crops, to which it is never more than an auxiliary. In the first case, it will become the pivot and most valuable stimulant for the improvement of general cultivation; it will introduce into the country methods of culture of the most perfect and economical character, which will extend from the Beet to other plants. In the second case, the Beet has special and most valuable properties. It requires operations less costly than the Carrot; the risks to which it is exposed from insects are much fewer than those with which the Turnip has to contend. It can be consumed in its raw state without inconvenience, and it is capable of being easily preserved for a long time in store; such, however, is not the case with the Potato, which sprouts two months before the Beet-root has ceased to yield fresh food for cattle. The Beet accordingly ought to be included in every good assortment of winter food. Its true use should be regarded as a resource when other roots have failed. Thus, during frost, when the earth cannot be conveniently opened to get at the Jerusalem Artichoke, we ought to supply its place by Beet-root, and defer its further consumption when the weather changes; again, however, having recourse to it when the Potato and the Jerusalem Artichoke begin to sprout; the circuit of the year therefore is then accomplished, which recommences with the vegetation of spring. It is by such combinations that the supply of fresh vegetable nourishment need not be suspended for a moment on the farm, to the great advantage of the health and condition of the animals.

SCHLEIDEN (1849-51).—Of all the binary compounds of the known elements, those formed of oxygen and of hydrogen are the most important for vegetation. I. Of the oxygen compounds, water and carbonic acid stand in the foremost rank of importance; then oxalic acid and the other oxygen acids; and lastly, the oxides of the known metals. 2. Of the hydrogen compounds, ammonia is the most remarkable; then the hydrogen acids of chlorine, iodine, and bromine. Ammonia is probably the source of all the nitrogenous compounds occurring in plants; it exists, however, in a free state, only in immature vegetable juices, as, for instance, in the spring sap of the Birch, the Vine, and also perhaps in some plants whose juice is of an anomalous character; as, for instance, in the Beet root. The Cabbages and Beets are particularly distinguished above all other plants, by the great amount of nitrogenous matter in their leaves; and they belong on this account to the most nourishing vegetable productions; as food, however, they very easily become flatulent. Beets of every kind are roots, the Kohl-rabi stalks, which through cultivation have become fleshy, that is, in which the parenchymatous matter of the pith and the rind has remarkably increased in size. They are generally rich in sugar and gum.

SCHMID (1850).—The discovery was first made by Marggraf, at Berlin, in 1747, that the same sugar as that furnished by the sugar-cane was contained in the juice of the Beet-root, and could be extracted from it in a pure state. This discovery soon obtained the notice of parties engaged in the industrial arts; but it was not until the year 1812 that it received from France a wider diffusion, and a knowledge of it became more generally extended, especially throughout Germany and Belgium. The result of all the experiments appears to prove that the variety known under the name of the white Silesian Sugar-Beet is the richest in saccharine matter. A fertile sandy loam, deeply cultivated to the extent of from 12 to 16 inches, yields the best Beet-roots. Fresh animal manure, containing, as it does, much nitrogenous matter, is on that account not the best application adapted for its cultivation, because it increases the amount of nitrogenous compounds in the root at the expense of the sugar. The greater the weight of a Beet-bulb is, so much smaller, generally, is the amount of sugar it contains. Accordingly, Beet-roots of the same crop have been found to give the following results:—

Beet-root weighing a quarter of a lb.		contained	13 per ct.	sugar
„	„	half a lb.	„	11 to 12 „
„	„	two lbs.	„	8 to 10 „
„	„	three lbs.	„	6 to 7 „

BOUSSINGAULT (1851).—In France, it is estimated that the average amount of white sugar obtained from the Beet is only about 4½ per cent., while the composition of that root shows so much larger a proportion of saccharine matter. This considerable loss is chiefly attributed to the action of the salts of potash contained in the juice of the Beet, as well as in that of the sugar-cane, salts that are again found in large proportion in the molasses obtained from each of those juices. To this undoubted cause of the alteration of the sugar during boiling must be added another, more powerful perhaps, and of which the effects are manifest in the juice immediately after its extraction by the press. This de-

structive action proceeds from the circumstance of the albuminous matter modifying itself in contact with the air into a real fermentative substance, which renders the sugar uncrystallizable. In the opinion of M. Melsens, who has successfully devoted his attention to the study of the causes of changes taking place in saccharine matter, it is sufficient, for the purpose of opposing the formation of destructive ferments, to exclude all intervention of air. In setting out from this principle, M. Melsens has applied himself to the discovery of a body very absorptive of oxygen, without action on the sugar, without danger to the health, and easy to be prepared. The bi-sulphite of lime has appeared to him to satisfy these various conditions. This salt effects the coagulation of albumen, of casein, and of white of egg, at the temperature of boiling water. The bi-sulphite of lime possesses all the properties of a clarifier, as it removes all the nitrogenous matter from the juice of the sugar cane and that of the Beet; it acts too as a decolorizer, or bleaching agent; it substitutes for the fixed acids in the juice an acid that is gaseous and inert, namely, the sulphurous acid. M. Melsens having made a great number of experiments on this subject, is so fully persuaded of the preservative properties of the bi-sulphite of lime, that he believes it will become possible, in tropical regions, where the juice of the cane turns sour so rapidly, to extract the sugar from it by the sole employment of the sun's heat, evaporating the juice in the open air in the same manner as the salt water is dried up in marshes near the sea. Without participating in all the expectations of M. Melsens on this subject, I am inclined to think that the bi-sulphite of lime will find an useful application in the treatment of the "begasse" (cane trash or sugar cane stalks that have passed through the mill, and are used only for lighting fires), the residuary sugar of which is destroyed with astonishing rapidity. The employment of the bi-sulphite would allow of the Beetroots being grated in advance, and of their pulp being kept on hand, to be pressed at convenient leisure after undergoing successive macerations. The juice would furnish limpid and colourless decantations, no longer requiring the employment of animal charcoal. Concentrated in evaporating vessels to the density of 1·30, it would then be removed to the crystallizing chamber. This method would much simplify the extraction of sugar; and even supposing that it were not adopted on a large scale, it would be the means of bringing the manufacture of Beet sugar within the range of farmers. All, indeed, that would be required, as M. Melsens himself remarks, would be a root cutter, a few casks, a boiling copper, and some earthenware pans, to extract at once from a ton of Beetroots a whiter sugar than any of the finest sugars of commerce. During a close investigation of the juice of the Beet, M. Bracconnot has ascertained that the nitrogenous principle, albumen, that it contains, does not become coagulated by the action of heat, even on continuing the boiling of the liquid or concentrating it by evaporation. He attributes this non-coagulation of the albumen to the absence of salts of lime in the Beet juice; for he found that if a small quantity of a calcareous salt, such for instance as the chloride of calcium, the acetate of lime, or even sulphate of lime in powder, was mixed with the juice, and heat then applied, the whole of the albuminous matter would be instantly precipitated in the form of bulky floccules. By this simple addition of a salt of lime, a liquor was obtained quite as limpid and colourless as that resulting from the Beet-juice when clarified by means of quick-lime. This liquor, evaporated conveniently, and removed to the drying-room, yielded a mass on crystallized sugar almost completely free from treacle. M. Braconnot concludes his researches by remarking that sulphate of lime in powder will probably be found advantageously to replace quick-lime in the clarification of Beet-juice, without presenting any inconveniences of that caustic alkaline earth. From the whole of M. Péligot's experiments, it results that the average composition of the Beet may be assumed to be constituted of 87 per cent. of water, 8 per cent. of substances soluble in water—chiefly sugar, and of 5 per cent. of insoluble woody matter; and as only about 4½ per cent. of sugar is extracted from the juice, it is obvious how great a loss of sugar is experienced in the manufacture. It occurs, however, in this case as in that of the sugar cane, that a part of such loss is occasioned by saccharine matter being left behind in the plant after the juice has been pressed out of it. Thus, with the presses now in use, only from 60 to 70 lbs. of juice are obtained from 100 lbs. of grated Beet-roots, which at the same time, perhaps, contain very nearly 95 lbs. of that liquid. We cannot therefore reckon on there being subjected to the process of sugar extraction more than the average weight of 65 lbs. of juice, containing, according to the mean result of the analyses, 5½ lbs. of sugar. The real loss of sugar, therefore, sustained, when we obtain only 4½ lbs. of it from 100 lbs. of Beet-root, may be stated as about one-fifth. This loss, great as it appears, is often estimated to be still greater when the roots contain from 10 to 11 per cent. of crystallizable sugar. In sugar-cane works, the saccharine matter left in the begasse or pressed canes, is completely lost, being either burnt with the wood or destroyed by fermentation. In this respect the Beet-root has an advantage over the sugar-cane, which is, that the sugar of the pressed pulpy matter may serve as food for cattle. This pulp cake, indeed, is ungrated Beet; and if as cattle-food a little inferior to the entire root, it arises only from containing a larger proportion of woody matter—that is to say, of woody matter which belonged to the juice extracted by the press. We may even estimate approximatively the composition of the pulp relatively to that of the root; for, according to the average constitution we have already assigned to the Beet-root, and supposing that it has yielded 65 per cent. of juice and 35 per cent. of pulp, it is obvious that 100 parts by weight of pulp will give 79 of water, 7 of sugar and albumen, and 14 of woody matter. One of the causes which have perhaps the greatest influence in diminishing the amount of saccharine yielded by the Beet, is the difficulty of preserving its root when it has attained its maturity. The crop being taken up at the end of autumn, the bulbs are as liable to injury from the severity of winter as from too mild an atmosphere. The frost destroys their organisation, while mild winters promote their vegetative tendency at the expense of the sugar they contain. As Beet contains saccharine matter at every stage of its growth, it might perhaps be advisable to prevent its attaining its full development by taking it up earlier. By sowing also more thickly, and commencing the extraction of the sugar before the full time of the crop, we should probably be enabled to compensate the difference that would result, as one of the consequences of this innovation, from the less size and weight of the bulbs. Should this view of M. Péligot be realised, even to a certain extent only, in practice, the cultivation of the Beet would recur more nearly to that of the Sugar-cane, in allowing to the manufacture of Beet-sugar a routine that would be found to diminish the inconveniences attending the preservation of the root.

PABST (1851).—Beet-roots are from autumn to spring a wholesome food, promoting at the same time both the milk and the flesh of an animal. They are more watery than Potatoes, and on the average 3 lbs. of Beet root may be reckoned for 2lbs. of Potatoes; but as they are neither purgative nor flatulent, when obtained in good condition and given with the ne-

cessary addition of dry fodder, Beet-roots in a raw state may be given in a considerably greater quantity than Potatoes can. When the Beet is of really good quality, as for instance of the yellow globe Oberdorf, or the white Silesian, sugar-Beet varieties, 275lbs. will be found equal to 200lbs. of Potatoes, or 100lbs. of good sound hay. I found, during the course of some experiments on fodder made by me at Hohenheim in 1825, that a fodder composed of one-fourth Potatoes, one-fourth Beet-root, and one-half hay and straw, was quite as valuable for dairy stock as 250lbs. of Beet and 200 of Potatoes. There is, indeed, no reason whatever for giving Beet-root to cattle in any other than its raw state, as its value for fodder would not be increased by boiling or steaming. When good stacks of Beet are made, and a portion also is put away in the store-house, it will keep fit for use until May, provided it be guarded from the injury of frost on the one hand, and from the influence of too warm an atmosphere on the other; for this root loses much of its value as soon as it begins to sprout. In every case the sugar Beets are more easily wintered than the other varieties; and their value on that account is essentially increased.

Wolff (1851).—Sugar occurs in the vegetable kingdom of two essentially different kinds; namely, as raw sugar, and as Grape or fruit sugar. The first kind is well known as being present in the sugar-cane, as well as predominating in the juice of the Beet-root and of the Maple tree; it differs from the second kind in external condition by the perfect facility with which it crystallizes, and chemically by the less proportion of water it contains. Raw sugar contains rather less oxygen and hydrogen (in the proportions forming water) than the starch or dextrine (starch-gum), out of which sugar is in every case formed; while Grape sugar, on the other hand, contains rather a greater amount of those two elements of water. Raw sugar is easily converted into Grape sugar during the process of fermentation, by the action of the peculiar substance diastase, and by means of diluted acid; so that it is probable that on the abstraction of water in the vegetable organism raw sugar first arises out of dextrine, and is again on the resumption of a certain portion of water further changed into Grape sugar, namely, into a kind of sugar which occurs far more frequently in the vegetable world than raw sugar does. Sugar is formed in large quantities in different plants and particular portions of them at certain seasons of the year; in fruits at their time of ripening, in many roots at the end of summer, in trees in the spring, in all young plants during the first period of their growth. We cannot regard any particular organ, not even in the case of one and the same plant, as the seat of sugar-formation: for even saccharine matter, like all matter universally diffused in the vegetable kingdom, is produced in the most widely different portions of plants; the formation of dextrine, however, always precedes that of sugar. It has been observed, for instance, that in spring the juice of the Birch-tree is richer in sugar, in proportion as the part from which it is drawn is further removed from the root; a circumstance arising from the dextrine being in greater amount in the lower vessels of the tree, and becoming converted into sugar, as its transition upwards is effected through a greater number of cells. Sugar can obviously be transformed into starch, as the accumulation of starch in the seeds of the Grasses, particularly in the grain of the Cerealia, clearly proves. In their early growth, these and many other plants are rich in saccharine matter, which, as in the cases of the Indian corn stalk, disappears when the grain attains its perfection, and is converted, as it would seem, into the great quantity of starch which those grains are found to contain. Whether the formation of sugar always precedes that of starch, is not generally to be ascertained; that it is often, however, the case is certain. Starch, like woody fibre, may, it appears probable, be formed immediately from dextrine, in the same manner as dextrine on the other hand may be easily produced from starch. Sugar also, under certain circumstances, undergoes a clear re-conversion into woody fibre and cellular matter, as may be observed in the case of sweet fruits, which sometimes lose their sweetness in consequence of their sugar being in a great degree converted into cellular substance. It is impossible to point out the causes of all these progressive and retrograde formations; we must content ourselves with knowing that they do actually take place, and that they possess in themselves some instruction for our guidance, since all these substances display so great a similarity in their chemical composition, while at the same time, by the simple assumption or rejection of water, they are often, beyond the range of vegetable organism, transformed into each other, and always contain oxygen and hydrogen in the same quantitative proportions as they exist in the composition of water.

Payen and Richard (1851).—There are very few agriculturists of the present day who are not perfectly acquainted with the advantages attending the cultivation of the Beet or Mangold Wurzel; it is, in fact, one of the most important plants in good husbandry. Its roots give, in nearly every soil, a large amount of crop, and serve both as a food for cattle and for the extraction of a sugar, which, when well refined, is equal in every respect to that which in hot climates is produced by the sugar-cane. These roots also, when properly cooked, furnish a tolerably agreeable vegetable, which serves to vary the food of man during the winter season, when there are so seldom fresh vegetables for the table. The breadth, however, of its cultivation in France is only 142,500 English acres, being much less than that of the Potato. The departments in which Beet culture is carried on to the greatest extent are those of the North, of the Pas-de-Calais, of the Somme, of the Aisne, &c., which furnish the greater part of the roots required for the sugar manufactories. The Beet is an indigenous plant; it came originally from the southern countries of Europe, but can be cultivated with equal facility in the north or the south. The following are its principal varieties:—1. Field-Beet: long, rose colour, growing above the earth; fleshy part veined with rose colour. It offers two sub-varieties: the one flat-bulbed, short, and half sunk into the earth; the other long, and growing more above the ground. This variety of Beet contains in general less nutritive principles than the other varieties, and especially less saccharine matter. In deep, wet land, the crop is very abundant; it can therefore be only grown as food for cattle. A sub-variety has, however, been found by M. Payen and M. Vilmorin to yield greater proportions of sugar and other proximate principles than even white varieties grown on the same soil. 2. The Sugar Beet: white, short, growing in the earth; flesh white. Two sub-varieties have been distinguished; the one with the neck green, is the Silesian Beet; the other, with the neck of a rose colour, is in general richer in sugar. 3. The Yellow German Beet: long, yellow, grows above ground; flesh white, or lightly veined with yellow. 4. The Yellow Globe Beet: round shape, growing almost completely out of the earth; flesh white, or lightly veined with yellow; contains only a small proportion of sugar. 5. White-Yellow Beet: middle length, grows in the earth, flesh white, skin of a pale yellow colour. 6. The Long or Great Yellow Beet of Castelnaudary: long, grows much out of the ground; flesh and leaf-stalks deep yellow. This is the variety especially cultivated in the neighbourhood of Paris. 7. The Great Red Beet: long, grows much out of the soil; flesh and leaf-stalks red. In general, even for the food of animals, we should less consider the bulb of the roots, or even the quantity of their produce, than the amount of nutritive matter that they contain. There is obviously every advantage in cultivating a variety

which in the same bulb will contain more nutritive principles. On this account the generality of farmers agree in giving the preference to the Silesian Beet, which contains more sugar and less foreign matters than the Field-Beet; and has also the great advantage of being one of those varieties that best resist the action of frost. If all rearers of stock are agreed as to the nutritive qualities of the Beet, they are not equally so as to the influence it exercises on the production of milk in dairy cows. According to some authors, Beet favours the secretion of milk; while others, on the contrary, think that it is very unfavourable for that purpose. Schwerz considered that feeding for two days only on this root was sufficient to diminish the amount of milk in a very striking degree. It maintained animals in flesh and good condition, a circumstance highly favourable in severe seasons. Potatoes and Turnips forced the milk, and Beet the flesh; the latter being more favourable for fattening stock than Potatoes and raw Turnips are. This opinion on the but little favourable influence of Beet on lactation is not participated in by all farmers. The Baron Crud remarks:—"After an experiment which I have conducted with the greatest care, and after the inferences which I have deduced from the results I have obtained in the employment of this root for the food of cattle, and particularly for that of dairy stock, I consider it to be wholesome, fattening, and milk-secreting; the milk given by the cows partly fed upon it being of an agreeable taste and flavour." We might here cite other parties in favour of the milk-yielding properties of the Beet, of whose roots the rearers of stock, who may be regarded as excellent judges on this point, require an enormous supply for consumption by the dairy-stock which they rear. Horses in particular appear to be the animals to which the diet of the Beet is most favourable. There are districts, as in the Palatinate for instance, where the horses are fed almost exclusively on this root during seven or eight months of the year, and are maintained by it in a perfect condition even while employed in the roughest kind of work.

Doebereiner (1852).—The manufacture of crystallized sugar out of the white Sugar Beet has assumed in Europe, and particularly in Germany, so important an extension, that a considerable competition has arisen between this article of commerce and the Indian sugar derived from the Sugar-cane. The returns obtained in consequence from field husbandry and cattle feeding have essentially increased, while corn growing, on the other hand, has ceased in some of the most fertile of our districts. The white Silesian Sugar Beet is the variety best adapted for the extraction of the largest amount of sugar; and it requires for its cultivation an adequately deep, fertile, sandy loam, and in dry seasons a clay soil; on either of which kinds of soil the Beet may be raised several years in succession, but never with fresh manuring matter. The crop is stored for future use in pits two feet deep, in which the roots are heaped four feet high and covered with a sufficient layer of earth. The stock must, however, from time to time be examined, in order that in necessary cases it may be immediately brought into use.

Fraas (1852).—The Sugar Beet, Fodder Beet, or Mangold-Wurzel roots were much cultivated in Burgundy in 1764; also in Upper Franconia in 1765, where Muenchhausen became acquainted with them, and recommended their adoption. Leopold was acquainted with three varieties of them in his time. Von Entnersfeld recommended them in 1791, and they were cultivated at Schleissheim, in Bavaria, in 1772. Bergen, however, in 1780, discountenanced their cultivation. About the year 1811, the Economical Noveltiea and the Hesperus periodicals contained many notices of successful experiments connected with the extraction of sugar from the Beet. In Bohemia, manufactories were established at Ziuk and Liboch; and at Neuhaldensleben, near Magdeburg, Nathusius, in 1820, prepared Beet sugar on a large scale.

Dairy Management.

Captain Stanley Carr, agreeably with his engagement, attended this meeting for the purpose of reporting the arrangements he had made for the importation of the German glass milk-pans, for more economical purchase by small farmers than it appeared was afforded by the expensive glass milk-pans brought into the market by the English manufacturer. Captain Carr stated that Mr. Thomas Peterson, of Trinity Chambers, Waterlane, Tower-street, London, had undertaken to supply the German milk-pans in any quantity at 2s. each, or at 21s. for the dozen, of the same shape, size, and quality as those which Captain Carr had himself obtained and sent to the Society some years ago.—Mr. Duncan, a gentleman residing at Bradwell, near Stony-Stratford, in Buckinghamshire, favoured the Council with the following communication, dated April 15:—

"All I know about glass milk-pans is this: When I first took to dairying on a large scale I laid out £20 in glass pans, because they looked so well in a dairy. On further acquaintance with them, I have come to the conclusion that they are the cheapest things (even at 4s. each) that a farmer can use; for they are washed and wiped, and are kept clean with 300 per cent. less trouble than 'leads.' If the dairy-maid is given to understand that she will have to replace all the pans cracked by the use of hot-water, experience proves to me that there will be no breakages whatever from that cause. I have seen them crack once or twice in three years, when the milk has been poured into them; but I imagine there must have been a flaw somewhere previously. But even supposing half a dozen to be broken annually, we have to balance that expense the dairy-maid's time throughout the whole year; for the trouble in keeping leads clean and polished is known to all dairy-farmers. I want 25 glass pans soon, and shall be only too much obliged to Captain Carr if he can procure them for me at the price named by him at the last meeting. My glass pans are about 20 inches in diameter. I do not like larger ones."

Mr. Slaney, M.P., reported to the Council the communication into which he had entered with Mr. Alderman Copeland, M.P., on the manufacture of milk-pans of Staffordshire-ware; and Mr. Law Hodges, M.P., favoured the Council with the following communication, dated April 20:—

"I regret extremely that I cannot possibly be present at the Council to-morrow, when the very interesting subject of Dairy Management will be again under consideration. If I could have been present, I should have mentioned a fact that I believe is little known. I forget the name of the party, but a dairyman who occupies an establishment built by Lord Bristol, at Kemp Town, Brighton, and who keeps 50 to 60 cows for dairy purposes constantly under that roof, has in one or two places where these cows are milked, cisterns with fresh water running into them, and provided also with soap and towels, in order that the men who milk the cows may wash their hands after milking each cow; because these men found that where any cow's teats were diseased, though at first so slightly as not to be perceivable, they nevertheless carried the infection on their hands and inoculated other cows. Now, in

order to make this serious inconvenience, which gives the men so much trouble to cure, impossible, they very willingly obey this order to wash their hands; and there is another reason for their doing so, because in warm weather their hands often perspire, and the milk frequently coming in contact with their damp hands, it becomes tainted in consequence.—With regard to the form of the milk pans, there cannot be a doubt that sides as nearly upright as possible must cause the largest amount of cream: the depth of the milk is a matter easily determined by observation, because the weather, the nature and quantity of the fodder, and the breed of the animals, may prevent, I should think, any precise rule on this head being laid down."

Mr. Rowlandson submitted to the inspection of the Council a gutta percha siphon on the Italian principle, with recurved moveable ends, to retain the liquid and admit of the siphons being removed in a filled state from pan to pan without being emptied and refilled on each occasion.—Lord Camoys also presented a complete dairy-siphon of his own invention, which had been used in his own and other dairies with great success. It was made of block-tin, and provided with a flexible wire piston, by which the air was drawn out and the milk set to flow without the necessity of the mouth being applied for that purpose. As the siphon had been reduced to great simplicity of construction, without impairing its efficiency, it could be made at a very cheap rate, and it was desirable that one should be kept for each pan. There was no registry of invention, or enrolment of patent right, connected with the instrument; so that any individual was at liberty to make and sell it. His lordship's own siphons had been made for him by Mr. Tagg, of Henley-on-Thames, at 1s. 6d. each; Mr. Freeman Roe too, of No. 70 in the Strand, undertakes to make them at 9d. each.—Capt. Stanley Carr thought this siphon a very simple mode of separating the milk from the cream, and one that would save much time and trouble. He remarked that in the best dairy districts of Holland and Germany the cream was removed by a very thin, shallow, finely-formed skimming-dish, generally made of lime-wood, and on that account capable of being kept beautifully clean; also with a large scallop-shell, to which sometimes for convenience a handle was fitted. This operation in Germany was generally assigned to the head dairymaid, and it was astonishing with what rapidity and exactness she was able by constant practice to accomplish that delicate task.—Sir Matthew Ridley having called the Council's attention to the subject of churns, Mr. Love stated that he considered the perfection of a churn to consist in its having an outside case that could be filled with water, for the purpose of keeping the milk or cream, as the case might be, at the proper temperature during the operation of churning, namely, at about 60 deg. of Fahrenheit; and, in its having its dashers so constructed as to carry down into the milk or cream a certain amount of pure air during the process.—Lord Camoys observed that the American churn (of which Burgess and Key, in Newgate-street, were the English agents) was exactly constructed on that principle; and he had in his own dairy found the full efficiency of that churn, which he had constantly in use with the most satisfactory results.—Mr. Fisher Hobbs referred to the similarity between the continental mode of placing the milk-pans on the floor of the dairy, and that adopted in best dairies in the neighbourhood of Cork.—Lord Berners and Lord Camoys detailed the conditions which they had respectively found to affect the ventilation of dairies, stables, and other buildings connected with farm-establishments.—Professor Way thought the theory on which the formation of dew was founded might also illustrate the beneficial effects of placing the milk-pans on floors of dairies.

Farmers' Flax Mill.—The Hon. R. H. Clive, M.P., has given notice that, on the 5th of May, he will make a statement to the Council on the mechanical preparation of Flax from the straw by simple machines adapted for the use of farmers; and the production of a marketable article which they may sell with advantage to themselves, and which the manufacturers will readily purchase.

LECTURE ON SOILS.

Professor Way, Consulting Chemist to the Society, delivered to the Members, in the Council Room of the Society, the following lecture "On the Absorptive Power of Soils," on Wednesday, the 28th of April; Mr. Pusey, M.P., Trustee, in the Chair.

Mr. Way commenced his lecture by saying that he proposed on the present occasion to report to the Society the progress which had been made in the investigation of this interesting subject. It would be remembered that he had before had the pleasure of addressing them on the same topic, and had subsequently published a more detailed report in the Journal of the Society. To facilitate the comprehension of what he had to say, and to place the whole subject distinctly before their view, he should shortly recapitulate the principal points of his previous lecture and report. Before the singular property of soils in reference to the salts of manure had first been observed, it was usually considered that the soil was an inert, dead mass; that it did indeed possess certain substances essential for the growth of plants, but that it was principally as a *place* for the roots of plants to find attachment to, and in which the various salts and compounds of manure might be presented to them—where also changes might take place between those compounds either internally or by atmospheric influence, and not as being absolutely or in a distinct way connected with the preparation of those substances, that the soil was to be regarded. It was not, of course, denied that physiologists and chemists had looked to the soil to yield to vegetation its necessary silica, its indispensable phosphates or alkalies; but there was, he believed, little or no idea of how this was to be effected. We were in the habit of reasoning on the action of different salts upon vegetation *in* the soil by the effects that we observed to follow from their use *out* of the soil. How numerous were the experiments that had been made of growing plants in different solutions! how constantly had the results been quoted and applied to the probable and expected action of the same salts when added to the soil! Sulphate of ammonia or nitrate of potash, when used as manure, and incorpo-

rated with the soil, were still viewed *as* sulphate of ammonia and nitrate of potash; no change was expected to occur to them, but it was a matter of speculation what the plant would do with these salts, how it would appropriate the parts that it wanted, and get rid of that which was unnecessary and objectionable; substances in every possible form of combination, and in solution of every imaginable and constantly varying strength, were supposed to come with equal welcome to the growing plant, which of course had the fullest power to compound and recompound according to circumstances and the necessity of its requirements. This, Mr. Way believed, was the general impression—an impression not confined to the ordinary observer, but shared by those who had made vegetable physiology their special study. Now, however, it became necessary to take another view of these matters; it had been shown that most if not all the salts of manure underwent an immediate and radical change directly they were incorporated with the soil; that sulphate of ammonia, for instance, directly it reached the soil, was no longer to be found in it, no longer existed there as such; that water, which washed it in, would not wash it out again; that all salts of the same base and of most other bases underwent similar changes, and that they were reduced to one general form, in which they were to be presented to the growing vegetable. It would be shown that the soil was by no means a passive or idle spectator of what took place in it; that it was not a mere meeting-place for the roots of plants and the food they were to grow upon, but that it was actually the *stomach* of the plant; or he might go further, and say that nature had actually given to the soil the function and office which in animals is performed by the gastric juice and the chyle—that of preparing and digesting the food of plants. If this position could be established—and he believed that it followed as a logical deduction from the facts which he had to bring before them—he thought that we should have gained a new and a charming insight into the working of nature, and should have supplied a link hitherto wanting in that chain of phenomena which we perceive to connect animate and inanimate existence. The passage from vegetable to animal life was comparatively easy: the proximate forms of the one are changed, indeed, in organization, but appropriated without change of composition in the other. Gluten in wheat and barley becomes albumen in the egg, and fibrine in the flesh of the fowl; and these substances are in the act of decay, by easy processes readily explainable on the laws of chemistry, again reduced to a few simple forms of combination: the egg and the flesh putrefy, and form intermediate compounds, which ultimately unite with the oxygen of the air, and carbonic acid, ammonia, and water, with various mineral salts, are the final results. But the building up of these various compounds again into the form of plants was a somewhat long step in the ladder: at the best it was difficult, and might always remain difficult, to conceive how carbonic acid and ammonia, with a certain portion of sulphur and phosphorus, were to be converted into starch and gluten; but at all events it was highly desirable to reduce this difficulty as much as possible, and it appeared that if it could be proved that the soil was entrusted with the duty of changing the various salts and compounds resulting from the decay of animal life into one general and uniform state, suited to the delicate organs of plants, and releasing them from the necessity of dealing with the heterogeneous materials which they might otherwise have to encounter and make use of, a certain and not unimportant step had been made in the perception of that unity and simplicity which cannot but obtain in all the great outlines of nature. Henceforth we should consider the soil not as a dead, inert mass, but endowed by virtue of chemical laws with a species of activity, subordinate and inferior, but somewhat more nearly approaching than we have been in the habit of thinking, to that of the plants that live on it. To return, however, to the history of these discoveries: whilst the state of knowledge was such as he had described it, observations were made by the Reverend Mr. Huxtable and Mr. H. S. Thompson, but more especially by the latter, which threw a new light upon the subject. Solutions of different salts of ammonia, and the drainage of manure-heaps, were found, when filtered through beds of ordinary soil, to be entirely altered in character: the colouring matter and smell of the manure were removed, and in the case of ammoniacal salts, the ammonia was arrested and retained by the soil. This was a curious and most interesting result: it indicated a power in the soil to combine with certain organic substances and salts, and to render them insoluble—a power which previously had never been supposed to exist. When he (Mr. Way) took up the subject, he soon found that this property was not confined to the salts of ammonia, but extended more or less to all the different alkaline compounds of manure—that it was shared by salts of potash, magnesia, lime, &c., and that phosphoric acid and soluble phosphates were included. He also observed that the power of the soil—its tendency to retain the compounds—only applied to the *base*, and not to the whole salt; that is to say, that if a solution of sulphate of ammonia were filtered through a soil, the sulphuric acid was found in the liquid, not indeed in the free or uncombined state, but as sulphate of lime, or in combination with some other earthy or akalline substance. The filtration process, too, did not appear to be necessary. A salt when in solution had only to be incorporated with the soil, and could not afterwards be washed out of it. This action was instantaneous, or almost so: no length of time was needed for its occurrence. With regard to the extent of the action, it was found that 100 parts of an ordinary loamy soil would unite with 2-10ths or 3-10ths of ammonia, and a larger quantity of potash; or in other words, 1,000lbs. of soil would unite with from 2 to 3lbs. of ammonia. This quantity might at first seem small, but it was not so when taken in connection with the vast mass of the soil which in agriculture we have to deal with. Every inch in depth of a soil over an acre of land was calculated to weigh 100 tons; and if 6 inches of the soil were cultivated, that quantity would weigh 600 tons, and would be found equal to unite with nearly 1½ tons of

ammonia—a quantity which would be furnished by about 7½ tons of sulphate of ammonia, or 10 tons of Peruvian guano. It was plain, therefore, that the power of absorption was fully twenty times as much as was necessary, or likely to be ever put in force; so that allowing for a very large portion of the soil not being brought into contact with the manures, the power in question was practically ample for all purposes. He had endeavoured to show how important the property was in relation to many details of agriculture; for instance, in the preservation of manure, since it was plain that alkaline salts did not remain in the soil in such a state that they might be washed away by the first shower into the drains—that manure consequently might with safety be entrusted to the soil, and that the manuring for a rotation of crops was not so wasteful a process (with due allowance for the nature of the soil) as might otherwise have been supposed. It was important, also, as removing any fear of the effects of drainage, and indeed threw an additional light on the benefit of drainage as a means of bringing the manure into contact with a depth and quantity of the soil which would ensure its retention. It had been shown, too, that this discovery had given a new feature to irrigation, and to the use of liquid manure, since water might, and did, carry into the soil in solution substances which it would leave there in the most available form for the uses of vegetation. Thus a solution of carbonate of lime as it was met with in hard water would leave in the soil a dressing of chalk, which although perhaps not large by absolute weight, was, on account of its more perfect and equal distribution, more than equal in effect to a mechanical addition of the same manure. Liquid manure might have been—he might say *had* been—supposed only so far available for vegetation as it could be at once taken up by the plants: if it were used in such quantity as that any liquid were to escape into the drains, that liquid was supposed to be the manure itself. Now, however, we saw that liquid manure might be applied to the *soil*, without reference to whether plants were or were not growing on it; and that manure was even more safe when so laid on than if applied in the solid state. All these conclusions, and many more which time would not allow of his dwelling on, had resulted from the discovery of the power of soils to unite with manure. But two important questions had now naturally presented themselves:—1st. What is the cause and nature of the change which the different salts of manure undergo by mixture with the soil? 2ndly. How, supposing these fertilizing ingredients to be rendered insoluble in the soil, do plants ultimately get at them for their nourishment? It was in respect to these two questions that he hoped to give the members of this Society some further information; but he would remark that he did not pretend at present to give more than a report of the progress that had been made. The subject was still, and would probably remain for a long time, under investigation, and as he hoped to have the pleasure to publish a paper on it in the midsummer number of the Society's Journal, he should content himself in the present instance with a brief outline of the principal results. And first, as to the cause of these changes. In the last paper it had been shown partly what were *not* the causes—that it was not a surface-attraction, such as, according to Lord Bacon and others, sand possessed, enabling it to remove common salt from sea-water—for in that case the whole salt was removed; whereas, in the case of the soil, it was only the base of the salt that was detained. It had been supposed to be due to carbonate of lime in soils; but independent of the fact that the change of a salt such as sulphate of ammonia into carbonate of the same base by the influence of carbonate of lime would still leave it soluble and capable of removal by water, clay, absolutely free from chalk, had been found to possess the absorptive property to a large extent, and the addition of chalk to it did not increase that power. Again, it was supposed to be due to certain organic compounds capable of forming insoluble combinations with ammonia; but although he did not deny that such compounds might exist, the property in question was clearly not referrible to them, for not only did a clay dug from a pit, white and free altogether from organic compounds, absorb ammonia, but a soil when burnt so as to destroy its vegetable contents, still in a great measure retained its power. The power therefore did not reside in sand, nor in carbonate of lime, neither did it belong to the organic bodies of the soil, and it could only therefore pertain to the clay or some substance in the clay. That it was not shared by the whole clay he was early convinced; because, if so, the amount of the power would have been far greater than it really was. He (Mr. Way) had early believed that it was connected with the existence of some double class of silicates; and he had mentioned this belief fully twelve months ago, when lecturing to them on the use of lime. And knowing that clay contained portions of the felspar, and other minerals which had existed in the rocks from which the clay was originally formed, he was induced to try whether they were the substances of which he was in quest. Felspar is a double silicate of alumina and potash; it might be supposed capable of yielding its potash up to certain acids and taking ammonia from them instead. Accordingly, powdered felspar was digested in sulphate of ammonia, but no kind of result was obtained. He had observed that wherever a solution of a salt of ammonia was poured upon a soil, although this soil contained no soluble salt of lime, yet the resulting liquid always contained lime in solution. It was thought, therefore, that soils might contain an insoluble silicate of lime capable of uniting with ammonia in place of lime, and so giving rise to the results observed. Silicate of lime was therefore prepared by adding to a solution of a salt of lime a solution of silicate of soda, or soluble glass, as it was sometimes called; but the resulting silicate, after being collected and washed, had not the requisite action on salts of ammonia. It was, therefore, necessary to look further; and an attempt was made to produce artificially, and without the aid of heat, a class of compounds similar to felspar and other natural silicates existing in granitic rocks. Such a class of compounds had hardly been known to chemists, or, if known, had

been but little studied, and certainly not with reference to their agricultural bearings. The present attempt to form them had been eminently successful, and had, as he hoped to show, served to clear up the difficulty in regard to the absorptive powers of soils. Mr. Way here showed to the meeting the way in which these silicates were formed. A solution of common alum gave, with a solution of silicate of soda, a bulky precipitate, which was not silicate of alumina only, but a compound of silicate of alumina and silicate of soda. Mr. Way explained that the best plan to get this compound of definite composition, and containing the highest proportion of alkali, was to dissolve pure precipitated alumina in caustic soda, and to add to this a solution of silicate of soda in which the silica was in relation to the soda in the proportion of rather less than one equivalent. The resulting silicate might be washed with distilled water, and dried. Mr. Way went on to say that this double silicate of soda and alumina was the type of several others which could be formed from it. He represented it in a diagram, thus—

Silicate of Soda and Alumina { { Silica / Alumina } / { Silica / Soda } } With water of combination ;

and stated that, when the water was driven off by heat, its composition in 100 parts was—

Silica	52·40
Alumina	29·68
Soda	17·91

or in the relation of two equivalents of silica to one of soda and one of alumina. This silicate was chiefly of interest as the source of others; thus, when digested in a solution of a salt of ammonia, soda dissolved out in the shape of a muriate or sulphate, as the case might be, whilst the silicate, when washed and dried, would now be found to contain ammonia. On the table were several of these silicates, which were white powders. He would, on the present occasion, direct their attention principally to the silicate of alumina and ammonia. He had not yet succeeded in obtaining it with the full theoretical proportion of ammonia; but it was found with as much as 6 or 7 per cent. of ammonia. It was a salt only very slightly soluble in plain water; indeed, it was hardly to be said to be dissolved by water, for water did not dissolve the whole compound, but left the silicate of alumina undissolved. The solubility was such that one part of ammonia dissolved in 70,000 parts of water, or, in other words, an imperial gallon of water would dissolve out from the silicate one grain of ammonia. Upon consideration, this would be seen to be an excessively slight degree of solubility; for an equal quantity of water, quite free from carbonic acid, would dissolve twice as much (or two grains) of carbonate of lime, which was usually reckoned an insoluble substance. One of the great questions—namely, as to how plants got their ammonia from the new compounds—was, therefore, partly answered. These compounds were not absolutely insoluble, although water dissolved so little of them that he might be pardoned for having believed at first that no portion of ammonia passed through the soil. But the silicate of ammonia was much more soluble in water containing carbonic acid gas, as all natural water did. It had been found that one gallon of a saturated solution of carbonic acid dissolved about two grains and a half of ammonia from the double silicate, or more than twice as much as pure water. If the quantity of water that annually fell on an acre of land, and which was as much as from 2,000 to 3,000 tons, was taken into consideration, and that part of the water was always in the soil, and might be engaged over and over again in dissolving the ammonia and presenting it to the plant, there was no difficulty in understanding how the few pounds of ammonia required by the wheat crop might be supplied to it with sufficient rapidity for its ordinary growth. But still it was possible that under certain circumstances the slight solubility of the silicate of ammonia might somewhat retard vegetation, and that this might explain the action of common salt. He had found that a solution of common salt dissolved the ammonia in much larger quantity than even carbonic acid water: thus, one gallon of water, containing two grains of common salt, would dissolve twenty grains of ammonia from the silicate, or twenty times as much as plain water. How very likely it was that this was the real explanation of the action of common salt! but in order that they might fully understand this part of the subject, he must explain to them an idea which he had taken in reference to this double silicate of ammonia and alumina. He had already stated that water did not dissolve the whole salt, but that the silicate of alumina remained undissolved, whilst the silicate of ammonia was dissolved in small quantity. Now he had found that this solution of silicate of ammonia, when carefully evaporated, dried up on the sides of the dish into thin transparent scales, like very thin glass, and these scales were found upon examination to be silica; the ammonia having evaporated with the water, and leaving the silica as a transparent varnish on the dish. Was it not likely that this fact formed the true explanation of the manner in which silica was deposited on the straw of wheat? He thought it might be. Chemists had always had a difficulty in accounting for this deposition of silica on the straw of cereal plants by reference to the soluble silicates of potash and soda; and the solubility of silica in ammonia had not been before observed. By the easiest and simplest process a weak solution of silicate of ammonia, in passing through the plant, might leave its silica behind; and the probability of this explanation was increased by Mr. Lawes' observation of the loss of ammonia from the soil in the growth of corn crops. Mr. Lawes had found that for every pound of ammonia of which the nitrogen was fixed in the wheat, in the shape of aluminous constituents, other 4lbs. were lost to the soil in the growth of the crop—that is to say, that 5lbs. of ammonia were required to produce a quantity of wheat containing nitrogen equal to 1lb. of ammonia. This loss would at once be accounted for, and would inevitably result, if the deposition of the silica were due to the action to which he had referred. This argument might seem opposed to the general experience that ammoniacal salts, whilst

they rendered wheat very luxuriant, and increased the produce, were attended with the objection of frequently causing the crop to lodge from want of strength in the straw. But this difficulty he could meet. If, as he had shown the power of the soil to convert salts of ammonia into an all but insoluble double silicate were twenty times more than was usually called into play, it followed as a necessary consequence that in soils containing a fair proportion of clay, all ammoniacal compounds, when fairly incorporated with the soil, would pass into that state. It further followed that in ordinary and natural circumstances, the form of silicate of ammonia or of carbonate, formed by the decomposition of the silicate by carbonic acid water, would be the only one in which the ammonia could be presented to the plant. In other words, that silicate and carbonate of ammonia were the only compounds of ammonia naturally available to supply that important substance to vegetation. He might mention, by the way, how probable this view became when the mild and harmless nature of these acids (the silicic and carbonic) was considered, as fitting them for the nutrition of the delicate organs of plants. Now, in the case of manuring with ammoniacal salts, especially in the form of top-dressings, which was the mode usually adopted, it was quite possible that a portion of the salts were taken up by the wheat in their unchanged condition, without having undergone the necessary elaboration and conversion into the true form of food, the silicate or carbonate; the ammoniacal salts might therefore make the wheat unhealthily gross, without affording it the necessary silica. Such an explanation was consistent with experience, which proved that all highly forcing and stimulating manures, such as guano and ammoniacal salts, soot, and animal matters, should be brought into thorough incorporation with the soil by being used before the time of sowing: then there was never any fear of the result; the maxim of never manuring for the wheat crop was evidently founded on this principle. If this reasoning were correct, every pains should be taken to form compounds of the manure with the soil; and the use of compost heaps of manure and soil had, since he commenced these experiments, always appeared to him by far the most philosophical mode of employing manure. He would even suggest *for trial* the mixing of guano and other concentrated manures with dry loamy soil some months before it was needed, watering and turning over the heap occasionally in a shed, or if sufficient earth were employed it might be done uncovered in the corner of the field where the manure was to be used. When eventually this compost was used, it would no longer be guano, but ready formed compounds, after the model of nature, and such as plants delight in. Mr. Way observed that he had a great deal more to say on these various silicates, but he must now call their attention to another character which the silicates of lime and soda possessed, namely, that of abstracting ammonia from the air. This would be seen to be of the highest importance. When silicate of ammonia and soda, or the corresponding silicate of lime, was placed under a bell-jar or glass shade, upon the bottom of which a few lumps of carbonate of ammonia were strewed, it was found that in two or three days the silicate would have absorbed three per cent. of ammonia or upwards. Here the volatile carbonate of ammonia, being diffused through the atmosphere, came in contact with the silicate, and the ammoniacal silicate was produced, whilst carbonate of soda remained mixed with it. The action would go on till the silicate was saturated with ammonia. Here then was one explanation of the fertility produced by cultivating the soil. The presence of these silicates in clay, enabled the soil to abstract ammonia from the atmosphere, and this abstraction would of course be in proportion to the extent of surface of the soil that is exposed. It had always, indeed, been understood that clay possessed this power of acquiring fertility by exposure, and that it was on its collecting ammonia that the advantage depended. But the power had been referred to a wrong cause, namely, the free alumina or oxide of iron in the soil. It had usually, also, been supposed that rain or dews were necessary to bring down the riches of the air to the earth; but it would be plain that at all times a good soil, freely opened to the air, would be getting richer in ammoniacal compounds. The power of clay to absorb ammonia from the air was most marked. If air saturated with carbonate of ammonia were passed through a tube containing dry clay in fine fragments, it would be found to issue quite free from ammonia; whereas, passed through a tube similarly filled with sand, the ammoniacal gas was in no degree removed. Mr. Way then exhibited to the meeting the experiment above described, and showed from the absence of any action of the air which had passed the tube on reddened solution of litmus, that the ammoniacal vapours were retained by the clay; the air passing through the sand, however, immediately turned the solution blue. He stated his intention of repeating the experiment at his next lecture with a tube containing some of the double silicate of alumina and soda, instead of clay. The subject was of the highest interest, but he should have another opportunity of enlarging upon it. He should now only further add, that these various silicates were convertible, one into the other, under given circumstances, which were being carefully studied, and that a knowledge of these was necessary for the understanding of the real action of many salts used as manure. Thus sulphate of ammonia, when added to the soil, produced sulphate of lime or gypsum, and this gypsum would be capable of effecting all that it usually does when added as manure. Manuring with sulphate of ammonia is also then indirectly manuring with gypsum as well, and so on. Mr. Way had speculated on the possibility of making these double silicates for agricultural use. If they could be made cheaply enough, they would undoubtedly be beneficial to light lands, which, owing to their position, it was impossible to dress with clay; and a few cwts. of the artificial compound might serve much of the purposes of a heavy coat of clay. Again, they might be used to abstract potash, and, more importantly, ammonia, from tank-water or sewage; and the liquids might be thus deprived of their valuable parts and allowed to run away. No known substance was

capable of doing this, and it might prove of great use; but at present he did not wish to raise such expectations, for, independently of the question of cost, there were many other points which could not then be entered into which would have to be taken into consideration. Mr. Way concluded his lecture by apologizing for its desultory character. He had more materials than he knew what to do with, and could easily have occupied their attention for several hours instead of one. He should have the pleasure of again addressing them on this and kindred subjects, when he would endeavour to fill up any gap which he might have left.

On the motion of Col. Challoner, seconded by Lord Lovaine, the best thanks of the meeting were expressed to Professor Way, for the valuable and interesting lecture he had then delivered before the members, as the opening of a course during the present season, which would not fail to advance the objects of the society.

A MONTHLY COUNCIL was held at the Society's House in Hanover Square, on Wednesday, the 5th of May. The following Members of Council and Governors of the Society were present:—The Earl of Ducie, President; Lord Camoys; Lord Berners; Lord Southampton; Lord Portman; The Hon. R. H. Clive, M.P.; Sir John Villiers Shelley, Bart.; Sir Matthew White Ridley, Bart.; Sir Charles Lemon, Bart., M P.; Sir John V. B. Johnstone, Bart., M.P.; Colonel Austen; Mr. Bailward; Mr. Raymond Barker; Mr. Barnett; Mr. Bramston, M.P.; Mr. Brandreth; Rev. Thomas Cator; Mr. W. G. Cavendish, M.P.; Colonel Challoner; Mr. Druce; Mr. Foley, M.P.; Mr. Garrett; Mr. Gadesden; Mr. Brandreth Gibbs; Mr. Grantham; Mr. Hamond; Mr. Fisher Hobbs; Mr. Hornsby; Mr. Hudson (Castleacre); Mr. Jonas; Rev. C. E. Keene; Mr. Langston, M.P.; Mr. Lawes; Mr. Walter Long, M.P.; Mr. Miles, M.P. (Leigh Court); Mr. Milward; Mr. Sanford (Nynehead Court); Prof. Sewell; Mr. Shaw (London); Mr. Sillifant; Prof. Simonds; Mr. Simpson; Mr. Slaney, M.P.; Mr. Smith (Exmoor); Mr. Stansfield, M.P.; Mr. Turner (Barton); and Prof. Way.

FINANCES.—Mr. Raymond Barker, Chairman of the Finance Committee, laid before the Council the monthly report on the accounts of the Society; from which it appeared that the current cash-balance in the hands of the Bankers was £2,732. He explained the various special balances of accounts included in this general sum; and laid on the table, for the information of the members, the quarterly statements of income and expenditure, invested capital and life compositions, assets and liabilities.

COUNTRY MEETING OF 1853.—The Report of the Inspection Committee having been read, the Council were favoured by Deputations comprising the following gentlemen:—The Hon. Admiral Berkeley C.B., M.P., the Hon. and Rev. W. W. Chetwynd Talbot, M.A., the Hon. General Lygon, M.P., Sir C. W. Codrington, Bart., M.P., Sir T. E. Winnington, Bart., Sir John B. Walsh, Bart., M.P., Captain Rushout, M.P., Colonel Clifford, M.P., Mr. Booker, M.P., Mr. Brown, M.P., Mr. A. Bubb, Mr. Clutterbuck (Mayor of Gloucester), Mr. Hill (Town-Clerk of Worcester), Mr. H. Hudson, Mr. Jenkins (Town-Clerk of Gloucester), Mr. A. G. Jones, Mr. W. Jones, Mr. H. Kerr, Mr. Knight, M.P., Mr. Laslett, M.P., Mr. Cornewall Lewis, M.P., Mr. Lucy, (Mayor of Worcester), Mr. R. Potter, Mr. Ricardo, M.P., Mr. C. H. Saunders, Mr. John Solley, Mr. Joseph Stallard, Mr. James Trebb, Mr. Alderman Walker, Mr. J. W. Walters, Mr. Gregory Watkins, Mr. Wegg Prosser, M.P., Mr. Westhead, M.P., and Mr. F. Woodward. These gentlemen having communicated to the Council the fullest local information connected with the South Wales district, derived from their respective personal knowledge, and answered satisfactorily every enquiry made of them by the Council; the President expressed to them the best thanks of himself and the Council for their kindness in having attended the meeting of that day, and for the deep interest they had evinced in promoting the objects of the society. The Deputations then withdrew; when the Council proceeded to the consideration of the particular locality best suited, under all circumstances, for the holding of the Country Meeting next year; and, after a lengthened discussion of the respective advantages of each position to which their attention had been called, it was finally carried, on the motion of Lord Portman, seconded by Mr. Brandreth, that the City of GLOUCESTER should be the place of such Meeting.

DISTRICT OF 1856.—The Council appointed a Committee, consisting of Sir John Shelley, Mr. Raymond Barker, Col. Challoner, Mr. Brandreth Gibbs, Mr. Miles, M.P., and Mr. Shaw, to take into consideration the subject of the District for the Country Meeting of 1856.

ESSAY PRIZES.—Mr. Pusey, M.P., Chairman of the Journal Committee, transmitted to the Council Mottoes of Essays to which prizes had been awarded by the Judges. The sealed motto-papers being opened by the President, the following successful candidates were announced:—

I. To WILLIAM DICKINSON, of North Mosses, near Cockermouth, the Society's Prize of £50, for the best Report on the Farming of Cumberland.

II. To HUGH RAYNBIRD, of Laverstoke, near Andover Road, Hampshire, the Society's Prize of £20, for the best Essay on the Management of the Clovers, Rye-grass, &c., with the best remedy for Clover Sickness.

LIFE-COMPOSITIONS.—On the motion of Mr. Raymond Barker, the consideration of the general question of the principle on which the Life Compositions of the Society are founded, as connected with any alterations it may be thought desirable or otherwise to make in the bye-laws affecting them, was referred to the special consideration of a committee, consisting of the Finance Committee and the Trustees, with the addition of Sir John Shelley, Sir Matthew Ridley, and Mr. Shaw.

GENERAL MEETING.—The Council decided on the arrangements connected with the General Meeting to be held on Saturday the 22nd of May, at eleven o'clock in the forenoon; and agreed, by ballot, to the House List

required by the bye-laws to be recommended by the Council to the Members on that occasion.

LECTURES.—Mr. Gadesden's suggestion that Prof. Way's lecture "On Jethro Tull's Principles of Agriculture," fixed for Wednesday, the 26th of May, at 12 o'clock, should be delivered in the previous week, on account of that date falling on the "Derby-day" at Epsom, having been brought under consideration; the Council, being desirous that no disappointment should take place among those members who might wish to be present, decided that an adjournment should take place over the Derby-day, and that Prof. Way's lecture should be delivered on Wednesday, the 19th of May, at noon, in the Council-room of the Society.

VETERINARY COMMITTEE.—On the motion of Mr. Shaw, and with the concurrence of Col. Challoner, the Chairman of the Veterinary Grant Committee, the Report of that Committee, then laid on the table, and about to be read, was withdrawn for another month, for the purpose of enabling the Committee to take the subject into further consideration before presenting their final recommendations.

FINES FOR NON-EXHIBITION.—The names of those parties who still refused to pay the fines incurred by them at the Windsor meeting were read; when orders were given by the Council that legal steps should at once be taken to enforce their payment in the Westminster County Court.

JUDGES' COMMITTEES.—Lord Portman, Chairman of the Past President and Stewards' Committee, reported the names of the Committee nominated by them for the Selection of the Judges of Stock at the Lewes meeting. The Council adopted this list, and proceeded to appoint, as usual, the Committee for the Selection of the Judges of Implements on that occasion.

STEWARDS OF IMPLEMENTS.—On the motion of Sir John Shelley, seconded by Colonel Challoner, Mr. Miles, M.P. (the senior-steward of Implements of the Society), was requested by the Council to supply the place at the Lewes Meeting which would have been filled by the late Hon. Captain Pelham had his life been spared; a request to which Mr. Miles (willing to lend his aid on all occasions to promote the good of the Society) cheerfully assented. On the motion of Mr. Shaw, seconded by Mr. Jonas, Mr. Fisher Hobbs was appointed the Steward-Elect of Implements on the same occasion.

POULTRY ENTRIES.—The Council adopted the suggestion of Mr. Davey, of Lewes, that the non-members' fee for entering Poultry for exhibition at the Lewes Meeting should be reduced from 10s. to 2s. 6d., in order to enable cottagers to compete in that department.

FARMERS' FLAX MILL.—The Hon. R. H. Clive, M.P., informed the Council that he had paid a visit by invitation to the works of Mr. Donlan, in the Warwick Road, Kensington, where he had inspected the construction and operation of the Farmers' Flax Machines invented by that gentleman. Having taken with him a sheaf of his own flax-straw, from which the seed had been removed, this straw was divided into four equal portions; and three of these being subjected to the action of Mr. Donlan's machines, the result was then submitted by Mr. Clive to the Council. The first portion was the original straw, on which no operation had been performed; the second was the next portion, which had gone through the first, or *beating* process; the third portion had gone through the beating process, and had also been passed through the double roller press, and undergone the *rolling* process; the fourth portion had been subjected to all the three processes—namely, those of beating, rolling, and *scraping*, and gave the final results of about 25 per cent. of marketable farmers'-flax, and about 12½ per cent. of tow. The whole of these machines were constructed in the simplest manner, but with the most exact adaptation of mechanical means for effecting the separation of the woody matter contained in the flax-stalk from the fibre required by the manufacturer; all the weak, imperfect fibres being retained, and only the strong and perfect ones being allowed to pass through. They were not of an expensive character; and could be worked either by men, women, or children, and by one person singly, or by several at the same time; horse, water, or steam-power might also be used, according to circumstances. The whole of the results, then submitted to the Council, had been attained by one man in the course of twenty minutes. This farmers'-flax, produced under favourable conditions of the straw, was valued at £32 per ton, and the tow at about £12 per ton; and for the marketable article thus obtained, the farmer, who under present circumstances could only dispose of his flax-straw at about £2 or £3 per ton, or not at all, would find in this country and on the continent a ready sale, the ton of straw, by this mechanical operation, yielding farmers' flax of commerce and tow, which together might be estimated at nearly £10; a sum from which would have to be deducted only the very small proportional part of the cost, rent, and wear and tear of the machines employed, and the labour required to work them. The flax, when dry, might be taken at once from the field without stacking, and, after the removal of the seed, was ready, without any other preparation, for this mechanical process, which was alike available to the smallest cottager or the largest occupier, and adapted either for manual labour or the application of machinery worked by any motive-power. He could not but regard this subject as one of great importance to the English farmer; and, as it had often engaged the attention of the Council, whose members had long considered such mechanical aid as this now referred to as a great desideratum, he felt that he was only discharging his duty as one of their body in calling their particular notice to the machines in question; at the same time, as the Council could not collectively deviate from their usual course, by giving any opinion themselves on an invention like the present, he would request a few of the members in their private capacity to accompany him to Mr. Donlan's works at an early convenient day, in order that they might inspect his operations more accurately in detail, and inform themselves of the full bearings of the question in a practical point of view.

LEWES MEETING.—Mr. Manning, of High Holborn,

the Society's Contractor of Works, reported the favourable progress of his operations connected with the erection of the Receiving, Exhibition, and Trial Yards, at Lewes, agreeably with the plans approved by the Council.

Poultry Show.—Mr. Miles, M.P., laid before the Council a letter addressed to the Earl of March by Mr. Baily, of Mount-street, suggesting that a distinct class of prizes should be offered by the Society, for "Chickens," at the Lewes meeting, and that the classification of some of the prizes should be altered. The Council directed information to be sent to Mr. Baily that Poultry *of any age* might be exhibited under the present schedule; but no alteration could now be made in any of the prizes, which were settled for each country meeting at a given date, agreeably with the bye-laws of the Society: his suggestions would, however, be reserved for consideration when the prizes of another year came under the notice of the Council.

Horses' Feet.—Mr. Turner, of Barton, submitted to the inspection of the Council various inventions of Mr. Pope, of Bridge-street, Exeter, for protecting the foot of the horse from injury. The chief of these was a compact felt, pressed into proper shape to adapt it as a covering for the outer hoof, and a protective shield for the bottom of the foot inside the shoe. Mr. Turner had found the felt in these cases infinitely superior to leather, as it was cheaper in the first instance, and very durable in wear; much softer in its substance, which never became hard or cracked, like that of leather; and when moistened with water, it retained its flexibility and dampness for a considerable time, to the great benefit of the horses' feet, which were thus maintained cool and moist, and prevented from cracking, while the horses were kept standing in the stable: the protective part of the felt, for the inside of the shoe, being well adapted for tender-footed horses. Mr. Pope's mode of shoeing also superseded the necessity of more than a very few nails being driven into the hoof to effect that object.

Beet-root Beer.—Mr. Baker of Writtle presented to the Council a Paper on the Preparation of a Strong-bodied Bitter Beer or Stout from the Beet-root; and submitted to their inspection a sample of this proposed new branch of domestic economy for the adoption of farmers.

The Council then adjourned to Wednesday, the 12th of May, at noon, when Mr. Trimmer would deliver before the Council, and such other members of the Society as would favour them with their attendance, his lecture "On Agricultural Geology in its practical bearings."

The May general meeting of this Society took place on Saturday, May 22, at the Society's offices, Hanover-square. The chair was taken at 11 o'clock by the Earl of Ducie, the president for the past year. There were present—Lord Camoys, Mr. R. Barker, Col. Challoner, Sir P. Booth, Mr. Shaw, &c.

The first business being that of electing a president for the ensuing year,

Mr. R. Barker, Chairman of the Finance Committee, said he felt great pleasure in proposing a nobleman who had shown his attachment to the Society by constant attendance, and who had been restored to that position in the Council which he lost during a period when he could not give his attention to the Society's affairs in the manner that he had done recently. Of late that nobleman had shown as much zeal for the society's interests as during the time of his earliest connection with it; and though he might not possess in so eminent a degree as their present chairman, the qualification of uniting science with practice, he had shown, by the ability which he had displayed, by the speeches which he had made, and by his general devotion to the pursuits of agriculture, that he was quite capable of conducting the affairs of the society successfully, and was fully adequate to all the requirements of the office. Without detaining the meeting longer, he begged to propose Lord Ashburton for the office of President, convinced that they would do themselves credit by electing his lordship to fill that important post during the ensuing year.

Mr. H. Blanshard seconded the motion, and expressed his conviction that the selection was an exceedingly good one. The motion was put and carried.

Mr. Shaw moved that the following noblemen and gentlemen should be the trustees for the ensuing year:—Sir Thomas Dyke Acland, Bart., M.P.; Lord Bradybrooke; Colonel Challoner; Hon. Robert Henry Clive, M.P.; Right. Hon. Sir James Graham, Bart., M.P.: Joseph Neeld, M.P.; Lord Portman; Philip Pusey, M.P.; Duke of Richmond; Duke of Rutland; Earl Spencer; and Duke of Sutherland.

Sir Peter Pole seconded the motion, which was adopted unanimously.

Mr. Blanshard moved that the following gentlemen should be the Vice-Presidents, observing that they were so well known that it was quite unnecessary for him to dilate on their qualifications or character:—Thomas Raymond Barker, Earl of Chichester, Marquis of Downshire, Earl of Ducie, Earl of Egmont, Marquis of Exeter, Earl Fitzwilliam, Earl of Hardwicke, Viscount Hill, William Miles, M.P., Duke of Wellington, and Earl of Yarborough.

The motion having been seconded by Mr. Bramston, M.P., and agreed to,

Mr. R. Barker said he could not help individually expressing his sense of the compliment which had just been paid to the vice-presidents by their re-election.

The meeting then proceeded to elect 25 General Members of Council, and for that purpose the list recommended by the Council was handed to the members present.

Col. Challoner observed that if any person wished to scratch out a name, and to substitute for it another, it was competent to him to do so. The Council were required by the bye-laws to recommend a list, but the meeting was not bound to adopt it without alteration.

After the lapse of a few minutes, it was announced by the Chairman that the Council had been re-elected without any change.

The Secretary, Mr. Hudson, read the following report—

REPORT.

Since the last General Meeting in December, 37 members have died, and the names of 120 been removed from the list; while 104 candidates have during the same period been elected: so that the Society now consists of—

93 Life Governors
156 Annual Governors
711 Life Members
4,002 Annual Members, and
19 Honorary Members—

making a total of 4,981 members on the list of the Society at the present time: a census which shows a slight decrease, since the last general meeting, in the governors and members paying annual subscriptions, but an increase in those who have connected themselves more permanently with the Society by payment of the compositions for life.—The Council have appointed Mr. Miles, M.P., of Leigh Court, one of the Vice-Presidents of the Society, in the place of Sir Thomas Gooch, Bart., deceased; and have elected the Earl of March a general Member of the Council, to supply the vacancy thus created in that list, by the transfer of Mr. Miles's name to the list of the Vice-Presidents.

The Council have the satisfaction of stating, that at no former period in the history of the Society, have its finances been in a more favourable condition than at the present time.

The arrangements for the Country Meeting at Lewes, in the middle of July next, are nearly completed. The entries of implements for exhibition and trial at this meeting exceed in amount those made for any former occasion; and the entries of live-stock, although not yet closed, promise to be equally numerous. The Council have adopted this year new regulations for the nomination and selection of the Judges of Stock; and they have limited the duties of the Veterinary Inspector to a general examination of the animals in reference to contagious or infectious disease, and to such special investigation on doubtful points, as the Judges in considering their awards may think proper to direct his attention. They have concluded their arrangements in the show-yard at Lewes for such an exhibition of Poultry as may, in their opinion, best promote competition among those varieties of breed which have been found by experience to be most profitable in an agricultural point of view; and for the purpose of enabling cottagers to compete for the prizes in this department the Council have reduced the non-members' exhibition-fee from ten shillings to half-a-crown.—The Council have accepted the invitation of the Authorities of Gloucester to hold the Country Meeting of next year for the South-Wales District in that city.

The Chemical Investigations instituted by the Society are in a state of active and favourable progress in the laboratory of Professor Way, the Consulting Chemist to the Society; who has already this season delivered before the members two interesting lectures on the peculiar agency of certain soils in promoting the supply of manuring matter as food to plants, and on the light thrown by the agricultural principles established more than a century ago by the celebrated Jethro Tull, on practical results obtained at the present day under certain conditions of soil and culture. Mr. Trimmer, the author of the Society's prize essay on agricultural geology, has also favoured the members with a lecture on the geological distribution of soils throughout the country; a subject of much practical importance to the farmer who is desirous at any time of transferring analogically the system of one district to another locality identical with it in the circumstance of soil: a result not always to be inferred from the ordinary geological maps, in which the rocks or subsoils are represented in their denuded state, and irrespectively of the actual drift or soil that may happen, from various causes, to rest upon their strata.

The Council are aware of the great caution required in the application of science to the practice of agriculture; and of the guarded manner in which any new or striking facts of cultivation ought to be enunciated, in order that the particular circumstances of their occurrence may be most clearly defined. These circumstances they conceive must be accurately understood by the farmer before he can safely transfer to his own locality a mode of management that may have been adopted with success elsewhere. Science, so called, can only mislead, when its quality is unsound, or its application erroneous: sound science, indeed, consisting only of principles derived immediately from facts; which principles, when duly applied to practice, constitute an art of any kind; and this art, whether that of agriculture or any other branch of industry, is only to be perfected by the application of improved principles, whether these be accidentally discovered or ascertained by direct investigation. The Council feel how much the modification or establishment of such principles of improvement depend on the extended practical observation and actual test of their members; and while they are most desirous on the one hand to aid in their legitimate development, they are most anxious on the other to prevent their hasty adoption. The really best practice in agriculture always includes as its prime mover the best science; but it is only by obtaining the distinct knowledge of such included science that the conditions can be ascertained under which the practice itself may be transferred successfully to other circumstances: and the Council, in endeavouring to carry out that union of "practice with science," which has become the well-known motto of the Society, invite from its members such communications of successful instances of management or cultivation, as will either at once become models for adoption, or serve by comparison with other results, to modify the character and extent of the deductions to be drawn from them. With such practical aid, the Council feel assured that the Society will continue to proceed in its steady course of public usefulness, gradually developing those national objects for which it was originally established.

By order of the Council,
JAMES HUDSON, Secretary.

Sir PETER POLE said from the report which had been just read, it was evident that the Council had done their duty in relation to the interests of agriculture generally,

and though there might be a few members less, he thought, on the whole, the Society was in an improved position (Hear, hear). He was very glad to have that opportunity of thanking the Council for having determined that the next show to that which was approaching should be held in his own county. There had been a strong feeling in the county of Gloucester that it would be a great advantage to that part of the country, and even to Wales, if a Show were held there; and he rejoiced exceedingly at the resolution which had been adopted on that subject.

Mr. Hercy seconded the motion; which was then put, and carried.

Mr. R. Barker, as Chairman of the Finance Committee, then read the following balance-sheet:—

HALF-YEARLY ACCOUNT ENDING 31st DEC., 1851.

Receipts.

	£	s.	d.
Balance in the hands of the Bankers, 1st July, 1851	2,584	9	5
Balance in the hands of the Secretary, 1st July, 1851	0	1	2
Dividends on Stock	160	6	1
Life-Compositions of Members	179	0	0
Annual Subscriptions of Governors	144	0	0
Annual Subscriptions of Members	1,570	5	0
Receipts on account of Journal	201	0	3
Receipts on account of Country Meetings	3,144	10	3
	£7,983	12	2

Payments.

Purchase of £1,029 Stock in the 3¼ per cents.	1,010	0	0
Permanent Charges	178	12	6
Taxes and Rates	13	19	5
Establishment	422	16	9
Postage and Carriage	19	11	0
Advertisements	2	16	6
Payments on account of Journal	303	3	2
Chemical Grant: two quarters	100	0	0
Chemical Investigations	200	0	0
Prizes of the Society	1,820	0	0
Payments on account of the Country Meetings	2,850	4	2
Transfers of Subscriptions	7	0	0
Sundry items of petty cash	5	5	10
Balance in the hands of the Bankers, 31st Dec., 1851	1,020	8	11
Balance in the hands of the Secretary, 31st Dec., 1851	29	13	11
	£7,983	12	2

Examined, Audited, and found correct, this 21st day of May, 1852—

Thos. Raymond Barker, Chairman,
C. B. Challoner,
Henry Blanshard,
} Finance Committee.

Thos. Knight,
George I. Raymond Barker,
George Dyer,
} Auditors on the part of the Society.

Mr. Rowlandson said that, in rising to move a vote of thanks to the auditors for their care in auditing the accounts, he was happy to be able to congratulate the Society on the very favourable position in which it was placed in a financial point of view (Hear, hear). He felt quite certain that the onerous duties which had fallen upon the auditors had been much lightened by the care and attention which had been bestowed upon that department by the talented Secretary and his assistants; but at the same time the mass of accounts which necessarily accumulated in that Society must require much care and attention in the auditors, and all present would feel that they were entitled to the cordial thanks of the meeting. The names of the auditors were alone a sufficient guarantee for the ability and skill which had been exerted in the supervision of the accounts.

Sir P. Pole said he could not feel a moment's hesitation in seconding the motion. That all parties concerned in the management had done their duty, was proved by the exceedingly favourable statement to which they had listened.

The Chairman formally conveyed to Mr. Dyer, as one of the auditors, the thanks of the meeting, and declared his belief that there was no society in England whose finances were better attended to than those of the Royal Agricultural Society.

Mr. Dyer, in returning thanks, said he had never seen any accounts which manifested more care than those of the society. The books were so plain and clear that a person of the humblest capacity might understand them; and he felt, with a preceding speaker, that the Society was greatly indebted to the secretary and his assistants. As regarded the motion, it was to the finance committee that thanks were most due: the labours of the auditors were comparatively light.

Mr. Sillifant said, that amongst the many ways in which the Society sought to promote its objects, he could see none more important than that of encouraging and providing weekly lectures. They all knew that the motto of the Society was "Practice with Science." The practice of agriculture could only be pursued in the fields of the country, but the science required the quietness of study; and science was, he believed, greatly promoted by the lectures given in that building by the gentlemen to whom he had risen to move a vote of thanks. The two names which he would especially mention were those of Professor Way and Mr. Trimmer. Those only who had been sufficiently fortunate to hear those gentlemen during the past year could fully appreciate the value of their lectures; but he was sure the cordial thanks of the meeting would be given to those gentlemen, for the deep attention which they had paid to the science of agriculture, and for the admirable manner in which they had illustrated it in that room.

Mr. Grantham, of Sussex, seconded the motion, which was then adopted.

The Chairman said it was the practice on that occasion for the Chairman to put one general question to the Members before the meeting terminated; but before he did that, he wished to call the attention of the meeting to one or two points. One point had respect to an alteration which had been made in the mode of selecting judges; and he would first read the resolution which the Council had agreed to on that subject. He then read the resolution; the effect of which was to allow Members of the Society to challenge the competency of the judges selected, and to communicate in writing any remarks

which they might wish to make in reference to the merits of the respective candidates. As this was a new rule (continued the Chairman), he had thought it right to direct attention to it (Hear, hear). The list was hanging up, and if any gentleman objected to either of the names he could state his objection in writing, and it would be laid before the Committee of Selection. He then stated that the usual Weekly Meeting would not be held on the following Wednesday; and concluded by observing that his chief reason for rising was this, that it was usual on that occasion for the Chairman to ask the Members generally, who were present, if they had any remark to make on any matter connected with the Society. He now put that question.

After the lapse of a few seconds,

Lord CAMOYS said he had no remark to make in the sense which was intended by the noble lord in the chair; but he rose for the purpose of proposing a vote of thanks to the noble lord, not only for his conduct in the chair that day, but also for his conduct as President of the Society during the whole of the past year (cheers). He was sure that, though many persons might do greater justice to that motion than himself, no person could feel more sincerely than he did that the noble lord was entitled to their best acknowledgments.

Colonel CHALLONER said, as having the honour to hold the situation of one of the trustees of that Society, he trusted he might be allowed to express his sense of how due the thanks of the Society were to its president, Lord Ducie (cheers). Whether it were in the small finance room—whether it were in the Show Yard—whether it were in the Implement Yard—or whether it were in promoting the general good of the Society—Lord Ducie had, ever since the Society's formation, made himself eminently useful (cheers). His name as an agriculturist, his name as one of those who first opened the door, he might say, to the adaptation of science to agriculture, was, he thought, a sufficient guarantee that they acted wisely in electing the noble earl as their president (Hear, hear), and he was happy to say that up to that moment he had fully answered the expectations of those who proposed him. He had, therefore, great pleasure in seconding the motion proposed by Lord Camoys; and he thought it was due from that Society to give not a mere cold and formal vote of thanks, but its real heartfelt acknowledgments to the nobleman who occupied the chair.

Colonel CHALLONER put the motion, which was cordially adopted.

The CHAIRMAN said it was always very difficult, even for a man who felt that he deserved approbation, to return thanks for such a compliment in appropriate terms. But on the present occasion the difficulty was increased by the circumstance that the difficulties of his office were really none, and that he had positively received the thanks of the Society for doing nothing (a laugh). He should be most ungrateful if he were not to acknowledge that, owing to the kind and continuous attention of many old members of that Society, he had become instructed on points on which he was previously ignorant, and that his path had been made smooth and easy. He should also be most ungrateful if he did not allude to a gentleman who had been already referred to by Mr. Dyer—if he did not say, not only that he himself had found everything made easy and plain before him, but that he was sure the noble lord who had been elected to succeed him for the ensuing year would also find everything made smooth and easy to him by the continued and able exertions of their secretary, Mr. Hudson (cheers). He was quite sure that he should not have done his duty if he had not alluded to the exertions of that gentleman, and he would never have forgiven himself if he had not mentioned in the strongest terms the benefits which the Society had received from that gentleman. As Mr. Dyer had stated, the accounts were laid before the auditors in the plainest and clearest manner, and being ignorant to an extent which he ought not perhaps to own, of the proceedings of the Society, he (Earl Ducie) had found no difficulty in transacting what little business he had to perform.

The meeting then separated.

NEW MEMBERS.

The Earl of Darnley, of Cobham Hall, Kent; and John Mainwaring Paine, of Farnham, Surrey; were elected Governors of the Society.

The following new Members were elected:—

Bale, John, South Creake, Fakenham, Norfolk
Botting, William, Westmeston, Lewes
Clarke, John, Ipswich, Suffolk
Daws, Walter William, Lordine, Ewhurst, Hurstgreen
Freeland, H. W., The Albany, London
Hardwick, Arthur, Hangleton, Shorcham, Sussex
Hillman, John, jun., Lewes, Sussex
Holmes, William, Borovere Cottage, Alton, Hants
Hutchinson, William, Ipswich, Suffolk
King, John, Thorpe-Abbots, Scole, Norfolk
Magens, John Dorien, Hammerwood, East-Grinstead
Oliver, Thomas, jun., Sunderland, Durham
Ranelagh, Viscount, Park Place, St. James's
Richardson, James M., Wilton Place, Tonbridge Wells
Sexton, George, Wherstead, Ipswich
Tatchell, John T., Sydling House, Dorchester, Dorset
Tucker, John, Abbey Print Works, West Ham, Essex
Young, Charles D., North-Bridge, Edinburgh

PATENT TILE AND PIPE MAKING MACHINE.—We were invited yesterday to witness the working of one of Mr. Hart's Tile Machines, at the Atlas Works, Borough-road, Southwark. This machine is one of a series intended for Italy, and its construction and principle have attracted a good deal of attention. It makes pipes, tiles, hollow and solid bricks, cornice work, and is capable of being readily adjusted to some 1200 different patterns. It is worked by a screw, and is simple to singularity throughout, and is, indeed, the very Quakerism of mechanics. A man and a boy are capable of giving it a pressure of ten tons; and by a curious reversing or self-acting movement, no time is lost in the working of both ends, one man being continually at work while the boy is carrying away. Thus, and with only moderate exertion, we saw tiles produced at the rate of eight miles per ten hours, and hollow and solid bricks, &c., with like rapidity.—*Morning Paper.*

AGRICULTURAL EDUCATION.—REPLY TO "A FARMER."—VALUE OF GEOLOGY.

"Truths would you teach, or save a sinking land,
All fear, none aid you, and few understand."—POPE.

It formed no part of our expectation, on commencing this series of articles on agricultural education, nor indeed any part of our desire, that our opinions, which we knew to be at variance with those of the class to whom our remarks are addressed, should pass unopposed and unnoticed. A medicine may generally be said to be ineffectual if, in its contention with the malady, it does not give some visible sign of its operation. It is unpleasant to stroke a porcupine the wrong way. The effect is much the same when one attacks a prejudice. We are glad, however, to have aroused an apparently earnest thinker to life upon this subject, and to the resolute expression of his thoughts. Would that more might be stirred from their indifferentism to join him.

The number of the *Farmer's Magazine* containing the animadversions of "A Farmer," was handed to us not long ago with the following exclamation:—"See! you are opposed in this letter: you had better read it, for it may require a reply." "No reply is requisite," we answered, after having run our eye over its contents; "and had the writer been more careful in his perusal, both of the article on the R. A. College and others, he would have been spared the trouble of moistening his pen. Had he but given a due consideration to the definition of the term education, that occurs in the article he particularly refers to—a definition we were careful to furnish, in order that misunderstanding might not ensue—he would find that we were pretty well agreed. Had he thought for a moment, also, he would have come to the most sensible conclusion that no one part of a series of articles upon any subject would be likely to contain the specific treatment of that subject in all its bearings. The reason that one writes a letter on both sides of a sheet is because the news to be communicated cannot be compressed into the space afforded by one. Our introductory paper will furnish our impatient correspondent with a general notion of our intended line of remark.

We were just in *process* of proving, to the best of our ability, that education was wanting to the agriculturist, when up comes our "Farmer" to say that education is of little or no use—that, indeed, the education of farmers is as sound and suitable for their calling as it need be.

Some men there are who answer a question and settle a subject before they have heard the one proposed, or the other witnessed. In this art our "Farmer" stands not in a minority; for were every man banished from this land who decides upon the stability of a subject before he has seen its foundation, the small county of Rutland would contain and feed the remaining population of the three kingdoms and all their dependencies. We are reminded, in speaking of those who form conclusions before they see, of the caution which M. Saugnin gave to Louis XIV., with respect to the Princess of Bavaria—"Sire, be not disgusted with her at the first glance, and you will afterwards be pleased with her!" and so it happened. And we venture to affirm that it will so happen that if our "Farmer" follows us to the close of our remarks, he will find himself thinking of men and things much in the same way as ourselves.

We are in a position to form an independent judgment of the agriculturists individually and collectively, and we see no reason to alter any one conclusion to which we have arrived with respect to them as a body, either as to their incapacity to manage their own business, to perform their social duties, or to use their political rights. This is strong language, we own; but associate with them in their own homes, meet them at the market-tables, and their public vestries, and there shall be found a very sufficient verification of it. There is evidence enough in favour of our assertion in the very statistics of literature and journalism. The intelligence of a people is ascertained by the activity of its press; and from what class, we should like to know, does the press receive its greatest encouragement? Fact says, certainly not from the agricultural class. We do indeed know "one man in the neighbourhood of the R. A. College," who can express himself in "sharp trenchant sentences;" and we have the misfortune to know 999 others, within a circuit of 50 miles, who cannot get rid of two sentences grammatically—who are ignorant of their geographical position—and who know, perhaps, less than their labourers, upon questions of political economy.

We see this miserable condition of things in no spirit of rejoicing; nor, indeed, do we point to it in any such spirit. The first step to the remedy of an evil is to discover it. When it is found, then comes a search for its source: naturally enough, everybody looks away from himself in such a search—as is the case with our correspondent, who points now to the landlord, now to the squire, then to the government, as the blameworthy parties—never to the farmers themselves. This course is essentially false. The greatness, the prosperity, and the freedom of a nation depend on the moral and intellectual stature of its people. The wealth of a nation consists, not in the fertility of its land, the variety and extent of its mines,

nor in its exhaustless beds of coal, but in the ability to turn these to the best account. This ability—economic ability—depends upon the exercise of reason; on the use of those mental qualities with which man has been gifted purposely that he may subdue the elements to his uses; in other words, upon intelligence. Intelligence admits of culture; and that nation which cultivates it in the highest degree to subserve the purposes of life, and possesses it in combination with moral excellence—the sole base of true greatness—carries the palm of superiority amongst her rivals. But national superiority depends upon individual superiority. Here, then, lies the source of disease—not only amongst farmers, but amongst all classes; and it is, therefore, to this radically diseased point or centre that we direct attention. The higher classes exert an influence upon the middle; the middle upon lower; the lower again upon the lowest—all for better or for worse—and all are responsible for the influence they exert. The whole framework of society is so hung together, that it is well-nigh impossible to elevate or depress any portion without extending the movement to the whole. We know well enough that the landlords and squires are below the position their advantages are designed to secure for them. They have no very powerful incentive to any vigorous putting forth of their faculties in the struggle for daily bread. But surely this is no reason why the farmers should be contented to be beneath them, having urgent need enough of all the intelligence and practical skill they can acquire to help them through in the great struggle that is coming.

The struggle that is coming! yes, we repeat it.

Rumours and warnings of armed foreign invasion have been plentiful enough; but there has been only one solitary cry raised to warn us of an invasion far more to be feared—an invasion induced by our own supineness and reliance on our natural resources. It is a bloodless, but deadly struggle for industrial superiority; and if we do not bestir ourselves to meet our foe, defeat is inevitable.

Dr. Lyon Playfair, than whom no man can be better fitted to judge of our scientific and industrial status amongst civilized nations, by reason of his official relation with the Exhibition, gives utterance to the following remarks, in a lecture On the national importance of studying abstract science with a view to the healthy progress of industry:—

"The result of the Exhibition was one that England may well be startled at. Wherever—and that implies in almost every manufacture—science or art was involved as an element of progress, we saw as an inevitable law, that the nation which most cultivated them was in the ascendant." After mentioning many articles of manufacture in which England is beaten, and many others in the production of which hitherto almost unknown competitors approach her, he continues—"Our nation has acquired a proud position among the industrial states of the world, partly by the discoveries of her philosophers, partly by the practical powers and common sense of the people; but chiefly by the abundance and richness of her national resources. These local advantages gave to our country enormous powers of production; and under the favouring influences of an accidental combination, it supplied its produce to the rest of the world. Circumstances remaining the same, our industrial position was secured, and we have thus been lulled into a fatal apathy; for conditions were, in fact, varying with great rapidity, and the world at large was passing through a state of remarkable transition.

"As civilization advances, the value of the raw material as an element of manufacture diminishes, while that of the intellectual element is much enhanced. Improvements in locomotion, both by sea and land, spread over the world the raw material, formerly confined to one locality; and a time arrived when a competition of industry became a competition, not of local advantage, but of intellect. It was obvious that when improved locomotion gave to all countries raw materials at slight differences of cost, that any superiority in the intellectual element would more than balance the difference. The continental states, acting on a perception of this truth, saw that they could only compete with English industry by instructing their populations in the principles of science. Hence have arisen in their capitals, in their towns, and even in their villages, institutions for affording a systematic training in science; and industry has been raised from the rank of an empirical art to that of a learned profession. The result is seen in the fact that we now meet most European nations as competitors in all the markets of the world. The result is palpably forced upon us by our actual displacement from markets in which we enjoyed a practical monopoly. The teaching of the Exhibition was to impress me with the conviction that England, by relying too much on her local advantages, was rapidly losing her former proud position among manufacturing nations; and unless she speedily adopts measures to cultivate the intellectual element of production, by instructing her population in the scientific principles of the arts which they profess, that she must inevitably lose those sources of power which, in spite of the smallness of her territory, have given to her so exalted a rank among nations."

This reasoning is as unanswerable as the allegations are undoubted; and the fact is patent enough, being verified in London, Birmingham, Manchester, Leeds, Sheffield, Glasgow, &c., that the English merchant is better paid by purchasing foreign supplies, say of hardware, glass, cotton, silks, and woollens, &c., *for reshipment here* to the various European establishments, than he is by obtaining them of the home producer. And if the populations of the manufacturing towns are found to be so deficient, what can

we say of the population of the rural districts, where men work destitute of the thinking faculty, like machines? "Nature," says Goëthe, "knows no pause in ever increasing movement, development, and production—a curse still cleaving to standing still." It is precisely so with nations.

If anyone doubtful on this subject would be at the pains to read the evidence taken by Mr. Chadwick on the influence of training and education on the value of workmen, and on the comparative eligibility of educated and uneducated workmen for employment, given by manufacturers and artizans from different countries, their scepticism would be much modified, if not annihilated. When we come to touch more particularly on this part of our subject, we will give our readers some extracts from it. It appears from it that England is the only European state that is not thoroughly awakened to the importance of giving an intellectual training to those intrusted with its manufactures. There is no good in looking everlastingly to government, whose proper function is to protect—not to create. The government is comparatively uninterested in the affair: those that feel their interests at stake must create the movement. The main thing is to penetrate the entire body of society with one quickening spirit of advancement. Each class must then work steadily, courageously, and independently, and the whole of the interests of the country be lifted at once, with benefit to all, and detriment to none. One class cannot lag behind another with impunity; for, as Goëthe says, "there is a curse cleaving to standing still." To the farmers we cry with a loud voice, Educate! Educate! Educate! But alas! alas! there are some men who never will see, till others are almost blind with looking.

In our ardour to put this subject in its true light, we have allowed but little space for the consideration of the value of geology in its relation to agriculture. If, however, our readers will give us their attention, we will not keep them many minutes.

The value of any science is to be estimated according to its tendency to promote improvement, and to subserve the purposes of life. And if men are guided in their judgments by this principle, we do not wonder that the Farmers' Club, when the question was proposed—"Whether a knowledge of geology is of any advantage to the farmer?" should have decided in the negative.

Geology has been so much the theme of arm-chair speculation, with but few exceptions, that it has proved of little practical use. These exceptions have occurred within the last half century. An enthusiast named William Smith gave his researches a practical application to agriculture and civil engineering. He devoted his attention to the oolitic districts in which soils prevail that have been derived exclusively from the subjacent rock, and from *local* phenomena educed *generalizations*, that, of course, failed to hold good. He gained the name of "Strata Smith" from the fact of his exaggerated notions of the connexion of the soil with the underlying strata—a connexion the great erratic deposits that have swept athwart the face of our country constantly disprove. Sir Henry de la Beche, at the head of the commission of inquiry respecting the stone to be used in the construction of Westminster New Palace, showed the application that might be made of geology in directing his search for the best and cheapest building material. Its application to mining has been tested with great benefit, both by Werner, by Smith, and by Mushet, who discovered the black band iron stone, to the enrichment of the Scottish iron-masters.

Geological surveys of Great Britain for various purposes have frequently been proposed, and some have been executed. Several maps have resulted from these surveys; but none have been of any extensive service to the farmer, because the principle upon which they have been planned has led the authors of them to neglect the superficial deposits (covering extensive areas, and varying in depth from one foot to some hundreds of feet), and so to make it appear that all soils are characteristic of the strata they overlie.

To be of any value to agriculture, geological investigation should embrace two classes of facts—the composition and distribution of the *strata*, and the composition and distribution of the *superficial deposits*.

"The true method, then, of ascertaining the respective influence which the rock formations and the superficial deposits exercise on the character of the soil, is to map them—laying down the latter with as much minuteness as possible, together with the mineral characters of the strata on which they rest, and which are grouped on ordinary geological maps under one colour, as representing a common assemblage of organic remains. The true method of investigating the nature of the operations by which the superficial deposits were formed, consists likewise in mapping them. Not only should the areas covered by drifts be laid down generally, but the varying depth and composition of those deposits should be shown. By no other method than by such a minute examination can we learn what portion of them was formed beneath the sea, and what on the surface of dry land; whether disconnected masses of them are separate drifts, or fragmentary portions of a once continuous sheet; whether after their desiccation they were exposed to any subsequent aqueous operations, and if so, of what kind, whether marine or atmospheric."

In order to form some estimate of the importance of these superficial deposits, it may be well to remind our readers that the great northern drift of some, and the drifts of other geologists, extended from the White Sea to the German Ocean, beyond this over nearly the whole of Britain, excepting the steep escarpments of some ranges of hills;—to North, and some portion of South America. The evidence of this great erratic

movement exists in the beds of clay, sand, and gravel, accompanied by large boulders, traced from their parent rocks in Lapland; and these in the northern hemisphere are spread over an area more than two thousand miles long, varying in breadth from four hundred to eight hundred miles. These beds cover the whole of Belgium, Holland, north of Prussia, and occupy large tracts of Poland and Eastern Russia.

The northern drift appears, from the two deposits that mark it—namely, the hill or boulder clay beneath, and the gravel and sand above—to have been the work of two distinct periods. Much that is interesting might be said about the action and course of this drift, were it within the range of our remarks. Then there are the detrital deposits, of comparatively recent date; and about these—that is, about their origin, there is considerable disputation. So that we may see, from the extensive nature of the erratic deposits, how important it is that accurate information should be supplied concerning them. To affect to teach agricultural geology from maps that suppress these deposits, and deal only with a subsoil which, in very few agricultural operations, is of any value at a greater depth than seven feet, is manifestly absurd.

A well directed investigation of the geological structure of our country, made with reference to the two distinct species of inquiry urged above, would prove of the utmost value to all classes interested in the land. From such an inquiry we might expect a knowledge of the laws regulating the distribution of soils; we might anticipate a solution to the "vexed questions of the proper depth and distance of drains, and how superfluous moisture may best be removed, or water obtained when deficient," from the data thus supplied of the depth and composition of soils and subsoils. There are few who in the present day understand the use of mineral manures, save such as marl and lime; but there will come a time when, more attention being given to the study of geology, greater regard will be paid to the distribution of such aids, and to the generous use of them as a means of improving poor soils. The knowledge secured by such an inquiry would be of great service to the farmer, &c., in searching for building material, and materials for draining and road-making; for they often lie beneath feet when he is expending money in their purchase and transport from other parts. And there are other and manifold *bonâ fide* advantages arising from the study of geology, that should tend to raise its importance in the eyes of owners, managers, and cultivators of the soil. If the government has thought it worth while to institute a school of mines, which promises to raise a race of future superintendents of mining operations, who will make a practical use of the science they acquire, how much more should some provision (not governmental—it smells of the insinuating abomination, the pernicious opiate to a nation's industry—centralization) be made to diffuse amongst the agricultural community a species of information operating to the production of a new economy in the expenditure of capital and labour!

O ye farmers! are we to wait as long in patient expectation of the coming race of scientific, clear-headed, intelligent, practical sons of the soil, as we have done for the "coming man"? With little hope of causing them to augmental effort, one clever writer, who has exhausted himself in putting forth the claims of geology to their notice, exclaims most mournfully as he closes his essay—"And till the agricultural class shall have somewhat more largely imbibed the streams of science, we cannot expect much progress to be made in agricultural geology." What! does not the yearning pathos of this writer move ye to some burning sense of tears? Are ye less indifferent to the voice of science than the earth ye cultivate? If, then, your ears are deaf to inducement, to entreaty, to persuasion, let them be stunned with the stern waking trumpet-blast of Playfair:—"As surely as darkness follows the setting of the sun, so surely will England recede as a manufacturing nation, unless her industrial population become much more conversant with science than they now are." Have regard, therefore, to the intellectual element.

F. R. S.

ON THE BENEFICIAL INVESTMENT OF CAPITAL IN LAND.

With the hope of preventing our monied friends from burning their fingers with some of the numerous bubble schemes which make their appearance whenever capital accumulates and a low rate of interest prevails, we endeavoured, in a former article, to draw their attention to the safe and profitable investment which experience has proved to attend the purchase and improvement of poor land. We resume the subject now in order to illustrate it by a few details.

The scene of operations shall be laid in that wooded tract of poor clay which runs through the counties of Kent, Sussex, and Surrey; between the chalk ridges of the North and South Downs, and which is known by the name of the Weald. Our capitalist has seen a property of 500 acres advertised for sale in that district, and he runs down to look at it by the Dover Railway, which traverses the centre of the Weald. He takes with him a professional agricultural adviser. Of these there are two classes. The one look only at things as they are, and think that under the circumstances in which this property is placed, and which will be described hereafter, nothing can save the owners and occupiers from utter ruin but such an advance of prices as they are not likely to obtain. If one of this class were consulted, he would of course give his advice against such an investment, declaring that it is better to pay a high price for

land of the first quality, which will always be in demand, than to have such land as this for nothing. The other class of agricultural advisers is not so numerous as the last, but is daily increasing. They look at things not only as they are, but as they may be; directing their attention to the capabilities for improvement which land possesses, the best means of effecting it, and the profit likely to result from it. Our friend is accompanied on his expedition by one of this class. They find the soil to be of the prevalent character of the Weald clay—close, adhesive, and difficult to cultivate, either in wet or very dry weather. The property is divided into three farms. The buildings are in bad repair, and ill-managed; built apparently with reference to the form of the plot of ground selected for their site, or, rather, on which they have been accidentally pitched, rather than upon any general principle as to the best situation for the farmstead, and the most suitable distribution of its several parts, so as to secure economy in the housing and conversion of the crops, and the distribution of the manure. The fields do not average more than five acres each; and they are surrounded with broad, coppice-like hedges or "shaws," which in many instances diminish the nominal area by 20 to 25 per cent. The system of cultivation is such as would impoverish a much better soil. The rotation of crops is: 1st, fallow; 2nd, wheat; 3rd, oats, beans, or vetches, or clover—the vetches not fed off, but harvested for the seed; 4th, wheat, and then fallow again. Little stock is kept, little made, and that of inferior quality; and the only dressing which the land receives is in the form of an occasional liming. No plough could be devised less adapted to such a soil than the turnwrest plough; but that venerable implement, rejoicing in its four, and even six horses, is more firmly established, at least in the Kentish portion of the Weald, than its large and ancient oaks have been, for they have nearly all fallen before the axe of modern innovation and the great demand for ship-timber which the last century has witnessed. The produce does not exceed, on on average, wheat 20 bushs., oats 30 bushs., beans 28 bushs. The present rent is 12s. an acre; but the tenants owe two years' rent. They demand a reduction to 8s., and as the large landowners are making this reduction, the smaller fry must follow their example. This does not appear a very desirable property for an investment, and yet the adviser whom our capitalist consults recommends him to purchase it—and he gives sound advice. In 1841 this property was valued at £11,000 exclusive of the timber. The owner has been advised of its capabilities for improvement, but he cannot be brought to believe that money can be profitably sunk on the soil. He considers, to use his own expression, that the game is up with land, and he has determined to get rid of so troublesome a property for whatever it will realize. He will have difficulty in obtaining £6,500. In fact we know an estate, similarly situated in all respects to the one just described, which has lately changed hands for somewhat less than that sum. The means of improvement are obvious. The great defect of the soil consists in the impalpable state of division of the particles of clay and sand of which it is composed. This causes it to run into a paste when wet, and to harden when dry into a mass which the roots of the plants can scarcely penetrate. To correct this fault recourse must be had to chalk or burnt clay, in order to separate the particles, and render it more friable. The chalk, which is now carted nine miles, to be burnt into lime upon the farm, would answer a better purpose applied unburnt. Burnt clay may be used for the same object. Some of the strata of the Weald Clay are calcareous, and were formerly applied in the raw state under the name of marl—before they were superseded by lime. There are several marl pits on the property in question. Their clay is well adapted for burning, and the roots obtained in grubbing the fences will supply abundance of fuel with which to burn it all. Useless expenses must be curtailed, and the turnwrest plough must be abandoned. There is no reason on earth, except inveterate habit, why this land should not be ploughed with two horses. Green crops must be gradually substituted for bare fallows. Tares and rape may be consumed on the land in the summer; swedes and mangold-wurtzel may be drawn in the autumn, and stored for consumption in the yard. Some of the land should also be sown down with grass, clean and in good condition, to be fed with sheep. All these are improvements pertaining to the tenant. There are other preliminary improvements required on the part of the landlord to give effect to them. The shaws must be grubbed; and the average size of the fields increased to ten or fifteen acres. The land must be drained, and the present homesteads pulled down, and rebuilt in a more central situation, and with arrangements more adapted to the improved farming of modern times. The estate should be laid into one or, at the most, two occupations. The collective cost of these operations will amount to £8 an acre, or £4,000. Should the purchase-money amount to £7,000 (an extreme price), this will make a total of £11,000. With the permanent improvements, and the improved system of cultivation indicated above, the land will be better worth 20s. an acre than it is now worth 8s. But, as the tenant will not derive much benefit from the improvements while they are in progress, he ought not to pay an increased rent till the end of that time. We will therefore add £500 for loss of interest to the cost and purchase, bringing it up to £11,500. From this outlay an annual income will arise of £500 a-year, or more than 4 per cent. This is regarding it as a permanent investment. But should the capitalist be desirous of reselling the estate after the lapse of five or six years when in good condition, and let to a thriving tenant at £500 a-year, he might reasonably calculate on obtaining 28 years' purchase or £14,000, which would give an additional profit of full 20 per cent. on his original outlay of £11,500. Compare this with the investment of £12,600 at 28 years' purchase for a farm of 300 acres of good land, in a high state of cultivation, let for £450, with no prospect of an advance, but much grumbling every rent-day about prices. It is true, that bubble schemes hold out the temptation of greater interest than 4 per cent., and speedy profit by the shares selling at a premium. But what do they realize on the average, is it profit or loss? Let the experience of those who have engaged in such speculations answer this question. Why, then, with such profits attending the improvement of our poor soils, is so advantageous a mode of employing capital neglected by our monied men? Simply, because they have been kept too much in ignorance of it; and, because they have heard during the last thirty years little else respecting agriculture but its losses, and the impossibility of cultivating land in England with any better result. Agriculture has too long been connected with party politics. Let us hope that the warfare of class interests is drawing rapidly to a close. The capital required for landlords' improvements, on an estate of 500 acres of such land as that of the Weald, has been pointed out, and also the increased value which the land will derive from such an outlay. But these permanent improvements will be useless unless followed up by a better system of cultivation than that which now prevails in the district in question. For that the majority of the present race of occupiers will require additional tenants' capital. Where is that to come from? That is a most important part of the inquiry, the discussion of which must be reserved for a future occasion.

T.

AUSTRALIA—WOOL AND GOLD.

It is very probable that the discoveries of gold in Australia will be pregnant with far more consequences than the depreciation of specie, and the superabundance of the circulating medium. The internal and economical effects on the Australian colony will be far more important to that country than any monetary revolution which its auriferous riches will accomplish. On wool, on tallow, on wine, on our antipodal agriculture, it will have the most wonderful effects. Gold itself is not riches; it is their representative: it cannot be eaten, nor burnt; nor can it to any great extent afford warmth or shelter. And yet the agrarian Anglo-Australian will leave his sheep, his cattle, his vineyards, and his fields, to pursue after the great medium of exchange of the civilized world, and almost of the barbarians. Men's minds are not now improperly turned to the *management of sheep in Australia*. The last October clip was accomplished before any great or general defection of shepherds to the mines of Bathurst was contemplated. Now it is the reverse. The tending of sheep is little to the clip. The *wool* rather than the carcase is the great object of the Australian farmer; and it is just that part of his flock's produce which requires the most speedy and determined labour. Who for 2s. 6d. to 4s. per hundred—the price paid for sheep-shearing—will continue the operation for a month or so, clipping from 50 to 80 sheep per day, when he can earn as many pounds all the year round day by day at the mines? How is a farmer to get two tons of wool—the product of many a farm—clipped, and folded, and packed? and how will he be certain that the messengers sent nearly twice one hundred miles will ever return; or will not be intoxicated by the golden dreams he hears; or leave his bullocks, his waggon, and his duty, in pursuit—not of an *ignis fatuus*, but a golden vision beyond all doubt a reality? There are certainly in Australia at least twelve millions of sheep, and only a population of some 246,299. Assuming each clipper to manage 1,500 sheep in a season, it would require 8,000 clippers who should be tempted to remain for the purpose. Wages will hardly tempt them. We heard of a case where a farmer was endeavouring to bargain with a man to attend to the clipping in October next. The man said he would engage to clip them *for the wool*. The bush-farmers of Australia are likely to suffer beggary from neglect of the riches Providence has given, when government officers, customs, military and excise leave their posts, and scamper off to the diggings. So alarmed are they, that they have sent an agent to the woollen districts of Yorkshire to explain their position to their Britannic customers. He met on Wednesday last the wool-staplers and manufacturers of Leeds. If no remedy is found, one-half of all our foreign supplies of wool will fall off; our manufacturers will be denuded of some twenty-five per cent. of their supplies; the raw material will rise to a very great extent, and they will be crippled and cramped in their operations.

In these times of depression thousands of farmers are directing their thoughts to Australia as a field of emigration. When everybody is gold-hunting, the farmer may live—for food they must have if they get ever so much gold. The "Australia" packet has just sailed from Liverpool with a large number of agricultural emigrants of a highly respectable class. The "Merlin," one of the finest ships ever afloat on the Mersey, of 1,800 tons burden, will sail ere the month closes; but the British farmers know little what they have to encounter in their journey. We cannot do better than devote a few sentences to the outline of what they have to brave, and the difficulties they have to meet with as flockmasters—in a word, on the management of sheep in Australia.

They have much to un-learn. To some overlander they will have to be indebted for a flock of sheep worth about as much as they are worth in England. They will cost from 30s. to 33s. per head. They must then either purchase a tract of occupied land, or pursue the footprints of the kangaroo and wild dog, where human beings have never trod, to find a settlement and get possession, for which they will pay the government. The former would be the best course; but they must then have a native shepherd. He only is capable of keeping and watching the flock from the bushman, the wild dog, or from straying over the ill-defined landmark of his neighbour. One shepherd and one watchman—the former for the day-strays, and the latter for the night—will be necessary to every 1,800 to 2,000 sheep. These will be ample, with colly-dogs to tend them; but they must be kept away from the lowland fens or morasses, or rot will follow. In the very dry seasons which often succeed the rainy periods in Australia, great skill and prudence will be required to prevent their straying on this forbidden ground. Leaves of trees will have to be furnished to the flock when all around is dry and withered, like the mown hay; and sometimes the want of water will cause the death of thousands, both of flocks and herds.

Nor will an European at first become easily accustomed to the heat. A dry heat of 70° or 80° in the shade in England is spoken of as terrific: some die from exposure to the sun under circumstances so dreadful. But not unfrequently the temperature ranges 100°, 110°, and even as high as 130° in that country—not refreshed by night dews, but burnt by hot and parching winds, blown, perhaps, over the desert sands of the vast unexplored interior.

The most formidable of all enemies to the flockmaster, however, is the dreaded "catarrh:" it is either epidemic or endemic; but it is one of the most dreadful disasters of a flockmaster. It commences usually in dry seasons, and is probably owing to a want of water. Its symptoms are a running of a dark mucus matter from the nostrils; the head droops; the ears fall; the animal singles off or stands inactive, and as if unfit to move. The stomach and liver seem to inflame and disorganize. It spreads from sheep to sheep; from flock to flock. The only business is to skin the animals, and boil the carcass: it is of no use whatever besides. This is a doleful and melancholy harvest to the flockmasters; but rain is at once a stoppage to the ravages of the disease. But the loss is great: the wool falls off the survivors, and they are enfeebled and poor.

The English settler would do well, whatever may be his capital, to apprentice himself first to the native flockmaster. The latter will be glad to engage him; will pay him, Jacob-like, of the fruits of the flock and the herd; will keep him, and will give him practical lessons which the best woldsman or fens-man of Lincolnshire or Yorkshire may be glad to learn.

We cannot help thinking, however, that Australia is one of the best fields for agricultu emigration.—Gardeners' and Farmers' Journal.

THE GREAT EXHIBITION.

[*Concluding Paper.*]

REMARKS ON SOME OF THE PRIZE AND FOREIGN AGRICULTURAL IMPLEMENTS.

The last part of the *Journal of the Royal Agricultural Society of England* contains a very interesting paper, by Mr. Pusey, on the prize awards. It is not my intention to quote very largely from this, the matter being in so condensed a form in the "Report to Prince Albert" that it would be impossible, and would, from my having alluded to various machines before, tend to much repetition. I shall, however, mention various articles that were too briefly alluded to in former papers, with engravings as more explanatory than descriptions, and add some remarks on the foreign agricultural implements.

A table of awards, as ultimately decided on, is contained at page 426 of the last volume of this magazine. I have taken some trouble to compare this with the original juror awards as printed in the Journal, and I find that 5 Council medals and 77 common ones were originally awarded in Class IX., but that eventually only 5 of the former and 38 of the latter were allotted.

Let us make another division, and we find that 70 medals were originally awarded to the English exhibitors, and 13 to the foreign, but that finally the En ish were cut down to 32, while the foreigner still retained 11 of theirs.

This diminution is effected by deducting altogether the prizes awarded to Howard for an expanding harrow, Ransome for Biddle's scarifier, Bentall for subsoil plough, and Garrett for chaff-cutter; by taking away the common medals from some of the larger manufacturers, and bestowing a Council medal, not in addition, but in place of them; and when a firm gained several medals for various implements, awarding one medal for them all.

That the eminent agriculturists who originally decided the prizes are not to blame for this is plain; their former experience, as members of the Royal Agricultural Society of England, led them to decide fairly on competition principles, and not by any pretended standard of merit. Every machine to which a medal was awarded was to receive it, although the manufacturer might thus sometimes gain half-a-dozen. The Council medals (like the gold ones of the R. A. S.) were awarded as additions, to mark superior merit, workmanship, and excellence as a whole; it was never intended that gaining the Council medal should cause the minor medals to be lost.

To make this plainer, I will put a case. Let it be supposed that His Royal Highness, the President of the Exhibition, on showing largely, as usual, at Smithfield, gained several prizes in various classes, would it be considered fair that he should only receive one small prize, equal in amount to the lowest given? or, suppose the Prince *unfortunate* enough to gain the gold medal, would it be right that this

should occasion a forfeiture of all minor money prizes? The gold medal would then tend to pecuniary loss, instead of gain. I make these remarks because the few medals awarded in the large class of agricultural implements, in which Englishmen were confessedly unrivalled, naturally occasioned considerable surprise. It is now clear that the original jurors did their duty, and some ulterior influence was used to deny the medals which, even in the reduced number, are not yet distributed to Englishmen (they are to the French, &c.); the only thing talked of being payments and testimonials to commissioners.

The trial of ploughs took place on the 29th of July last, on Mr. Mechi's farm; a rather unfortunate choice, as the frequency and manner in which this farm comes before the public, and the rather "shop" style in which that gentleman states his experiments, leads to a doubtful feeling with many farmers, even when no reason exists for it. English, American, French, and Belgian ploughs entered into competition. Eleven ploughs started. A Belgian and American appearing rather lighter in work than the English; the three lightest being Odem's, Belgian, 527 in dynanometer, Hale and Spear's American, 530, and Busby's English, 540. Of the three judges, two were foreigners, *i. e.*, Belgian and American. We hear nothing of the style of work, or depth and width of furrow; and, as Mr. Pusey justly observed, "no inference can be drawn from a single summer trial, even as to the *lightness* of a plough in ordinary work. When land is hard and dry, cleavage is the principal element of resistance, the friction is limited, and cohesion of course null. Hence our English ploughs, which seemed the lightest, were brought in a former trial to a dead stand in moist clay. The American ploughs are very elegant and light, but seem hardly steady enough for breaking up an English clover ley."

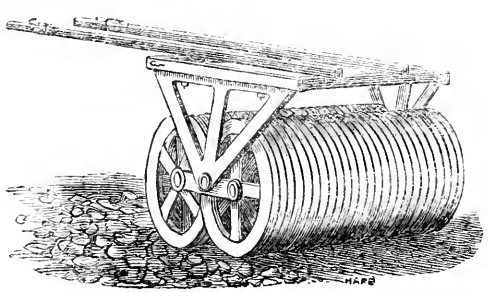
Why the Belgian and American should be slightly lightest in work arises, I should think, from the use of wrought-iron ploughshares by them, and of cast-iron by us: the wrought-iron are sharp when new, and wear blunt; the cast-iron comparatively blunt when new, wear sharp. The ground being clay, was easily divided (the dryness prevented cohesion to the mould-board), and Odem's, from what I saw of it in the Exhibition, appears better calculated for clearing than turning over the soil. That the Belgian ploughs made very bad work is clear, from the ridiculous complaint of the Belgian judge, Baron Martens, that there was "no ploughman to use them well;" ridiculous in Essex, where the labourers would work any plough that had any go in it.

A more complete and satisfactory trial followed at Pusey, chiefly for English and Scotch ploughs, but the prizes appear to have been awarded principally from the trial at Mr. Mechi's. Ball, Busby, Howard, Hensman, and Bentall (subsoil) gained prizes among the English, as did Deltouche and Odem (Belgian), Talbot (French), and Jenkin (Dutch).

In harrows, no novelties were shewn, the well-known iron harrows of Coleman, Williams, and Howard gaining prizes.

In common rollers, the greatest novelty was M. Claes', of Belgium, for narrow ridges, where four separate rollers work on a spindle much too small for them. This, Mr. Pusey says, possesses the germ of the very squeezing motion we require, as distinguished from the pressing one of English iron ones. Our English treble cylinder rolls, when from age their spindles and axle-holes get worn, and the roll acquires what we may call a "wobbly" motion, will be M. Claes' in perfection gained, like that, at the expense of occasional dragging over the soil instead of rolling it, and a waste of horse power, from the spindle never working in the actual centre of the roller.

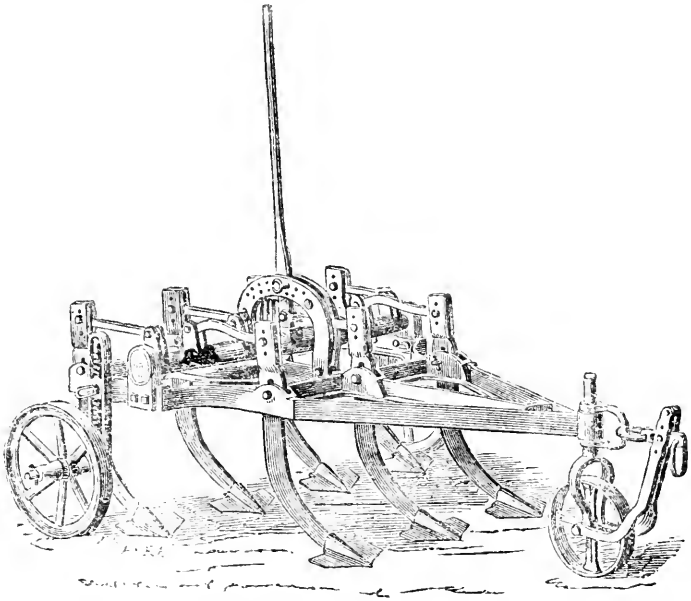
Among clod-crushers and press-rolls, Croskill's most deservedly gained a medal, but why all notice of Cambridge's was omitted, which is confessedly less liable to clog, and more suitable on certain soils, it is difficult to imagine. Mr. Pusey observes that, "Mr. Gibson's clod-crusher, now first brought out, is formed of two rows of very narrow wheels, alternating with each other. Mr. Croskill's has the defect of clogging when the ground is moist; Mr. Gibson's, of pressing the ground rather tightly. It is between these two weak points that choice must be made in selecting a clod-crusher." This clod-crusher covers 4 feet 9 inches of ground, and has 20 wheels in one row and 19 in the other. Price £15. Prince Albert, it is stated, has since purchased one of them.



Gibson's Clod-crusher.

Among wide cultivators, Ransome's and Coleman's obtained prizes; the former is well known. Coleman's, as will be seen from the engraving, is less wide than Ransome's. This less

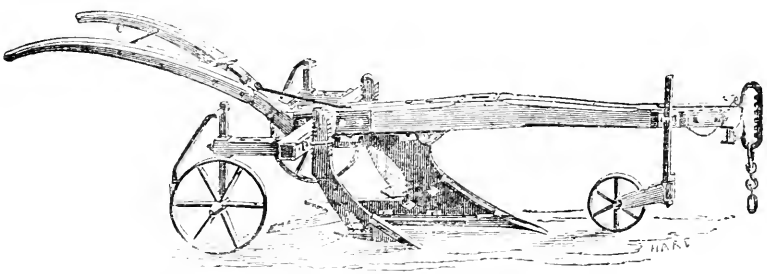
width (5 feet to Ransome's 6½), and the fact that it raises only a light upper frame with the teeth, and leaves the lower main frame in its place, renders a less powerful leverage necessary than in Ransome's. Mr. Pusey states that his experience of Coleman's is, that it is superior to all others he has tried, in never rising partially out of the ground, nor swerving in its course. The price also is cheaper.



Coleman's Prize Cultivator.

Bentall's narrow cultivator is, as Mr. Pusey says, "excellent for paring a very tight surface. Its long snout, like a swordfish's horn, is an ingenious device, by which it is enabled to adhere to the land. This cheap implement has also received a prize as a subsoil plough; and though it be a good rule that no implement should do more than one thing, an exception must clearly be made here."

Bentall's as a most useful implement for many purposes, is, we are glad to see, coming into general use in most parts of England.

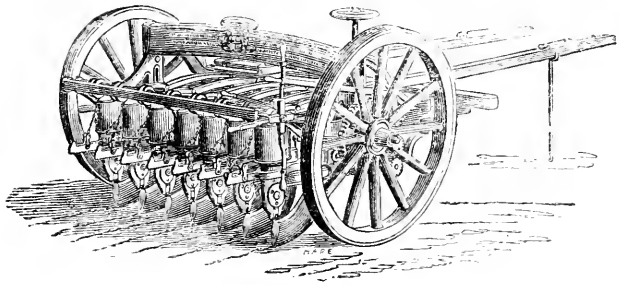


Bentall's Subsoil Plough and Broadshare.

Drills.

Nearly twenty of these were sent down for trial to Pusey. Messrs. Garrett and Hornsby, as usual, divided most of the prizes between them. Their drills are too well known to need description. I may just mention Hornsby's improvements, in substituting india-rubber for tin in the seed tubes, and an ingenious contrivance for drilling corn on sides of hills, by extending or contracting, by means of a screw, two legs, similar to the governor of a steam-engine, attached to the side of the drill, and by which (the drill being hung by, or supported on the centre) it can be regulated while in motion.

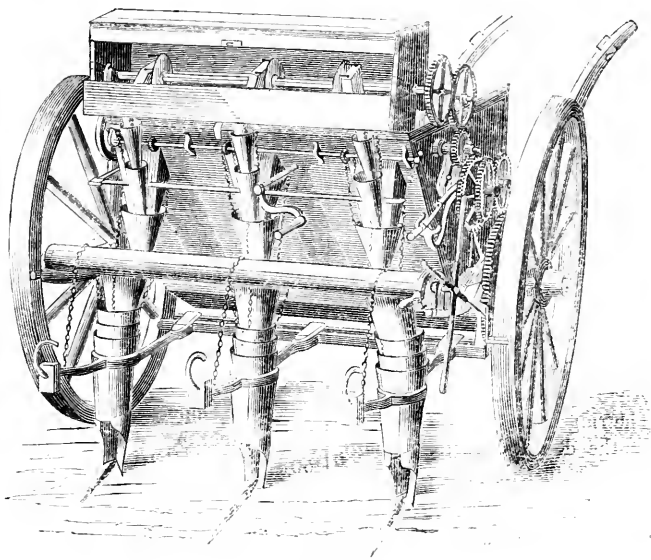
Messrs. Ransome and May, of Ipswich, exhibited a very well-constructed drop-drill, which did its work very well, and was of a very different construction from any of the other drop-drills. A medal was awarded for ingenuity of contrivance and excellence of workmanship. Having described this implement before, I shall now only add an engraving.



Ransome's Drop Drill.

M. Claes, of Belgium, obtained a prize for the simplicity and cheapness of his drill. It sows nine rows, and is, the inventor says, much lighter in work than any English drill, being applicable for one horse. It appears he was ignorant of Messrs. Garrett's one-horse drill for small farmers, which is superior in every respect. The Belgian *improvements* all tend to increased heaviness in work, as it is not the machine itself, but the dragging the coulters through the soil which occasions the labour. Thus the Belgian seed coulters make a wider seam, and are fixed instead of on levers; both these *improvements* evidently increase labour, the latter (which also tends to imperfect work) especially on stony soils. Small coulters, on levers, follow the fixed seed coulters, to *cover* in the seed, and this adds a little in increasing the horse labour.

The water drill, invented by Mr. Chandler, of Market Lavington, Wilts, I have described before. The annexed engraving will make its construction plain.



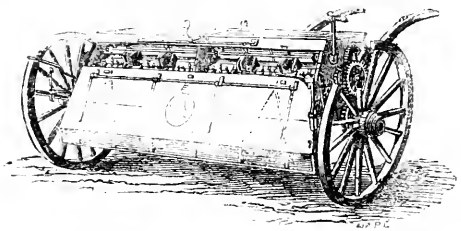
Chandler's Water Drill.

Here the manures are mixed with water, instead of ashes or other substances; thus, as Mr. Pusey observes, bringing up the plant from a mere bed of dust. "Only last July, when my bailiff had ceased turnip sowing, on account of the drought, by directing the use of the water drill, I obtained from this late sowing an earlier and better show of young plants than from the former one with the dust drill."

Excellent as this drill is, yet it must not be forgotten that the water costs something, and probably, before the work is concluded, as much as ashes. The weight of water is so much more than ashes (about double), the quantity of water used so much greater, and on the soils where water is most wanted it is often so distant, and often difficult to be obtained, that the actual cost probably exceeds that of ashes. Water certainly is a better mixer than ashes for perfectly dissolvable manures, or when they are so divided and

near the same specific gravity that a slight agitation keeps them suspended. But when the specific gravity is much lighter or heavier the water drill would probably distribute irregularly. Nor must we forget that the ashes act as a manure as well as a dilutant, and that substances might be chosen that absorb moisture from the atmosphere, and the effects of drought be thus obviated even by a "dust drill." Still the success of Chandler's liquid manure drill has been so great that it may be considered one of the few real inventions of the day, as combining great usefulness with complete novelty. 300 gallons of water are used per acre. A common oil-pipe, costing about 10s., containing from 150 to 200 gallons, is used to convey water to the drill, being placed so high on a cart, that by means of a tin pipe it may be discharged into the drill as wanted. A small tub at the end of the furrow, is filled with a solution of superphosphate, &c., and a bucket of this mixture poured into the drill. The inventor adds, "three water barrels, two on the road and one filling (which may be accomplished with two horses), will convey sufficient liquid for a one-horse drill to put in from 6 to 7 acres per day.

Holmes's sowing machine (see engraving) is used in West Norfolk both as a top-dresser for wheat, and for manuring turnips.



Holmes's Manure Sowing Machine.

The manure, either with or without ashes, falls into the furrows of the ridged turnip land at 24 or 27 inches apart. The ridges are then turned over on to the manure by the double-breasted plough, and the manure covered sufficiently out of the way of the seed, so that instead of striking immediately into the whole body of manure, it catches it gradually at the different stages of growth. The manure distributor covers 3 or 4 furrows at 27 inches apart, and is worked with one horse. It is followed by a light drill, expressly for turnips and mangold wurtzel, also worked by one horse. As Mr. Pusey observes, "The saving of horse power is indeed great; but it must not be disguised that there is inconsistency between the principle of general diffusion here recommended, and the concentration which is the aim of the drop drill. Each method in fact has its merit for different purposes—concentration for pushing the young plant, extension for feeding it in the latter stages."

It is unnecessary to do more than allude to the horse-hoes, among which Garrett's was, as usual, pre-eminent.

I proceed to those implements used in harvesting, and first as to the celebrated reaping machines.

I shall not reopen the questions of origin, whether British or American, disputes between makers, or description of each machine, such being already fully known to readers of this magazine. I shall merely compare horse with hand labour, taking the data as set forth in the Journal.

Mr. Thompson says that Hussey's machine cut from 4 to 4½ feet at a bout, with ordinary driving, which was quite as much as was cleared by M'Cormick's at the Ormesby trial—4½ feet being taken as an average width, and the rate of progression 2 miles an hour, 1 acre of wheat would be cut down in 55 minutes, or 13 acres in 12 hours.

Mr. Pusey says that M'Cormick's cut at the rate of 15 acres a day, and gives the following table:—

Average cost of reaping 15 acres at 9s. .	£6	15	0
Horses and men for reaper	0	10	0
Binding 15 acres at 2s. 6d.	1	17	0
	2	7	6
	£4	7	6

Besides often saving the crop in bad seasons and late districts.

This account, I think, requires various deductions to suit the experience of other districts. The mowing and tying up of good crops of wheat is frequently performed at from 6s. to 7s. per acre. The inventor himself states (see advertisement in *Exhibition Catalogue*) that four horses are often required in stout crops. Good workmen to attend the machine would require from 3s. to 3s. 6d. a day in harvest time. The 15 acres assumed would not probably be done in a *common* day's work—12, or even 10 would be a good average. The interest on the machine at 10 per cent., divided over the harvest month would amount to 2s. a day, or if 50 acres of wheat were mown by it, which is as much as it would do on many farms, to 1s. an acre; and incidental expenses, as breaking knives, &c., may be put down at 1s. The sheaves would take longer to tie up, and be worse for thrashing, &c., on account of the slovenly method of delivering the corn from the machine. Taking these points into consideration, we may state—

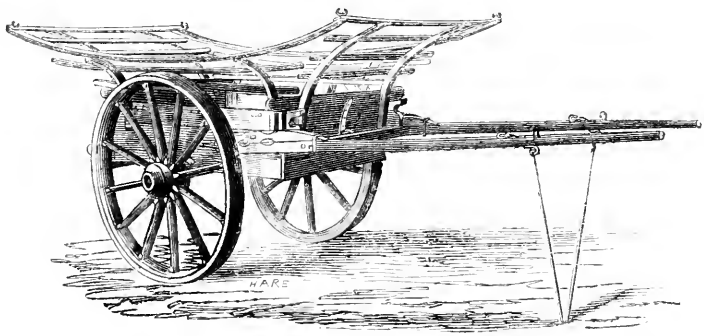
Mowing 12 acres at 6s. 6d.....	£3	18	0
4 horses and men for reaper	0	16	0
Tying up 12 acres at 3s. 6d. (the cutting is not half the work)	2	2	0
Interest on mach . .	0	3	0
	3	1	0
	£0	17	0

Now in mowing barley, which is often done at 2s. per acre by hand, would the machine effect any saving? Still the machine would possess the advantages of despatch of work, and the employment of the farmers horses, otherwise perhaps standing idle in the stable.

Is it to be wished that the Scotch machine of Bell was not exhibited? as from its more perfect delivering apparatus it would probably have been considered superior even to Hussey's.

One-horse Carts.

Mr. Busby's cart obtained a prize for its better adaptation to the purpose of a harvest cart. The fact that raised ends in the harvest frame have a tendency to condense the load, was first pointed out by the judges in 1849, at the Norwich show, and in this cart these suggestions have not only been followed, but improved upon, by raising the sides as well as ends. Mr. Busby's cart is also lower than others, which not only diminishes the labour of loading, but lowers the centre of gravity, and thus lessens the likelihood of an upset; this is done by affixing the shafts to the side, and not making them, as in others, a prolongation of the sole.



Busby's Harvest Cart.

Gray's, of Uddington, Scotch cart, deservedly obtained a prize for excellent workmanship. Although, as Mr. Thompson says, it is too high, the naves unnecessarily loaded with iron, and the wheels too much out of the perpendicular, yet "the Scotch iron work is notoriously excellent, and in Mr. Gray's case it is just what it should be, substantial and well finished, and (with the slight exception above mentioned) with nothing redundant." The excellence of the wood work is also shown by the cart being unpainted.

Preparation of Produce for Market.

Mr. Carr's report on the prize steam engines is too long for extract, though it is well worth perusal. Certainly, whoever in his respective district should purchase any one of the prize portable engines, either Garrett's, Hornsby's, Tuxford's, Barrett and Exall's, or Clayton and Shuttleworth's, would have no reason to regret his choice; and the nearer his residence was to the original makers, the cheaper those unavoidable repairs would be, which, in so complicated a machine, would be far beyond the village blacksmith, or even the town mechanic.

Much stress is laid upon a slight difference in coal consumed, in many instances the expense of fetching water will amount to as much as the whole price of the coal, and so will any trifling disarrangement which may occasion only half an hours' delay. A break down, or accident, which causes work to be altogether discontinued, is of course of far greater consequence; therefore lightness, strength, simplicity, and safety from fire, are, in the choice of an engine, of far more importance than a cwt. or two of coals saved daily.

TABULAR STATEMENT OF STEAM ENGINES.

Names of Manufacturers.	Nominal Horse Power.	Time getting up steam	Coal used in getting up steam	Coal burnt per horse-power per hour.
		minutes.	lbs.	lbs.
Tuxford and Sons, No. 1	6	53	56.68	7.46
Ditto ditto No. 2 ..	4	41½	35.60	10.80
Hensman and Son..	4	33	29.00	18.75
Hornsby and Son ..	6	49	35.23	6.79
Butlin	4½	50	42.00	14.71
Garrett and Son* ..	5	42	26.50	11.65
Caborn	9	44	52.00	12.48
Clayton, Shuttleworth, & Co., No. 1	6	32	35.40	8.63
Ditto ditto No. 2 ..	6	42	With	drawn.
Barrett, Exall, & Co.	4½	26	25.56	9.20
Burrell	6	28	35.00	13.10
Ransomes and May...	5	70	With	drawn.
Roe and Hanson ..	4	83	75.20	25.80

* Garrett and Son's slide was wrong in this trial; but in a second experiment tried with Newcastle coal, this engine worked out what would equal..... 8.63

TABULAR STATEMENT OF TRIAL OF THRASHING MACHINES

First Trial.—Wheat.

	1.	2.	3.	4.	5.	6.	7.			
							Quality of Work.			
	Nominal Horse Power.	Horse power required while threshing.	Revolutions of driving pulley as shown on counter.	Net pressure of steam in pounds.	Minutes in threshing 2½ cwts. of wheat-sheaves at the specified power and speed of drum.	Horse power required to thresh 2½ cwts. of wheat sheaves in one minute.	20 represents perfect work. Clean threshed	12 represents perfect work. Broken grain.	8 represent perfect work State of straw.	Total.
					min. sec.					
1. Hornsby	4	4	616	15.76	4 13	16.88	18	9	4	31
2. Blythe.....	4	4	407	15.50	2 41½	11.76	10	12	7	29
3. Garrett	6	6	260	32.00	2 21	13.96	18	12	8	38
4. Crosskill.....	4	4	305	19.00	2 27	9.84	16	12	8	36
5. Hensman	4	4	358	17.50	2 40	10.67	20	12	8	40
6. Caborn	6	6	417	26.00	3 5	18.48	20	8	4	32
7. Barrett and Co..	6	6	336	26.00	2 58	17.88	16	10	8	34
8. Ransome.....	4	6	368	26.00	2 44	16.44	18	6	6	30
9. Holmes	6	6	248	28.50	2 0	12.06	20	12	7	39
10. Smith	3	6	595	24.00	4 0	24.00	20	11	7	38
Second Trial.—Barley.										
1. Garrett			160	32.00	1 27	8.72	20	10	8	38
2. Crosskill			346	19.00	2 47	11.16	20	11	8	39
3. Holmes.....			168	28.50	1 20	8.19	20	12	8	40
4. Hensman			195	17.50	1 27	6.62	15	12	8	35

Of the three prize thrashing machines I notice Holmes's, as not having come so prominently before the public as Garrett's and Hensman's.

Holmes' has a certain and easy method of regulating the concave, the want of which is a frequent cause of accident and bad work, from the concave being set closer at one end than the other, or from its getting closer to the drum, from the giving way of the regulating apparatus.

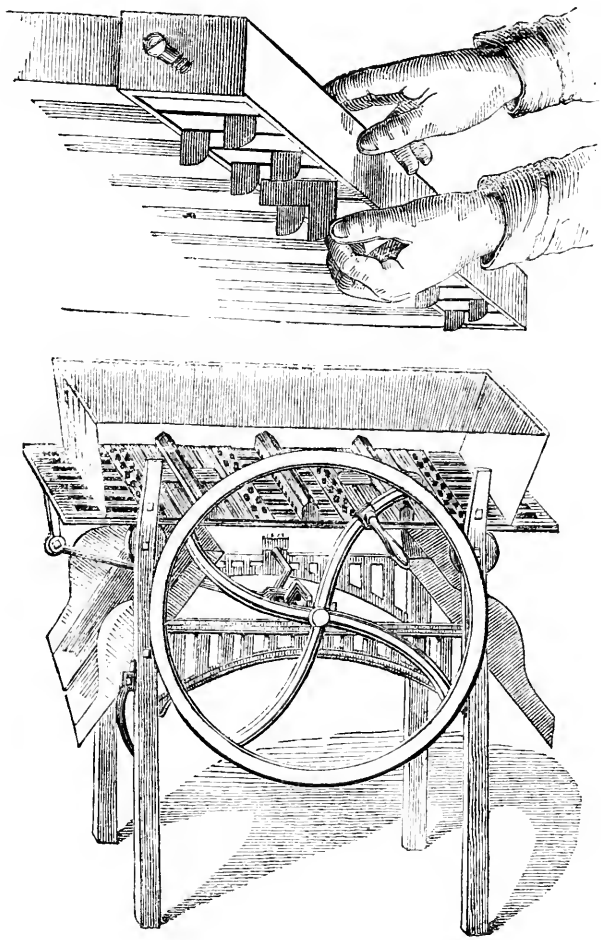
Holmes' concave consists of an open wire, alternating with toothed iron bars—the beaters are plain and smooth. His shaker acts also as a sieve, from its consisting of four frames upon which are fixed iron plates with circular nobs, the shaking motion given by the alternating rise and fall of the plates. This shaker was especially commended by the judges as being very efficient, and yet adding little to the draught of the machine. There is no blower to this machine, but it admits of one being attached. Mr. Holmes considers a blower objectionable in a portable machine, from the chaff being blown about by the wind, and the additional machinery adds considerably to the weight and height of the machine.

Among the winnowing machines Hornsby's obtained a medal. The judges at York stated of this machine, that—"It does its work well, parting the whole into best corn, good tail, whites, screenings, and chaff, at the rate of above 15 quarters per hour, and dressing over the second time at the rate of above 20 quarters per hour, parting the whole into six parts as before." At the Exhibition trial, the judges state "Messrs. Hornsby and Son are above all others the most sucessful in these machines, dressing more than double as much corn as any other in *a rough state*. Theirs is fitted with a spike roller, working through a grating, and forms a sort of hopper, separating the corn from the chaff in a rough *pulsy* state, as it comes *from the thrashing machine*, without being previously riddled; and can be adjusted to suit corn either in rough chaff or in any other state; the second time over, a slideboard is adjusted in front of the grating, and is excellent for finishing the corn for market."

We now come to machines for preparing food for stock. The machines that gained prizes in their departments being all so well known, I shall make a selection of the most novel, as Burgess and Key's turnip-cutter, Crosskill's American meal-mill, Harwood's mill, and Burrell's gorse-bruiser.

Although I do not think that Burgess's turnip-cutter will by any means supersede Gardiner's, yet, after the reaping machines, it is the best importation from America in this class of implements, and de-

servedly attracted great notice. The judges', at the Exhibition, report on this implement is, that—"It is on a different principle to those generally in use: it cuts a very large amount of roots for beasts and sheep at the same time exceedingly well, and requires a very small amount of power. There is a great facility of changing any of the knives that may become blunt or broken; and there is a very simple and ingenious method of letting stones or gravel escape before coming in contact with the knives. The medal was awarded for novelty and usefulness." Price £5.



Burgess and Key's Turnip Cutter.

Still I may notice one or two objections to this machine. From the shape and divided form of the hopper large roots would often not reach the knives, and the reciprocal motion is not so conducive to the steady cutting of roots, and to diminishing the machine's wear and tear, as the continuous one of Gardener's.

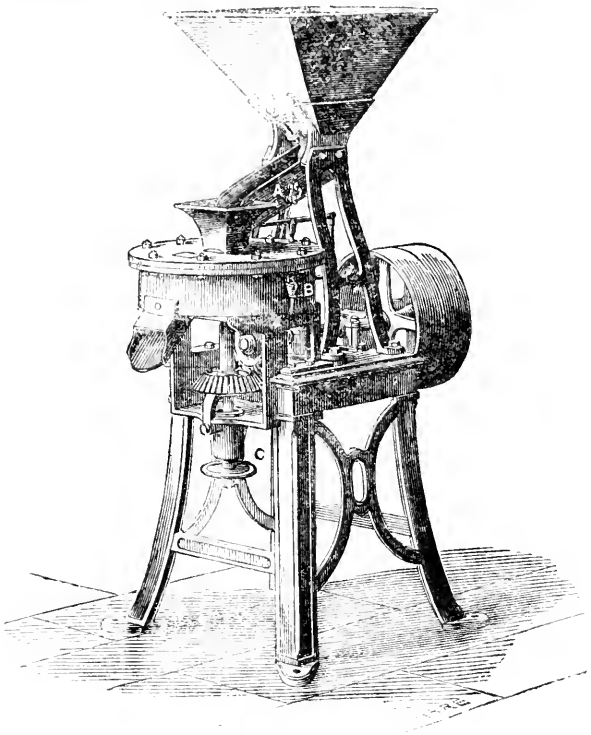
Mills for Grinding Fine Meal.

The Exhibition judges state that "the best metal mills that have been produced for this operation are those of Messrs. Hurwood of Ipswich, and Messrs. Crosskill, of Beverley." That of Messrs. Hurwood, which is composed of a series of cutting rings, screwed upon a cast iron plate, having the dress somewhat resembling the common millstone; the drift increased from the centre to enable it to clear itself. The rings appear to be easily replaced by new ones when worn out, and which is a great advantage over the old mills. This mill did 6 bushels of barley per hour, with a power of little more than three horses, and is applicable to beans barley, and oats.

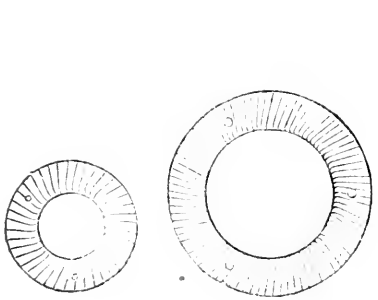
"Messrs. Crosskill's is an American invention

consisting of a number of cast iron plates turned up in circular grooves, either fine or coarse, dependent upon the work required, and fixed *eccentric*, which gives them a sort of clip. The mill requires great power, and should be driven at great speed. By changing the plates it will grind anything from linseed to flint stones. In the trials at Kensington it ground linseed, barley, beans, and oats, very well."

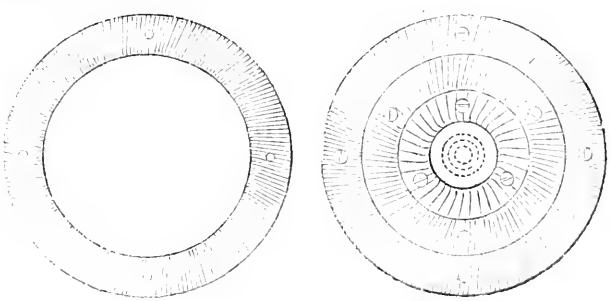
Having previously given an engraving of Crosskill's, we now add one of Harwood's mill.



Harwood's Ipswich Meal Mill.



Detached Rings.



Rings shown as in use for grinding.

Burrell's gorse-bruiser, the judges state, "did the most and the best work, and although it consumed rather more power than some others in bruising the gorse, it did oats and linseed at a moderate amount of power. The price is £27." This machine first cuts the gorse as chaff, and then passes it through one pair of rollers, one of which has a pressure by means of a leverage, of four tons weight. It is fitted with an extra hopper when used for crushing.

Churns.

It is rather remarkable that in this, as well as in the reaping machines, the decision of the public should have entirely reversed that of the judges. Drummond's, which is set down as not making the butter at all in the trial, has proved itself the best on other occasions, and was certainly far the most popular in the Exhibition. Of the four prize churns (divided between the four competing countries), Wilkinson, English; Burgess and Key, American;

Du Chene, Belgian; and Lavoisie, French—it may be fairly stated that not one for completeness and novelty was equal to Drummond's.

Wilkinson's was well made, but is merely the common box churn. Du Chene's is also very well made, but contains nothing new; it has the continental plan of a fixed barrel with moveable beaters. Lavoisie's was a toy; it could churn only two quarts of cream—was made of tin in the fixed barrel form, with moveable wooden beaters; the speed of these beaters was increased by a cogged wheel and pinion—an outer tin case held warm or cold water according to the season. The method of increasing the speed is the only novelty, the use of metal being a decided disadvantage; in fact, I consider this inferior to the "original glass churn" plan of a quart bottle, to be put into hot or cold water as required, before shaking the cream contained in it into butter.

The American churn has been much praised, but it has many defects; it requires to be exactly half-filled, the cream must be diluted before using or the hollow unperforated beaters will not work well. It is called atmospheric, but at most it only drives the same air backwards and forwards through the cream—it supplies no fresh oxygen: it is badly made as compared with Wilkinson's or Drummond's, and it is sold at a very high rate.

Drummond's churn "is in form an elliptic or oblong square, or nearly so, divided in the middle, forming two chambers or compartments, but which communicate with each other by a series of round holes perforated in this division, or at top and bottom. To each of these chambers belongs a lid or cover, and a staff and *dasher* similar to those in the ordinary plunge churns, but the staves of which are peculiarly but simply constructed to secure an infusion of pure air through the whole body of cream at every stroke. At the outside of the churn is a portable iron bracket supporting a fly wheel and an eccentric, which latter acts between the upper ends of the two staves, and is simply attached by means of two common cords. To the fly-wheel is a handle by which it is driven round, acting on the eccentric by a connecting rod, effecting 200 strokes a minute with considerable ease.

"The one staff, as it is propelled downwards, forces the cream through its dasher, and likewise through the division at the bottom into the other compartment, the other simultaneously forcing itself through the cream upwards, and in the same manner causing a *cross action* through the holes perforated at the top, and *vice versâ*." This constitutes the merit of its action.

Its advantages are that the same churn can make from one pound of butter to twenty. No metal being in contact with the cream, there is no galvanic action as when zinc or tin are used, and no injurious matters impregnating the cream as when iron spindles work in iron, or, worse, in brass, as in the box-churns. Fresh air from the outside is forced in and through the cream at every stroke of the plungers, and the foul air, "contained in all cream 24 hours off the milk, is forced out of the cream." Good butter appears to have been produced from this churn in from 3 to 10 minutes.

Mr. Drummond is, however, wrong in saying no other churn is entirely free from the cream coming in contact with metal, for the common English barrel churn is, and also allows by means of a vent peg the occasional introduction of fresh air; but neither this nor any other forces the outside air through the cream as Drummond's.

Exhibition Trial of Churns.

First Trial.

Exhibitors.	Cream.	Time.		Butter.		Quality.	Form of Churn.	Thermometer.	
	quarts.	min.	sec.	lbs.	oz.			air.	cream.
Wilkinson	4	11	0	3	8	best	wood		
Tytherchief	10	18	0	9	2	soft	tin ..	70	69
Destrey	4	16	0	3	12	soft			
Destrey	9	11	0	8	12	soft			
Patrick	10	20	0	9	4	soft			
Burgess and Key	4	10	0	3	12	second best	box		
Drummond	6	9	0	5	2	not made	wood ..	72	71
Lavoisie.....	2	2	0	1	13	third best	tin		
Dalphin	6	8	0	5	0	soft			
Allen	6	7	30	4	2	soft ..	.. ..	77	74
De Pourquet.....	3	9	0	2	6	soft			
Duchêne	9	19	0	7	9	not all made			
Smith.....	5	22	0	4	10	indifferent	centrifugal		

Second Trial,

With Jersey cream previously half-churned (as Mr. Pusey says) in the steam-packet.

Exhibitors.	Cream. quarts.	Time. min.	Time. sec.	Butter. lbs.	Butter. oz.	Quality.	Form of Churn.	Thermometer. air.	Thermometer. cream.
Wilkinson	4	1	45	4	0½	best	wood box	79	75
Burgess and Key	4	1	45	4	2	very good	wood box		
Lavoisie, French	2	0	45	2	2	third best	tin		
Clare, French	1	1	45	1	0½	good	tin		
Duchêne, Belgium	30	2	30	27	0	second best	barrel wood		

The prize tile machines of Messrs. Clayton, Scragg, and Whitehead, have been often described before; and I have in a former paper mentioned the "commended" draining plough of Mr. Fowler, which, as Mr. Pusey says, "but for the American reapers would have formed the most remarkable feature in the agricultural department." I cannot, however, avoid mentioning two machines in Class VI., which if they could be adapted to private use, and brought within the pecuniary reach of most farmers, would be of great service. They both attracted considerable notice at the Exhibition, and were decided novelties. The first is No. 442, W. Westrup's conical flour mill, which has been frequently alluded to in this magazine; the other No. 630, W. L. Tizzard's apparatus for brewing with barley, using a very small admixture of malt.

In concluding the report of the *English* implements, I cannot do better than use the words of Mr. Pusey:—

"It seems proved, then, that within the last twelve years, since annual country shows of implements were established by Lord Spencer, Mr. Handley, and others yet living, old implements have been improved, and new ones devised, whose performances stand the necessary inquiry as to the amount of saving they can effect. To ascertain that amount precisely is difficult; but, looking through the successive stages of management, and seeing that the owner of a stock farm is enabled in the preparation of his land, by using lighter ploughs, to cast off one horse in three, and by adopting other simple tools to dispense altogether with a great part of his ploughing—that in the culture of crops by the various drills horse-labour can be partly reduced, the seed otherwise wanted partly saved, or the use of manures greatly economized, while the horse-hoe replaces the hoe at one-half the expense—that at harvest the American reaper can effect 30 men's work, while the Scotch cart replaces the old English waggon with exactly half the number of horses—that in preparing corn for man's food, the steam threshing machine saves two-thirds of our former expense—and in preparing food for stock, the turnip-cutter, at the outlay of 1s., adds 8s. a head in one winter to the value of sheep—lastly, that in the indispensable but costly operation of draining, the materials have been reduced from 80s. to 15s.—to one fifth, namely, of their former cost—it seems to be proved that the efforts of agricultural mechanists have been so far successful as *in all these main branches of farming labour, taken together, to effect a saving on outgoings of little less than one-half.*

"There is a further effect of machinery upon agriculture which has hitherto been overlooked. The main difficulty of farming has always laid on its uncertainty. Though machinery has not altogether cured, it certainly has much mitigated this evil. On undrained clays a wet winter may destroy half the yield of the wheat. On the same land drained the wheat may escape altogether unhurt; and you may also plough heavy land in wet weather when drained, though you could not before. Upon any land wheat may suffer in winter, but in spring the presser settles it in its bed, and the manure distributor with a cheap sprinkling restores it to vigour. In sowing barley earliness may save the crop; but the ground is often too cloddy, though the season is wearing away and May-drought approaching. This cloddiness may be prevented, as has been said, by the paring plough, or, if it could not be prevented, may be remedied by the clod-crusher or Norwegian harrow; and besides these implements, the cultivator does the plough's work in one-fourth of the former time, thus enabling the farmer to profit by the auspicious hour of seed time. And so too with the turnip, the land being prepared for it in the previous autumn and winter, is moist to receive the seed; the dry drill, supplying it with superphosphate, saves it almost certainly from the fly; or yet more, the water drill, anticipating the clouds, makes its seed time independent of weather, while the horse-hoe afterwards preserves it from neglect in the busiest harvest time. Again, while machinery remedies the absence, it also guards against the inconvenient arrival of rain, by making our hay, and now even reaping our corn, while the sun shines. It may be further said then, that *machinery has given to farming what it most wanted—not absolute, indeed, but comparative certainty.*"

In the foreign implements I shall be very brief, and shall describe those not previously mentioned, under the heads of America, Belgium, France,

Minor States, Austria, India, Tunis, which I consider the rank they ought to be placed in, according to merit.

1.—*America.*

Most of the celebrated implements of this class, as the reaping machines, the American meal mill, churn, and turnip cutter, have been noticed in previous papers. The American ploughs attracted great notice, from their elegant appearance and superior lightness to any others. An intelligent American informed me that English makers would probably think them too slightly made, and so they would be, if constructed of English wood; but the American second growth white oak, which is used, is of so tough a nature that it allows of this apparent lightness.

Pronty and Mear's self-sharpening American plough took the prize in the Exhibition. I was informed that Starbuck's (No. 9) was considered superior in the United States, and that this lost through sending a plough calculated to turn a furrow twelves inches wide instead of nine, as approved by the judges. At all events, both these appear neat ploughs; perhaps rather too short and too much like toys to suit English taste, but much better calculated for ploughing between stumps.

The very light ploughs that may be carried *in one hand* are *horse-hoes*, used to plough between the rows of Indian corn while in growth.

A. B. Allen shows an American horse-power. This may be considered as a sort of tread-wheel for a horse, only that, instead of treading on a large wheel, as in the common treadmill, this is an inclined plane of pieces of wood (Georgian pine) fastened to two endless chains, and then passing over and turning two polygonal wheels. A spindle affixed to either of these wheels turns the machinery. The horse is fastened between two rails, and by continually stepping on this inclined and endless web of boards, uses his weight, as well as his strength, in moving whatever machinery is attached.

Purkis's new system of agricultural tillage, by stationary steam and atmospheric motive power, shews great ingenuity, but probably is of little practical value *at present*. Hermetically sealed metal tubes, six-inch diameter, are laid one-third of a mile apart, parallel, all over the farm; flexible tubes, each 350 yards long, are fastened, where required, to these metal tubes; these flexible tubes are fastened to a drum on an engine, and the air being exhausted from the metal tubes and the flexible ones, this works two pistons on the engine, and these pistons two large wheels; these wheels work ten spades, turning over the soil to a depth of four inches, of —if circular scythes are affixed, cut—26 acres a-day, at the rate of four miles an hour.

Lombard and Hall (428) exhibit a grindstone, with the inscription, "Presented to Lord Stanley." Is this a sly joke of Uncle Sam's? It is a highly finished implement, worked with a treadle, and having its axle running upon two small anti-friction wheels, in a similar manner to those frequently seen in England.

The celebrated American broad axe and cradle scythe were also exhibited.

2.—*Belgium.*

The Belgian ploughs are strongly and heavily made, and are perhaps more suitable for hard work than those shown by any other foreign nation. They resemble the ploughs in use in the east of England, in their having but a single handle, showing in this particular, as in some others, a resemblance in the construction of the implements of farmers residing on the opposite shores of the German Ocean, which late improvements have not entirely superseded on our side. The ploughs on the east coast of England are, however, larger in the handle, and the plough-staff can be used to guide the plough, and are altogether superior to the Belgian.

(510) A plough, to which a medal was awarded, by P. Deltouche (Brabant), has a skim coulter; a subsoiler is fixed in the hinder part of the beam, with an apparatus to raise or lower it at the pleasure of the ploughman; the length of beam 4 feet, of the single handle 2½ feet.

J. M. Odeurs (Marlinne), No. 169, exhibits double and single ploughs. He obtains a prize for a plough that professes to be made for one horse, but, except on the lightest sand (such as in Belgium), we fear its weight, clumsy mould-board, and general make would prevent its being so used. The length of beam in this is 3½ feet, of the single handle 3 feet; the mould-board and share are combined, and made in nearly two equal parts, and fixed together by hinges, so as to admit of alteration. Had these ploughs been English, and shewn in the English department, they would not have obtained prizes in competition with Messrs. Howard and Busby. We suppose the rewards were given on account of their merits in their own class. They are certainly strongly made; but if the prize was given to the first plough for the skim coulter, or for the subsoiler fixed behind, or, if in the second, for the power of altering the position of the mould-board, a slight acquaintance with implements described in the catalogues of the Royal Agricultural Society would have shewn that long ago similar contrivances, yet of far superior workmanship, had been in use in England.

D'Omalius (of Liege), No. 171, shows a rough and strong subsoil plough, with short handles.

E. Verbist, No. 162, shows a plough called

"tourneroille," which is a very simple, and probably effective form of turnwrest, or one way plough. The share is made with two edges, placed at right angles, and turns under the frame, so that each edge of the share alternately comes into work.

Deltouche (of Brabant), amongst a rather numerous collection of Belgian implements, shows a nineteen-fold articulated roller, somewhat resembling Mr. Gibson's clod-crusher.

J. J. Duchêne (Namur), No. 166, is an exhibitor of churns and buckets. The prize barrel churn is a specimen of good and useful workmanship which is scarcely surpassed in this department of agricultural implements; it has four beaters.

3.—*France.*

Borio Brothers (of Paris) exhibited a brick and tile machine, which being kept at work, illustrated practically the manufacture of their tubular bricks, which are recommended as requiring less fuel and being lighter carriage than the common. This machine has an English and French patent, and excited some attention from our English brick and tile makers. The agent for the sale in London is Mr. E. Elliott, 33, Bucklersbury.

Vachen, Son, and Co. (Lyons), prize for machine for clearing corn, combining a circular revolving screen.

Lebert's plough; good and simple; wheels in the wrong place.

J. Bodin exhibited some useful-looking ploughs.

Talbots show a plough that obtained a medal; it is difficult to see for what, unless for weight; more probably it was for the mode of raising or lowering the fore-carriage without stopping the plough, by means of a screw and handle; if so, a reference to "Bacon's Norfolk Agriculture" will show that this is nothing new. If the prize was given in comparison only with other French ploughs, it was deserved, as it was very strongly made, and appeared likely to be useful.

A French chaff-cutter was exhibited, extremely like an American one exhibited some years back; the lower roller formed the cutter, and consisted of a series of knives working against the upper roller, which is covered with vulcanized India-rubber.

Amongst other machines in the French department were sowing machines upon the hole system, turnwrest ploughs upon nearly the same principle (although not nearly so well made or so simple) as Wilkie's, and models of a threshing and winnowing machine with horse power somewhat similar to the Scotch.

4.—*Minor States.*

In Switzerland, an iron turnwrest plough, by Gisin, of Bâle, upon the same principle as Lowcock's. What was rather surprising was, that churns and dairy utensils were almost entirely absent from the Swiss department.

In the Danish department is a copy of our common chaff cutter; a strong and useful, though heavy article, made principally of cast iron, *bronzed over* in its rough state.

In the Netherlands, a turnip cutter, consisting of a series of knives on a spindle, working through the hopper, which was formed of iron bars, set far enough apart to allow the knives to cut between them. The same maker, W. Jenkin, of Utrecht, exhibited a swing plough, which obtained a prize.

5.—*Austria.*

Contributions are made by F. Lebejic, Hirsk (No. 123), and Prince F. Von Lobkowitz (No. 124), both from Bohemia, with one or two others, of seed-markers, drills, cultivators, eradicators, &c., but we observed none suitable for rough cultivation; the drills are complicated, and the cultivators and eradicators have so many tines and hoes that they could not possibly be worked upon any other than a very friable soil, and even then only in a shallow and superficial manner.

Miesbach (610), of Vienna and Pesth, the largest brick maker in the world, who employs 4,220 persons, and makes annually more than 107 millions of bricks, illustrated his enormous scale of manufacture by a large drawing of his most extensive works, and also sent most excellent specimens of draining bricks, tiles for roofs, &c. Some of the bricks were beautifully moulded, with casts and coats of arms upon them. We have seen nothing in this country to equal them. The bricks were white, red, and party-coloured.

The numerous Austrian scythes doubtless attracted the attention of visitors; although deficient in the lightness and elegance of the English ones, they are no doubt well made, useful articles. The following, from the Exhibition catalogues, is a little too much in the "puff" style, but probably essentially true:

"*Scythes, sickles, &c.*—The importance of these articles, as well as the prominent position of the manufacture of them in Austria, is generally known. The Austrian scythe and sickle find their way into almost every country in Europe, and even across the Atlantic. The reason of this is to be found in the excellence of the material, the lowness of the price, and the care with which they have been made for centuries. The principal seat of the manufacture is Upper and Lower Austria, Styria, and part of the Tyrol, which furnish nearly three-fourths of the whole number made. Stadt Steyer, in Upper Austria, alone furnishes annually nearly two million scythes and sickles; and the whole production of 142 works in the monarchy (not including 34

scythe factories in Lombardy) amounts to about seven million scythes, sickles, and straw cutters. Specimens are exhibited of various shapes and sizes used in the different countries."

6.—*India.*

The models of agricultural implements show that the agriculture of the East is but little advanced from the earliest times. Their use, and also many of the customs and ceremonies of this country, are instructively illustrated by the groups of Indian models.

The plough is similar to that seen in the Tunis department, but it is drawn by buffaloes. A Malay scarifier resembles the wooden horse-rake sometimes used in this country. The common India hackery, or native cart, is merely a rough frame upon unshod wheels of wood. These and other queer-looking grubbers, &c., are employed in the culture of rice, sugar, and cotton, the products of the tropical agriculture of India.

7.—*Tunis.*

This collection, perhaps the rudest in the whole Exhibition, included rough forks and rakes of wood, a rude plough of roughly-hewn wood, with merely a point of iron for the share, intended to be drawn by a man, by means of some ropes of rushes shown close by, while it was guided by another. The slow and original practice of grinding corn by hand was illustrated by a pair of small circular stones, resembling our own millstones in quality. These, with their dirty-looking candles, and clumsy collars and ox-harness, contrasted oddly enough with their splendid and brilliant specimens of manufactured articles, glittering as they were with spangles of gold and silver.

Jan. 21*st.* W. H. R.

A NEW PATENT SOWING MACHINE.

On Saturday, May 8, an exhibition of Capt. Kaemmerer's sowing machine took place at Windsor, under the superintendence of General Wemyss. The machine was first taken to the corn market, where it was minutely inspected by the farmers and country gentlemen who attended the market. Mr. Mechi and several other distinguished scientific agriculturists were present. The lightness of the machine was its first quality that attracted attention, many of the farmers, accustomed to the cumbrous drilling machines now in use, being scarcely able to believe that the machine, if made for regular work, could be so light. Its capabilities with regard to broad-cast sowing were first exhibited. The seed falls by means of a series of inclined planes, the quantity being regulated by metallic cups, fixed at intervals upon wheels, and depositing only a certain quantity of the grain. On leaving the depositors, the seed runs down a board covered with pegs, so arranged as to secure its regular distribution. If the seed to be sown be clover or any small seed, this board is studded with finer and closer pegs. The whole arrangement is exceedingly simple and effective.

For drilling and dibbling the pegged board is removed, and gutta percha tubes are attached, by which the seed, instead of being broadcast, is confined to the drill, which is made by an iron knife preceding the gutta percha tubes. Dibbling, in England, as our readers know, is the making of holes, into which the seed is dropped. Capt. Kaemmerer's machine does not, however, make holes in dibbling, but a drill, and deposits the seed at regular intervals, instead of in a continuous stream, as in drilling.

Capt. Kaemmerer proposes by his machine to effect a great saving to the agriculturist in seed, in first cost of machine, in repairs, and in labour. A great advantage certainly is the applicability of this implement with equal profit to small farms as to the most extensive. It will be seen by the following extract from his circular that the captain proposes to effect as great a revolution in the time and cost of sowing as the American reaping machine bids fair to do in the ingathering of the crops:

BY THE BEST MACHINE IN PRESENT USE.	BY CAPT. KAEMMERER'S MACHINE.
1. Different machines are required for sowing the various kinds of grain.	1. Every description of corn or seed may be sown by the same machine.
2. The mode of sowing cannot be easily varied in the same machine.	2. Every variety of sowing may be performed, broadcast or in drills.
3. Have very limited means of altering the widths and distances.	3. Simple means are provided of altering the widths apart of drills to any required extent, and of changing the distances of depositing the seeds.
4. Uncertainty in depositing the seed.	4. Exactness in regulating the quantity of seeds sown—thus effecting a large saving in seeds, and obtaining better results.
5. Are complicated in construction, and therefore liable to derangement.	5. Great simplicity of construction, and fewness of parts.
6. Are of considerable weight, being at least 10 cwt., and require one man and one horse to work them.	6. Saving in weight—the large machine weighing only 2¼ cwt., and requiring only one boy to work it.
7. Are costly, the best costing £50.	7. Being very simple in construction, the cost is small—thus a small machine, 2 feet wide, for very small farms, is only £5; the large machine, 6 feet wide, only £15; intermediate sizes in proportion.
8. The best machine can average only 10 acres per day.	8. Will sow 40 acres per day, with one man only (this has been done); will drill 20 acres per day, with one man only.

The machine, in the afternoon, was taken to the Home-park-farm, and put in operation upon some ground prepared by the orders of General Wemyss. The trial was considered to be perfectly successful.

Capt. Kaemmerer served in the Prussian armies in the

campaigns against Napoleon, and commanded a regiment under Blucher at Waterloo, and in the sanguinary battles of the preceding days. He has now turned his sword into a ploughshare, and has become one of the first agriculturists in Prussia. The gallant captain speaks no English, but has an excellent interpreter in his friend, Ed. vom Hof.—*Morning Post.*

BEET-ROOT SUGAR.

We called attention to the fact (see page 507), that a company is projected on a large scale for giving to farmers the benefit of a market for sugar-beet. That this is a question of national importance is beyond all doubt; and to shut our eyes to the undisputed advantages which home-made sugar promises, is to reject a benefit which our continental neighbours have long turned to good account. At the earliest period of this manufacture in France great mechanical and chemical difficulties had to be overcome. The English manufacturer goes to his task with all the experience at his command which the continent has acquired. In France, for these reasons, the progress was slow at the commencement; but once having taken root was never given up.

We subjoin an historical sketch of the gradual progress of this branch of industry in France from 1820 to 1840:—

Year.	Production of Inland Sugar.	Foreign Sugar entered for Consumption.	Total Consumption of Sugar.
	Kilogrammes.	Kilogrammes.	Kilogrammes.
1820....	50,0 0	44,416,795	44,416,795
1821....	100,000	41,502,749	41,502,649
1822....	300,000	49,328,057	49,328,057
1823....	500,000	37,590,270	38,590,270
1824....	800,000	56,048,430	56,048,439
1825....	1,000,000	48,546,683	49,546,683
1826....	1,600,000	64,407,342	65,407,342
1827....	2,000,000	50,797,139	52,797,139
1828....	2,700,000	61,987,771	64,987,771
1829....	4,400,000	62,160,175	66,160,175
1830....	5,500,000	54,647,941	60,647,941
1831....	7,000,000	67,750,207	74,750,207
1832....	9,000,000	62,642,643	71,642,643
1833 ...	12,000,000	57,874,877	69,874,876
1834....	20,000,000	65,643,511	85,643,511
1835....	30,000,000	64,095,647	94,095,647
1836....	40,000,000	56,276,475	96,276,475
1837....	45,000,000	64,167,840	109,167,840
1838....	50,000,000	63,251,965	113,251,965
1839....	55,000,000	62,731,995	117,731,095

Within the last ten years the augmentation has been less rapid. In 1851 the production was 60,000 tons or 60 millions of kilogrammes, notwithstanding the repeated prophesies that the beet-sugar would not compete with the cheap sugar of Brazil, Java, and Manilla.

In Germany the manufacture of sugar is of more recent date than in France. Its progress of late has been:—

Beet-root Sugar made in the Zollverein:—	Foreign Sugar imported:—
1848.... 26,000 tons.	1848.... 60,500 tons.
1849.... 34,000 „	1849.... 54,000 „
1850.... 40,000 „	1850.... 48,000 „
1851.... 43,000 „	1851.... 45,000 „

In the Austrian empire 8,000 tons were made in 1848, and in 1851 15,000 tons. Russia is said to have contributed 25,000 tons in the year 1851.

It does not at all follow that sugar made in England is to drive our Colonial sugar out of the market. There is more foreign sugar imported than we could hope to see replaced in many years. In 1851 it exceeded 45,000 tons, of which but a small portion was re-exported. To this figure we may therefore push our efforts, and most gratifying it is to be able to reflect that while slave-labour must inevitably grow dearer, every mechanical and scientific improvement can but enhance the power of the European producers and ensure their ultimate victory over the slave-owner. Samples have been shown in the city, of beet-sugar from the Rhine, quite equal to white Havanna, and refined sugar made from the same that could not be distinguished from West Indian.

THE BARK TRADE.—The following circular of Messrs. T. J. and T. Powell refers to a subject of interest to agriculturists at this period of the year: "In our May circulars, for many years, it has been our practice to give all the information in our power as to the probable supply of and demand for English bark, the harvest of which is now commencing. For this purpose we have been in communication with various of our friends—tanners as well timber and bark merchants—residing in most of the counties in England, and now we give an epitome of their replies. In answer to our most important questions, as to the amount o the fall, from nineteen of them we are informed there will be an 'average.' Six say there will be 'more than an average,' while five the report is that there will be 'less than an average.' We are, therefore, fully justified in saying that there will be a full average supply. Then, as to prices. Those who are sellers believe it will obtain nearly last year's value. The manufacturers all concur in quoting it at 5s. to 15s. per ton lower than last year—much has been offered at 5s. less, but has been refused. At the government sales about 10s. per ton below the prices of the past year was named, but none sold, so that the actual sales to this date are far smaller than usual. In regard to its quality this season, the reports vary considerably. The continuance of cold easterly winds is said, in some counties, to have retarded the process, while in others the statements are that it 'strips well.' We ought to add that in the counties whence the greatest supplies are drawn, the fall this year is the largest, and that some of our correspondents allege as a reason for the greater supply 'the rage for clearing the land by removing the hedgerows;' another informs us that the whole of the forest—1,000 acres—is clearing for inclosure. Taking all our reports into consideration, and making some concession to the greatly lowered price of leather, we think our quotations of £11 to £13 per load of 45 cwt., delivered in London, will be found nearly correct."

STEAM THRASHING MACHINE.—We consider a moderate sized farm in arable districts to be about 300 acres, and small if below 150; either of which farms will pay for the erection of a steam-engine. A four-horse engine will cost about £60, and a six-horse about £80. The thrashing mill will be from £60 to £80 additional. This is exclusive of fixed erections, chimney stalk, the erection of which is the province of the proprietor. This outlay being under £160, will be more than repaid during the currency of a nineteen year's lease, even on a small farm.—*North British Agriculturist.*

ON FALLOWS.

BY A PRACTICAL FARMER.

"Ye fostering breezes, blow!
Ye softening dews, ye tender showers, descend!
And temper all, thou world-reviving sun.
———the penetrative sun,
His force deep-darting to the dark retreat
Of vegetation, sets the steaming power
At large, to wander o'er the verdant earth."

THOMSON.

Of all the modes which have been adopted to promote the improvement of soils, none have been so universal or so effective as fallows. The advantages are great and manifold; and although we propose confining ourselves chiefly, in this article, to the various operations necessary to a *good fallow*, we desire to say a few words upon the subject itself.

Fallows! What are fallows? We answer, that prolonged cultivation of the soil by such mechanical and other operations as will produce or bring it into a cleanly, friable, and well-pulverized condition—this is what we understand by the term "fallows;" and the terms "summer fallows," "fallows for green crops," "bastard fallows," and the like, are merely terms applied according to their significance. A summer fallow will extend throughout the whole summer, and is commonly known as a bare or dead fallow; the green crop fallow will merely extend throug such portion of the season as may be found requisite to bring the soil into that state and condition most suitable to produce or grow the intended crop; the bastard, or occasional fallow, is that taken when opportunity offers and the occupier has time to seize upon it—a little extra outlay in this respect will be abundantly repaid.

What are the chief benefits or objects to be attained by fallowing? We answer, cleanliness, pulverization, aëration, the alteration of the constituent particles in the soil, the destruction of insects, their eggs, and larva.

It promotes cleanliness.—By fallowing, all kinds of weeds may be eradicated. Those whose nature it is to possess roots of great tenacity and extraordinary vitality may, by continued and lenghthened exposure to the sun and winds, be got rid of; and the seeds of annuals and other weeds, on being brought to the surface and exposed to atmospheric influence, speedily germinate, and are then readily destroyed. In a short or bastard fallow the weeds are mostly brought on to the surface, and picked off by hand.

Pulverization.—The frequent stirring of the soil at as great a depth as can fairly be obtained, and the separation of the particles of soil, by which it is rendered loose, open, friable and porous, is "pulverization;" and this is of immense advantage to the soil. By deep pulverization more room is given to the roots of plants to luxuriate and send abroad their fibres in search of food; it also increases the supply of food, by permitting the rains with greater readiness to carry down to the roots those supplies of carbonic acid gas with which the atmosphere is charged, and the greater facility given through its porosity, by which manures and other substances are rendered soluble. It promotes a more even temperature in the soil, heavy rains soon disappear, and heat, by its porous condition, can penetrate the soil and give warmth to the roots themselves. Attraction is also promoted: the dews decending upon a bare, hard surface at night, are soon taken off again in the morning; but an open, porous soil will imbibe their humidity to a considerable extent, and atmospheric air is thus enabled to add its virtues to promote a quick and healthy growth, by extending its influence to the roots of plants as well as upon their leaves. Dr. L. Playfair says that "fallow is only a legitimate operation of farming when the soil, as generally is the case in clay, contains a practically inexhaustible amount of alkaline silicates. In poor soils the process must be one of rapid impoverishment; and unless the ingredients thus removed from the soil be fully restored by manure, the operation of fallow can only be characterized as an exhaustion of the capital of the land, and not as the use of its interest."

Æration, and the Alteration of the Constituent Particles of the Soil.—Chemists tell us that remarkable changes of a chemical character take place in the soil itself during the process of fallowing, and mainly by repeated and lengthened exposure of the soil to the action and influence of the weather upon it. This we call *æration;* and it is for this æration or exposure to the sun's and other weathering influences during a lengthened summer, that bare fallows are still held to be good management, and are yet persisted in. We cannot advocate this practice even on the most retentive clays. That a total destruction of weeds may be the result we do not doubt; but we think that these necessary chemical changes may be brought about by more frequent and effective stirrings, by the use of scarifiers, ploughs, or other mechanical contrivances: the great object being to expose as much surface as possible, so that their ingredients may be more speedily distintegrated; and the more constantly the soil is stirred, the more progressively does disintegration go on. We find also that this process is in full action during the winter. The frost, rain-water, and the chemical action of the air exert a powerful influence in disintegrating the constituent particles of soils. We recommend our readers to consult any of

our popular books on agricultural chemistry for correct information on these points: we believe they will be fully satisfied that a whole summer's fallow is not requisite to promote those chemical alterations and changes in the constituent parts of soils so necessary to vegetable prosperity. We are well aware that many objections are made against the introduction of green crops of winter food on retentive or heavy clays. We feel the force of them. There are many, and great difficulties in the way. Still, we think, the advantages far counter-balance the whole. Clay lands will produce good turnip crops, and splendid crops of rape or cole-seed. By careful attention these may be fed off, or carted off if requisite, previous to winter, and the land ploughed, and thus left for the chemical action of the air, the frosts, or the rain, or all those combined weathering influences, so effective in promoting these chemical changes necessary for the full development of the powers of the soil.

A friend of the writer, occupying very heavy land, grows beautiful crops of rape, which he mows and carts into his fold-yard as food for cattle, and upon which they thrive most satisfactorily. The land is ploughed up in the winter, and by the early spring is in good state to sow with corn.

The Destruction of Insects, their Eggs, and Larvæ.—This is a very important thing in fallowing. The eggs of innumerable insects are hatched during the early summer; the larvæ of many others will remain in the soil for years, some even to seven years before they assume their crysalis state, during which they feed voraciously upon the young and tender plants. Good and effective fallowing will destroy these: constant stirring and the destruction of every weed is requisite for their final extirpation. We do not deem a summer fallow necessary for this; moreover, these insects are seldom found in great numbers on land generally subjected to a summer fallow: they abound most on light and open soils, and by keeping these continually stirred by scarifiers, large harrows, and occasionally by the plough, they may be destroyed, and also their propagation by their various progenitors prevented; for such is the natural instinct of these little creatures, that they are known to deposit their eggs where there is the greatest likelihood of future supplies for their progeny. The writer of this saw a striking instance of this kind a few years since: two farmers occupied adjoining lands; the one introduced bones to improve his turnip crop, and other similar aids; the other, continued in his old beaten track. In two or three years his farm was clear of wire-worm: his neighbour's full of them.

It is almost impossible to give a detailed and satisfactory account of the various operations necessary to produce a good and cleanly fallow: they will, of course, vary according to the nature of the soil, and the mechanical appliances brought into requisition. We shall again, at the risk of being thought too egotistic, describe our own course of fallowing, and leave our readers to improve upon our practice, or condemn it, as they may deem it to be correct or erroneous

The soil we occupy is loam and loamy clay, of moderate fertility and depth, resting upon sand, and properly subsoil-drained. Our appliances are ploughs, harrows of ordinary weight, rollers, Biddle's scarifier, large four-horse harrows, common drags, and ridge-hoes, universal ridge-ploughs or skeleton-ploughs. We generally, if we have time, commence our process of fallowing immediately after harvest by skeleton-ploughing the land to be fallowed; this we think does good in several ways; it prevents the ripening of the seeds of many annuals; it promotes the growth of those already shed; it lays open the soil to the action of the atmosphere, and all the influences of the weather; and also, as we think, lays it open to the absorption of vegetable effluvia, with which the air is at this season surcharged, and which becomes deposited by the heavy autumnal dews; and it also destroys insects and their habitations in vast numbers. If the weather is favourable we in a few days harrow it across the furrows, and rake up and pick off the weeds, and either burn them or carry them to the fold-yard, to be there converted into manure; for we really do not like to burn anything capable of being made available to increase our stock of manure. In the early part of the winter, or at any time during the winter when the land is dry, we plough it up into lands or stetches, about four yards wide, leaving it rounded up so as to drain well into the open furrows; the furrow-slices are about 11 inches wide, and from 7 to 9 inches deep. In the first open and favourable time, beginning about the middle of February, the whole is cross-ploughed as deeply as possible, and again left to the action of weathering influences; it may be for several weeks, or even months, before some portions of our fallows can be moved. Immediately after our spring sowing is over, we commence working our fallows with all the force and appliances of the farm. Our first process is to scarify with the Biddle scarifier, taking care to move the whole at the full depth to which it is ploughed. If the land is tolerably clean we follow with a large two-horse harrow, to break it down a little, and then cross it again transversely with the scarifier. If the land is rough and weedy, or pestered with twitch, we follow with a large four-horse harrow, to tear, if possible, the whole of the rubbish on to the surface; these weedy fallows we work down by other harrows and rolls as fast as we can; rake together the weeds and twitch, and carry them to be burnt in heaps, prepared by the burning of sods and other rubbish gathered from the headlands or elsewhere, to form an ash-heap for drilling in with the seed. We now, as time and season serves, continue our scarifyings and harrowings with as little interruption as possible, endeavouring, if the season permits, to keep the whole continually stirred—being

careful not to get too fine a tilth unless required for cleaning purposes. Our object is to expose as much surface as possible to atmospheric influences, with the view of promoting chemical changes and alterations in the constituents of the soil: in this way we think, by constant stirrings, we obviate the necessity for bare or dead fallows, whilst at the same time a high state of pulverization is accomplished. We know there are many objectors to this course, preferring to allow the soil to lay quiet after a working, to give time for the weeds to grow; we think in the common course of business it will be found that ample time will inevitably occur for these purposes. One field must lay, while another is in the immediate preparation and process of sowing. Independently of this, the seeds of annuals and others will germinate on being exposed; it is by no means necessary for them to grow into plants before they are open to destruction, and the sooner they are destroyed after germination the better. With respect to the growth of roots of weeds, we cannot see the shadow of a reason for this practice; but would, by every means in our power, prevent it. About the middle of April we commence giving our third ploughing: we plough as deeply as possible, and follow closely up with harrows, to prevent the hardening of any portions turned up into clods; as soon as the ploughing is finished we proceed with scarifiers and harrows, as before, and by judicious working after this ploughing a good fallow, and an almost perfect pulverization, may be obtained. Of course, where it is requisite the picking of weeds and twitch proceeds as before. About the first week in May we prepare for our mangold-wurzel crop, which we put in upon ridges well manured, and twenty-six inches apart. We have so fully described our mode of cultivating mangold-wurzel in our last article, and the subsequent management of the ridges, as to preclude the necessity to pursue that part of our subject further here, and therefore refer our readers to that paper. When our mangold-seeding is over we again scarify, harrow, and roll, so as to produce as fine a tilth as possible in preparation for our next or Swedish turnip crop; this we put in after the same way about the middle of June, and pretty nearly in every respect the same as our mangold crop—the chief difference being in the application of artificial manures drilled in with the seed. When the "Swede season" is over, we again proceed as before to prepare another portion of our fallow lands for the common turnip crop, following as hard after our swedes as we can arrange our procedure. Our common turnips are put in "on the flat;" we set out our field in four-pace lands; we spread our manure out of the carts—it is shaken about by lads, and ploughed in at once. The turnips are drilled in with ashes mixed with a cheap compost made up of night-soil, loam, soot, pigeon or pig manure, or other ingredients likely to benefit the young plant. The soil is rolled down, and by this means the drill-rows are partly left open, which facilitates the advent of the tender plant. Our next object is to prepare the remainder of our fallows for our colesced (rape) crop, which is done after the same course. We put this crop in precisely the same as we do swedes or mangolds, and the subsequent management of the ridges is the same. We therefore again refer to our paper on the Culture of Mangold-wurzel.

WOOL.

I am no farmer, but have had experience in the buying and selling of wool for a good many years; my remarks must consequently go to show what style of wool will suit the buyer best, and how a farmer may spoil his wool by bad management, leaving it to him to make the application or apply the remedy.

I may say that, for some years past, and as a rule, the half-bred class of wool has fetched the highest price among the English wools. By half bred, in this case, I mean the produce of a cross between a well-bred long-woolled sheep and a well-bred short and fine woolled sheep, as the Leicester and South-down or the Leicester and Cheviot breeds, the former of these crosses being found principally in Norfolk, and the counties south and west of these, and the latter in Scotland and one or two of the northern counties of England. The wool produced by these crosses has length enough for most purposes of manufacture, combined with a fineness of hair altogether unattainable in the pure Leicester breed. As to the comparative results of these two crosses, my experience goes to prove that in fineness of wool the South-down cross has a decided advantage over the Cheviot cross, and it is not so liable to grow wild and hairy towards the hind quarters of the sheep; but this advantage is too frequently neutralised by a want of cleanliness and a general carelessness in the getting up of the wool. This particular of cleanliness and appearance is one not sufficiently valued by many growers of wool: there is sadly too much use made of tar in some form of application or other. I do not know if spirits of tar be the best remedy for scab; but if I were a sheep farmer, tar in any shape should never come near my wool, except in case of sheer necessity, and for this reason: no washing, even with hot water and soft soap, will take away the stain, and this disqualifies the wool for the purposes for which it is most esteemed. A very little of this stained wool among the unstained will make the yarn spun from it streaky, and no dye but black or very dark

colours will hide this defect. For a mere washing for the destruction of vermin, &c., there are preparations sold by the chemists which I believe answer the desired purpose, and which I know rather improve than injure the colour of the wool. Olive oil, too, I am told, answers well, and I am sure it would greatly benefit the wool; however, it is dear. In these remarks about tarring, I am, of course, not alluding to districts where the sheep require to be regularly "laid" with tar and butter. Another great drawback on the value of wool is the presence of that gritty sand which we sometimes see lying so thickly strewn among the locks. This is most generally found in hill flocks, and on uneven ground where the sheep have inviting opportunities of rubbing their itching sides against conveniently protruding ridges of soil. In such cases I consider that the farmer neglects his duty, and his interests too, if he does not have these ridges cut down, and made level with the surrounding surface. If very strong winds occur during spring, it sometimes happens that, even on low-lying arable land, the soil, if sandy, is sent flying by cart loads into the roadsides and hedge bottoms; and in such a case the sheep are almost sure to receive a good dredging. For this I do not know a remedy; but if the farmer can devise any, it is his duty to adopt it; for however well bred and well managed this wool may have been up to that time, a *contretemps* like this spoils it for the seaon. Assuredly no washing that he can give it will ever "take away the stain." Buyers always look shy at such a clip of wool, and it will frequently be left till late in the season, or perhaps over season, till a good companion clip of the following year shall help the tainted one away, and then there is no satisfaction to either buyer or seller; for the price will necessarily be low, and the consumer, finds that though (after the processes of sorting washing, and combing) his "tops" are pretty clean the loss of weight is immense, this "short" wool being almost unsaleable through the quantity of sand accumulated in it. Not long ago I tried such a sample of fleeces, and by mere working through the fingers (without either washing or combing), found the loss in sand alone to be rather better than 60 parts in 100; but this was a bad lot.

Another great drawback on the value of wool is the presence of that moss, or, as the Scotch call it, fog, which abounds in some soils, and is thence transferred to the fleece. It is not that the weight of this moss is of much importance, but that the difficulty of freeing the wool from it is so great. This can only be done by manual labour, and it is so difficult to separate the two, that I have known clips of which a sorter could not clean six fleeces a day (say 30 lbs.) at the rate of 3s 6d., making the sorting and cleaning one pack, or 240 lbs., of wool amount to 28s. Now this same pack of wool, had it been free from the plaguy moss, might have been sorted in one day; so that the difference is a loss to the consumer of nearly 1¼d. per lb., or of 25s. per pack in wages alone. I have known a coarse comb used, before clipping, on the back of each sheep (where the moss principally lies), bring away a deal of this stuff, and more readily than it can be got out after the fleece is off the back; but the only certain remedy must be to get rid of such vegetation, and replace it with something more useful, and less apt to worm itself into the wool.

The next point of management which presents itself, is the washing of the sheep. This, I am certain, can be done nowhere so effectually as where there is a running stream of some width and sufficient depth to leap the sheep and swim them from one man to another. Sooner than wash in the puddle holes which are the only conveniences some farmers possess, I would drive the sheep severa miles to a suitable place, taking care, however, that they were not driven back before the wool was dry, or they would be little better for washing at all. I have known the wool of a large flock lose all its bloom and be quite soiled by being driven, even one mile, over the dusty roads, on a hot day after washing. Therefore, seeing the difficulty of keeping the wool clean if you have thus to drive, the best thing would be to have the sheep clipped where they are washed—let them walk back minus their coats, and you bring the wool home in the carts. I should think any honourable farmer would give his brother farmer the opportunity on fair terms, and cleanliness of the wool would thus be secured. Some may cry out, "But what trouble and expense!" Truly; but if I were a farmer I think I should not be content for my first-rate sheep to produce second-rate wool, if a little expense and labour would remedy the evil; and that wool is certainly second-rate that is not good in all respects. The wool ought to be clipped as soon as dry, say from 5 to 10 days, at the outside, after washing. If the sheep run so long as 14 days, especially in hot weather, the wool suffers by it, for the grease or yolk gets up into the staple again, and it rapidly approaches the condition it was in before washing. I know it is said that wool clips better after a little grease has got into it, and I can well believe; but if you err, err on the right side—clip early after the wool is dry; remember that grease will not make yarn, and no one knows this better than the buyer. Before the fleece is wrapped up, all clag-locks, &c., should be removed; it does not increase the confidence of the buyer when he finds lumps of filth almost as big as his fist inside the fleeces; besides, such roguery is not only dishonourable, but punishable by law. And now, having got your wool in

nice order, let each fleece be firmly tied and stowed in a suitable place, namely, one that is dry, clean, and light. We too frequently see it laid against damp walls, on wet timber, or in dark out-of-the-way places, where no human eye can form an opinion of its merits; however, if wool is to be kept over the year, it is best kept in the dark, always guarding against damp and dust.

As a summary of what I would inculcate, I will say, if you wish to grow good wool be particular as to your breed, avoiding the wild hairy-coated animals, such as the Teeswater. When you buy, prefer buying from a known good breeder, at his own house, to waiting for the market; you run less risk of disease, and are more certain of your breed. Guard against check in the feeding of your flock; a regular diet, even if low, being preferable to first high feeding and then the reverse. Do not breed too much into your own stock, for by doing so you lose as much weight of wool as you do of mutton in proportion; therefore introduce fresh blood at times. Wash well, clip early after the fleece is dry, remove all dirty locks, stow your wool in a dry clean place, and then with confidence expect a good price.—J. M., Halifax, Yorkshire, April 20.—Gardeners' Chronicle.

CALENDAR OF HORTICULTURE.

Plant houses.

Conservatory.—The different varieties of Epacris, some time ago recommended to be well cut back and kept close, will now be making fresh growth; and it will be as well to go over the stock immediately, and look to the necessary shiftings. Large plants will probably not require, or even be worth shifting; but the state of the drainage must be looked to, and they should be liberally top-dressed. Small plants, which if well grown are very preferable to large overgrown specimens, will require more attention. Turn them out of the pots, and remove the old drainage and also a portion of the top of the ball. If previous shiftings have been properly attended to, the side of the roots ought not to be matted together, and had better not be much disturbed. If the balls are unnaturally dry they had better be soaked in water which has stood for some time in the sun, or has been made slightly tepid by other means. Let them have a size larger pot, and bestow great attention on the drainage, with which let there be some rough angular lumps of charcoal mixed. The compost should be a gritty fibry peat, and used in as rough a state as possible; and for young growing plants not rammed in too tight. Thrust in some lumps of charcoal, and here and there a pebble or sandstone down the sides as the potting proceeds. The object to be attained in using very rough compost, with the addition of lumps of charcoal, &c., is to produce a number of small air-cells through the new soil; and if on examination some time after these little cells are found to be full of healthy fibres, it is a good criterion that all is right. If the compost is properly moistened before using, they should not be watered for a few days; and on being returned to the cold pit or other structure, should be kept close and shaded for a few days. Many of the above remarks will apply to Corræas, some of which will now be in a good state for shifting; they also delight very much in lumps of charcoal, and the compost may have the addition of about one-fourth of nice fibry turfy loam. Some young plants of Heaths may also be ready for another shift. In fact, for all young growing plants, shifting, as I have before observed, cannot be generalized, but must be performed when they require it—with this proviso in the case of most hard-wooded greenhouse and conservatory plants, that their season of rest may be reckoned from the end of September to the end of January; and the aim of the cultivator should be to regulate his last shiftings so as to get the plants into a dormant state at the proper season. It would be ridiculous to give a plant a shift just as it was going to sleep; yet I have seen such things done. To prevent the plants of Lilium lancifolium from being drawn up too high, they should now be securely staked and removed to the open air, in a very sheltered situation, open overhead, but shaded from the powerful rays of the mid-day sun. Pelargoniums are now in great beauty, and should have plenty of light and air. Shading during mid-day will tend to preserve them longer in bloom; but too much of it will draw them up weakly. Keep the interior cool and the air moist by sprinkling the floors, &c.; but be careful of syringing overhead, or the blooms will be spotted. Fumigation will also be necessary, even under the best management, occasionally. Attend to the training out as the plants advance in growth; but endeavour to keep the sticks out of sight as much as possible. Calceolarias will come pretty much under the same routine.

Forcing Houses.

Pineries.—Let it not be supposed that, because we have now a fine growing time derivable from solar influences, these will submit to any neglect. The great object is to take every advantage of favourable external influences, but, at the same time, not to relax in the use of artificial appliances. Endeavour to maintain an abundant supply of heat both at bottom and top, and also atmospheric moisture to all the growing plants. We must remember that this is the season when growing plants for future fruiting will store up the greatest amount of organic matter in reserve, to strengthen themselves for the great drain always made upon their

resources as fruiting approaches. Therefore, keep them steadily progressing, and take care to let this growth be made under as favourable circumstances with regard to air, light, heat, and moisture as can be applied. Avoid shading as much as possible. Take care to secure a good supply of the strongest suckers, as they become ready, on the plants from which the fruit is cut.

PITS AND FRAMES.

Melons becoming ripe must have all the sun possible, and a good supply of air. Discontinue watering altogether, and keep the fruit turned round now and then. Growing plants must have water if they need it; but I think the reason why so many melons are so tasteless is because flavour is sacrificed to size; and, in order to attain it, water and liquid manure are too plentifully given during swelling off. I think a small, compact melon, grown with regard to flavour, in a strong heat and less water, infinitely preferable to an overgrown one which has only size to recommend it. Let Cucumbers be frequently thinned out, and not permitted to bear too many at a time. With these the reverse is the case with regard to the application of water and air-moisture. A tender crispness is with them a desideratum, to attain which they should be grown quick, with plenty of heat and moisture.

FLOWER-GARDEN.

Proceed with planting out the bedding-plants of all sorts as fast as possible, and bring the operation to a close speedily. When finished, rake and level the beds neatly, and afterwards peg down everything requiring it, whether liable to be injured by the wind, or to keep them dwarf in the beds. Commence planting out the tender annuals as soon as they are large enough. It is not advisable to plant them out too small, as they are then more liable to the attacks of slugs. Persevere in syringing Roses, and also in the application of liquid manure to the roots, as it not only strengthens the bloom, but very much assists the growth for a future season. A light hoe should now be kept constantly at work when the sun is powerful, to keep down the myriads of small weeds which are sure to spring up with such favourable weather as now prevails.

HARDY FRUIT GARDEN.

The recent close, warm weather has brought out insects in great abundance. It will, therefore, be necessary to ply the engine incessantly, using soapsuds and tobacco-water, where it is not possible to dislodge them with water alone. I have, however, found that unceasing perseverance in the use of water will answer every purpose. Apricots, Plums, Pears, and Cherries are peculiarly liable to the attacks of the leaf-roller, which can only be kept under by a diligent hand-picking. Most sorts may now have a final removal of superfluous wood; and commence nailing in the strongest of the young wood. Look out for the gooseberry caterpillar: the safest remedy is hand-picking.

KITCHEN-GARDEN.

The most important operation here is that of thinning out the young growing crops of onions, carrots, parsnips, red beet, spinach, and turnips; after doing which, let the surface be well stirred with small hoes. The hoe must also be kept constantly at work amongst all growing crops. Remember to keep up a succession of salading by frequent sowings. Sow another breadth of turnips and spinach. This week is the latest in which to sow summer Peas with certainty of a crop: the next succession must be of early sorts. C.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR MAY.

The long drought to which we alluded in our last month's report, and which, at one period, was calculated to have a most injurious effect upon the growth of spring corn, as well as upon the crop of hay, has, happily, been followed by a somewhat plentiful supply of moisture. Of late, a most extraordinary and, we may add, beneficial change has taken place in the general appearance of vegetation in all parts of the United Kingdom. The improvement is of a character calculated to inspire confidence as respects the future; but, at the same time, it has had the usual effect of checking any upward movement in the value of agricultural produce. Still, however, we perceive that most of the wealthier holders of wheat have evinced no anxiety to realize; whilst, in many instances, they have withdrawn their samples from the various markets, under the impression that prices will rise between this and the close of harvest. It is very possible that we shall not be so overwhelmed with foreign grain as we were two or three years since; yet experience teaches us that our additional wants will be freely met from abroad. On the subject of the stocks of old wheats now on hand, opinions of a most opposite character have been expressed—some parties contending that they are unusually small; others, that they are seasonably extensive. Admitting that the produce of 1851 was remarkably good, both as to quantity and quality, it is clear, when we consider the enormous supplies which have passed into consumption, that the supply must be materially diminished; and we have no hesitation in saying that at least two-thirds of it are now in the hands of the leading growers. Very little spring corn is now to be met with in any quarter; hence, the value of that article may be considered tolerably safe.

The pasture lands are now well covered; yet we fear that the first-cut of hay will be a comparatively light one, especially in some of those counties from whence the metropolis is chiefly supplied. Should this prove to be the case, we may anticipate rather a high value for old qualities, notwithstanding that the supplies continue comparatively large. The fine condition of the soil during the months of March and April produced a fine tilth for barley. Although that grain has come up somewhat irregularly, there is evidence of a fair average crop. This remark applies more particularly to Norfolk and Suffolk. In some quarters peas have appeared in full blossom; whilst both oats and beans are looking remarkably strong and healthy.

We never recollect a finer lambing season than the past. Even in the most exposed situations, the losses have been trifling in the extreme, and our markets have exhibited more than the usual average number, for which, however, the demand—owing in a great measure, to the late long-prevailing cold weather—has been by no means active. Many of the graziers in the Isle of Wight, as well as in the west of England, were compelled to withhold a large portion of their lamb supplies from market, from the circumstance to which we have just alluded. The lambs, therefore, in many instances, became too heavy for general consumption, and materially interfered with the value of the ewes. Very few complaints have reached us on the subject of disease. In most quarters the stock has been chiefly fed upon dry food, yet it has fared well. During the early part of the month, oil-cake was in good demand, on rather higher terms; but, as grass has since become more plentiful, the sale for it has fallen off, and the quotations have receded to nearly their former level.

The extraordinary position in which we are likely to be placed as regards our future supplies of colonial wool has invested the public sales now in progress in London with more than usual importance. All connected with the trade, or acquainted with the value of the article, are aware of the comparative cheapness and value of the produce of our colonies, because it combines the essential qualities of fineness with a lengthy staple, consequently well suited for general clothing purposes. Immediate scarcity is not anticipated; yet it is too evident that so long as hostilities continue at the Cape, and so long as labour is diverted from its natural element in Australia, agriculture, and with it the breeding and rearing of sheep, must decline. It might be unnecessary for us to dwell upon the wonderful metallic discoveries in Australia; but we may observe that they are calculated to engross the attention not only of the labourer but the man of wealth, and, to an extent, seriously interrupt the usual business of life. The buyers of wool—both home and foreign—at these sales, then, has been numerous in the extreme, and every lot offered has changed hands at an advance of from 1½d. to 2d., in some instances 2½d. to 3d. per lb. But even this advance will not compensate the growers, because they are suffering from the effects of a great scarcity of labour, which when obtained is commanding an extravagant amount of remuneration. Hitherto, the total shipments from Sydney, Port Philip, and Geelong, including Van Diemen's Land, have fallen short of those to the corresponding period in 1851, by upwards of 8,000 bales; and we much fear that the forthcoming season's supply will be by no means equal to our wants. An increased value of woollen goods will doubtless be the result, although it is fair to presume that every effort will be made by our manufacturers to obtain a supply of the raw material from other sources. The stock of wool in London is now unusually small. As might be expected, British wools have been in increased request, on rather higher terms; but the actual business doing up to this time has not been extensive. Several large parcels have been taken by foreigners since the commencement of the year; but the home-dealers have greatly outbid them at the auctions.

During the whole of the sowing-season, and indeed up the present time, a very active business has been doing in guano. The price fixed by the Peruvian Government—£9 5s. to £9 10s. per ton—has continued to be paid, and at those figure at least 100,000 tons have changed hands—nearly 20,000 having been forwarded to Holland, France, and Belgium. The "contract" has, indeed, worked well for the bondholders, whose property has been greatly benefited thereby; whilst not a few of them have been sufficiently fortunate to obtain the full payment of their nominal demands. It is greatly to be regretted that no positive movement has yet been made by those whose interests are so much at stake in this matter—the agricultural body—to obtain an open market for the sale of this commodity. The market is a close one—and for what? That a few individuals who have invested money in certain speculative bonds may derive all the advantages from an article which in purity and strength happens to be procured only in the neighbourhood of Peru! Surely *something* might be done to break down a system of monopoly unjust and oppressive in its bearings, besides being productive of heavy pecuniary losses to our farmers.

Generally speaking, the accounts respecting the appearance of the potato-fields are very satisfactory. Should the acreable yield prove a good one, we may reasonably calculate upon an immense crop, for the important reason that a much greater breadth of

land is under cultivation than for a series of years past, even including that of last season. The supplies of old qualities are now nearly exhausted; hence, those on sale of late have commanded much higher—though irregular—quotations. Very few new ones have as yet been brought forward.

The imports of foreign stock have not been equal to those of last year, and we have noticed very little improvement in its condition. Prices of all kinds of English have steadily advanced, with a good consumptive demand.

In Ireland and Scotland the corn trade has continued very inactive; yet the quotations of most articles have been supported. The shipments of grain to England have been by no means large.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

In the early part of the month just concluded, arising from the limited quantities of grass in the whole of our grazing districts, the leading markets were somewhat extensively supplied with each kind of fat stock; hence, the demand was in a depressed state, at drooping currencies. The fine rains which have fallen subsequently having been productive of a fair average supply of pasture food, the receipts of both beasts and sheep have declined, and the trade has assumed considerable firmness, at an improvement in the quotations of from 2d. to 4d. per 8lbs. From most quarters, our accounts in reference to the health of the stock are very satisfactory—scarcely an instance having occurred in which the feeders have sustained any serious losses. The lambing season has passed off remarkably well. The fall has been an extremely good one; yet we fear that the returns hitherto, owing to the changeable state of the weather, have not been remunerative.

From abroad, the imports of stock into London and at the outports have been but moderate; whilst their quality has not exhibited any signs of improvement. Two arrivals have taken place from the westward, viz., 130 oxen from Oporto, and 80 from Spain. The former were in good condition; but the latter were in a wretched state, and worth only from £5 to £6 each. It is clear that no profit can result from such importations; although we learn that the Spanish beasts were brought over on speculation by a steam-boat company.

The total imports from abroad into London have been as under:—

	Head.
Beasts	1,219
Sheep	5,418
Lambs	65
Calves	1,781
Pigs	23
Total	8,506

	Head.
Same month in 1851	9,214
„ 1850	6,060
„ 1849	5,465
„ 1848	7,904
„ 1847	6,275

The aggregate supplies of English and foreign stock exhibited in Smithfield have been:—

	Head.
Beasts	17,839
Cows	476
Sheep and lambs	118,034
Calves	2,393
Pigs	2,655

COMPARATIVE SUPPLIES.

	May, 1848.	May, 1849.	May, 1850.	May, 1851.
Beasts	16,541	16,320	16,468	19,464
Cows	491	450	456	460
Sheep & lambs	102,230	115,340	128,910	133,362
Calves	2,087	1,555	1,740	1,855
Pigs	2,581	2,193	2,258	2,780

The arrivals of beasts from Norfolk, &c., have been extensive, viz., nearly 9,000 head; from other parts of England they amounted to 2,500, do.; and from Scotland 2,051, do.—about one-half of the latter being per railway.

About 60 oxen came to hand from Ireland by sea; and nearly 3,700 lambs from the Isle of Wight—the latter in excellent condition.

COMPARATIVE PRICES IN SMITHFIELD.

	May, 1849.	May, 1850.
	s. d. s. d.	s. d. s. d.
Beef .. from,	2 4 to 3 8	2 6 to 3 6
Mutton	3 4 to 4 0	2 10 to 4 0
Lamb	4 10 to 6 0	4 0 to 5 4
Veal.....	3 4 to 4 0	3 0 to 3 6
Pork	3 2 to 4 2	3 2 to 4 0

	May, 1851.	May, 1852.
	s. d. s. d.	s. d. s. d.
Beef .. from,	2 4 to 3 6	2 4 to 3 10
Mutton	2 6 to 4 0	2 6 to 3 10
Lamb	4 8 to 5 10	4 2 to 5 4
Veal.....	3 0 to 3 8	3 0 to 4 4
Pork	2 8 to 3 8	2 4 to 3 6

On the whole, Newgate and Leadenhall markets have been fairly supplied. The general demand has continued steady, and prices have improved fully 2d. per 8lbs. Beef has sold at from 2s. to 3s. 4d.; mutton, 2s. 4d. to 3s. 8d.; lamb, 4s. to 5s. 2d.; veal, 3s. to 4s. 2d.; pork 2s. 4d. to 3s. 6d. per 8lbs., by the carcass.

HEREFORDSHIRE.

The prevailing remark in all the agricultural reports of this quarter must be the unprecedented dryness of the season. What is termed "a soaking of rain" has not occurred for several months, although we have had the highest flood at the commencement of this year upon our rivers that has been known for a long period. The wheat plant, taking the averages

of the county, looks well, strong, and a good colour, particularly the autumn planted; but the spring wheats are not so promising, from lack of moisture. There have been few ravages of that destructive insect, the wire-worm, this season. The autumn-planted beans, which are now much in favour in this county, are very short, from the excessive drought, in most instances not exceeding eight inches in heigth, and are at this time in blossom. Should rain come now, it will be too late to ensure a crop; but the spring-planted beans may still recover. The barley sown last month came up partially: a large portion did not vegetate for some time. The crop (in those instances) will, therefore, not arrive at maturity evenly, and produce a good malting sample. Oats, of which there is a considerable breadth sown on the poor lands of this county, are suffering from the same cause as the other crops; but, being situated on the more undulated portions of the district, they have received the benefit of the partial storms with which, "few and far between," we have been visited. The land was never prepared for the turnip and other roots earlier or better than in the present season; and a farmer must be an inveterate sloven who has not his land perfectly clean. The price of guano still forms a considerable item in producing this crop, and we wait anxiously the steps that *should* be taken by our county members to urge the Government to break up the exacting monopoly of the Peruvian authorities; at the same time, we cannot shut our eyes to the extravagant manner in which we throw away into the next brook or river the first-rate manures of our own cities, and even of a great proportion of our farm-yards. This locality now puts forth its loveliest appearance. The beautiful and variegated bloom of the fruit trees has been seldom surpassed; and, although the price of this description of produce has hitherto been remarkably low, we hope when we get our railways (now in progress), that the value of cider and perry will much improve. Of the hop plant little can yet be said: at present, the bine is generally backward, but looks healthy. There has been a considerable increase to the plantation this season, in consequence of the favourable results of last year: the extent cultivated varies more than any other description of produce, in consequence of the uncertainty attending the return. The quantity of hay that has been consumed this spring, owing to the lateness of the season, is greater than ever before known. It has not hitherto affected the price; but should the present drought continue, the hay crop must inevitably be light, and also late. Our markets have been over-supplied with fat cattle; and it is remarked, that the difference in value between the store and the fat beasts has been very little: all store stock, considering the scarcity of keep, has been bringing good prices. The lambing season has been a good one, and the losses few.—May 17.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

ABERYSTWITH FAIR.—The show of cattle was, on the whole, inferior, and what were sold were at low prices; cows with calves 8*l.* to 8*l.* 10s.; bullocks, three year olds, from 6*l.* to 5*l.*, barreners 5*l.* The horses were better and more numerous than ordinary, but did not command good prices.

BEDALE FORTNIGHT FAIR.—We had a thin supply of cattle and sheep, which were readily sold at higher rates, although the quotation for mutton appears lower than usual, owing to all the fat sheep being now clipped. Beef, 5s. 6d. to 6s. 6d. per stone; mutton, 4½d. to 5½d. per lb.

BEVERLEY FAIR.—We had a good supply of first-rate horses, with an abundant number of very distinguished and extensive horse-dealers, who were eager to buy good animals, consequently nearly the whole of the horses were sold at remunerating prices.

BRECHIN—DUN'S MUIR CATTLE TRYST.—There were fewer cattle than ordinary, and buyers being numerous sales were more readily effected than in Edzell on the previous week, and at rates five per cent. higher. There were few north country cattle on the ground, and all the best lots of beeves fit for grass soon exchanged owners at enhanced prices. Best fat, 6s. 6d., inferior 5s. 6d. to 6s. per stone, and all sold. Two-year-old Stots and Queys sold from 7*l.* to 10*l.* 10s.; year-olds, 4*l.* to 5*l.* Mr. Adamson, Morphie, sold a lot of capital two-year-old Stots to Mr. John Mollison at 10*l.* 4s. Mr. Scott, West Mains of Rossie, sold three-year-old bullocks at 10*l.* 10s. Calving cows of the best sorts brought 8*l.* to 11*l.* On the whole, the market was considered the best selling one held in the district this season.

BRIDGEND FAIR.—A large number of horses, cattle, sheep, and a good number of buyers were also in attendance. The price realized for the different kinds of stock was good, and gave general satisfaction.

BUNGAY FAIR.—There was the largest show of neat stock, in good condition, that has been exhibited for a considerable time, and we believe that a tolerable amount of business was transacted. Good horses were in demand, but the supply was very limited.

CHELMSFORD FAIR.—The supply of stock of all descriptions was very moderate, particularly in that of a fat description, and although there was a thin attendance of buyers, a middling business was done. Few beasts were shown, but the supply was quite equal to the demand, and some left the field unsold. Mr. Simpson had some lots of very superior Welsh beasts, nine of which were purchased by Mr. Wendon, of this town. There was also a supply of small store beasts. Some very fine runts belonging to Mr. Byford, of Halstead, were sold, and estimated to weigh about 90 stone each, for which £12 10s. each was asked. In sheep there was considerably more business doing. A pen of hoggets, fed by Mr. W. Yell, of Great Baddow, were sold at 41s. each, the prices varying from 36s. to 48s. Down tegs, from 23s. to 36s. In stock the principal exhibitors were Messrs. Crooks, Howard, Simpson, Ratcliffe, and Byford. There was a good show of horses, particularly of the cart kind, for which the demand was exceedingly dull, and few found buyers.

CHIPPENHAM FAIR was well supplied with cattle The supply of young stock was unusually large, several herds of Irish yearlings and heifers being on sale in addition to the usual numbers of English heifers and calves. The trade ruled brisker in consequence of the late falls of rain, but a complete clearance was not made. Horses were very inferior in quality, and the trade dull.

COCKERMOUTH FAIR.—The show of stock was somewhat limited, but for good bullocks or grazing heifers there was plenty of demand at paying prices. The fair, taking into consideration the inferior quality of the stock shown, was fully as good as the previous.

DORKING FAIR was one of the largest at Dorking since the year 1843. The trade was brisk, and a good clearance was effected, especially of things of good quality. Beef ranged from 3s. to 3s. 4d.; mutton, out of wool, 3s. 6d. to 3s. 10d.; lamb, 5s. to 5s. 4d.; stock pigs, 24s. 6d. to 35s. There was a good show of suckling calves, and a great many store pigs, but the demand for them was rather tame.

GLOUCESTER MONTHLY MARKET.—The supply of beasts was unusually large, but their condition was anything but good. The attendance of dealers was good, but the trade ruled heavy. A few of the best quality of beasts reached 5d per lb., but the general figure for beef did not exceed 4½d. Of sheep there was a good supply, which sold readily at 5d. per lb. Of lambs a few only were penned, and were disposed of at about 7d. per lb.

HENLEY-ON-THAMES.—There were more sheep than

usual; high prices were asked, and the trade was dull early, but towards the close most of the lots were sold. There was a limited number of cow cattle, with little demand for them. Lambs, 16s. to 21s.; tegs, 27s. to 35s. each; fat sheep, 3s. 6d. to 3s. 8d. per stone.

HEREFORD FAIR.—Owing to the long droughts, very dull sales were anticipated; but we are happy to say that the fine rains of Tuesday last inspirited everybody, for their beneficial effect, especially in the pasturage, could not be well overestimated; the consequence was a brisker fair than we have seen in Hereford for many a day. The stock was not more numerous than it is generally at this fair; cows with calves, especially good milkers, sold briskly at advanced values; and also fresh barrens and steers; of lean stock, too, the turn was in favour of the seller. In the sheep market hog wethers sold readily at from 30s. to 32s.; ewes, with lambs, 40s. to 44s.; fat sheep, shorn 6¼d. per lb., unshorn fully 6½d. per lb. There were but few store pigs; no alteration in value. In the horse fair a considerable stroke of business was done; there were more good roadsters than usual, and nearly every useful animal for the road or for agricultural purposes found a purchaser. Altogether, it was a good fair.

HERTFORD FAIR.—The supply was good, and there was a fair attendance of buyers. The wetness of the day gave an impulse to trade, by holding out a promise of fodder for the cattle, and produced an unexpected advance in prices. Mr. E. D. Rayment, of this town, exhibited some fine long-woolled tups and some tup tegs, which excited great attention, and were sold at fair prices. They were admitted to be the best long-woolled sheep ever brought to the fair in this county. The wool on some of them was estimated at from 16 to 18lbs. the fleece.—*Hertford Mercury.*

HOWDEN FORTNIGHTLY MARKET.—There was a short supply of beasts, but a good supply of sheep; the attendance of buyers was numerous, and all the sheep were sold up. Beef, 5s. 6d. to 6s. per stone; mutton, 5d. to 6d. per lb.

KELSO FORTNIGHTLY MARKET.—The supply of fat cattle, as might be expected, was much smaller than for some time past, and there being plenty of buyers, with a brisk demand, the whole were quickly bought up at an advance in price from last market. Fat cattle brought from 5s. 6d. to 5s. 9d. per stone. There were a good many grazing cattle, which were selling at from £4 10s. to £6 10s., according to condition. A number of cows selling at from £5 10s. to £12. The sheep market was largely supplied, and the demand good. Clipped sheep, light weights, brought 5d., and large sheep a little less per lb. Numbers shown:—Fat cattle, 92; grazing do, 91; cows, 63; sheep, 1,150. Numbers in corresponding week last year:—Fat cattle, 233; lean do., 103; cows, 59; sheep, 1,230.

KENDAL FORTNIGHTLY FAIR.—There was but a thin attendance, and business was by no means brisk. Of the cattle a large portion was only of an inferior description. Prices varied considerably; a few good cows were offering at from £13 to £14; inferior and aged ones from £7 10s. to £10; heifers at from £8 10s. to £10; calves at from 30s. to 35s.; sheep in the wool were selling at for cross breeds from 26s. 6d. to 30s; black-faced sheep at from 22s. to 23s. 6d.; lambs were rather numerous, and were selling at from 16s. to 21s. Lean stock—milk cows were being disposed of at from £6 to £9 10s.; black-faced sheep at from 16s. to 18s. The transactions of the day were not extensive, buyers not meeting with suitable cattle were very chary in their offers; consequently, though the number of stock was only limited, a good many were driven away unsold. Average price per pound—beef, 4½d.; mutton, 5½d.; veal, 4½d.; lamb, 7½d.

LEEDS FORTNIGHT FAIR.—There has been a fair show of horned cattle, and a full attendance of buyers. They were brought chiefly from the north, were generally in good condition, and a good clearance was effected. Beef, 6s, 6s. 4d., to 6s. 6d. per 16 lbs.; mutton, 5d. per lb.; lambs, 20s. to 23s. each, or about 7d. per lb., and a few pens of excellent quality 7½d.—all sold. Number of beasts, 650; sheep and lambs, 4,000.

LOUGHBOROUGH FAIR was well attended by dealers and farmers of the neighbourhood. Store cattle and fat stock realized tolerably good prices, but amongst incalvers and other kinds of stock very little business was done. In the horse fair but few good animals were shown, and only a few sales were effected

MUIR OF ORD MAY MARKET.—There was a considerable, though not large, attendance of dealers. The market was slow, and rather stiff throughout. The best beasts were difficult to sell at past prices, and some lots were from 5s. to 10s. back from last market, whilst the month's keep was also lost to the sellers. Small beasts were, as expected, rather difficult to sell, at prices also somewhat down. The show of heavy stock was very limited, only some three or four lots appearing suitable for the purposes of the east country buyers. The show of the smaller crosses was large, but they were almost neglected by the dealers from a distance, and the scarcity of grass contributes to depreciate them in the estimation of buyers.

NEWARK FAIR.—Only a moderate supply both of beasts and sheep; buyers somewhat scarce; beef, 6s. per stone; mutton, 5d. to 5½d. per lb. In the horse fair some good nags changed hands at high prices; of heavy or draught horses there were plenty; many good ones were disposed of, and commanded very great prices. We had plenty of the inferior class.

NEWBURY FAIR.—The show of horses was larger than it has been for some years. The demand was dull, and on the whole but few purchases were made, mostly at a rather lower figure. The cow fair was also largely supplied, and like the horse trade, a large number were driven away unsold; milch cows with calf sold from £8 to £14; good grazing oxen, from £10 to £13; barreners, from £6 to £10; inferior sorts were difficult to dispose of at any price.

WYMONDHAM FAIR was well attended with farmers and dealers. There was a tolerable supply of most descriptions of stock, but business was not very brisk, except for sheep and lambs, for which there was a very good inquiry, and nearly all were sold at improving figures.

YORK FORTNIGHT MARKET.—Prime fed first-class beef, 6s. to 6s. 3d. per stone; clipped mutton sheep, 5d. per lb. Very few in wool shown, except for grazing; and which sold at good prices. In lean cattle (being Beverley fair) we had only a moderate show of good-bred short horns, which were well sold. Lean Irish were in abundance, but fewer were sold in proportion. Calving cows were in good supply, but had slow sale. We had some prime good-bred Irish colts and fillies, many of which were sold.

CHEESE FAIRS.

BISHOPSTOKE CHEESE MARKET.—There was a numerous attendance of purchasers. Upwards of 150 tons were pitched, of which about 100 tons were sold at a small advance on last quotations.

CHIPPENHAM.—We had upwards of 100 tons of cheese pitched. Prices as follows:—Broad doubles, 40s. to 47s. per cwt.; prime Cheddar, 54s. to 60s.; thin, 25s. to 35s.; loaves, 40s. to 46s.; skim, 18s. to 21s.

GLOUCESTER was almost deserted, the attendance of buyers being few, and the quantity of cheese pitched not exceeding five tons. Prices were about the same as at last market.

SALISBURY.—Owing to Lymington fair and other obvious causes, the quantity pitched was little more than 100 tons. Nevertheless the quantity on the whole was very good, and the sale was better than anticipated by many. Skims ranged from 20s. to 26s.; best Somersets, 56s. to 63s.; seconds, 50s. to 54s.; North Wilts, 40s. to 44s.; cowards, 34s. to 42s. per cwt.

PERUVIAN GUANO.

A very valuable little *brochure*, by Mr. Nesbitt, principal of the Chemical and Agricultural Academy at Kennington, entitled "On Peruvian Guano; its History, Composition, and Fertilizing Qualities: with the Best Mode of its Application to the Soil," has just been published. Mr. Nesbitt has most clearly and intelligibly performed what the title of his pamphlet promises, with the addition of some important remarks upon the adulteration of the article. We cannot better express our opinion of this little essay than by saying that every farmer wishing to use guano should first peruse this pamphlet.

METEOROLOGICAL DIARY.

Day.	Barometer. 8 a.m.	Barometer. 10 p.m.	Thermometer. Min.	Thermometer. Max.	Thermometer. 10 p.m.	Wind and State. Direction.	Force.	Atmosphere. 8 a.m.	2 p.m.	10 p.m.	Weath.
	in. cts.	in. cts.									
Apl. 23	29.84	29.90	39	63	49	E. by South	strong	fine	sun	cloudy	dry
24	29.91	29.88	42	48	40	East	strong	fine	sun	fine	dry
25	29.90	29.90	34	48	40	East	brisk	fine	sun	fine	dry
26	29.90	30.06	34	57	43	East	brisk	fine	sun	fine	dry
27	30.10	30.15	31	48	37	N. Westerly	gentle	fine	cloudy	fine	dry
28	30.17	30.02	30	63	45	S.S.W.	breezy	cloudy	sun	cloudy	rain
29	29.86	29.80	44	64	52	S. Westerly	ditto	cloudy	cloudy	cloudy	rain
30	29.62	29.55	49	65	50	Westerly	ditto	cloudy	cloudy	cloudy	rain
May 1	29.80	29.85	45	55	45	North	lively	cloudy	sun	fine	dry
2	29.98	30.08	36	48	37	North	gentle	cloudy	cloudy	fine	dry
3	30.09	30.16	27	48	38	N. by East	gentle	fine	sun	fine	dry
4	30.17	30.17	28	50	39	E. by North	gentle	fine	sun	fine	dry
5	30.19	30.21	30	53	42	N. East	gentle	fine	sun	fine	dry
6	30.28	30.18	33	58	45	North	gentle	fine	sun	fine	dry
7	30.14	30.04	38	67	47	S.E., S.W.	gentle	fine	sun	fine	dry
8	30.04	30.06	44	72	52	W. to N.W.	gentle	fine	sun	fine	dry
9	30.07	30.06	48	69	54	S. West	var.	fine	sun	fine	dry
10	29.99	29.87	47	56	46	S. Westerly	lively	cloudy	fine	fine	rain
11	29.87	29.90	41	61	47	S. West	strong	cloudy	fine	fine	rain
12	29.75	29.75	47	60	51	S. West	brisk	cloudy	fine	cloudy	rain
13	29.77	29.77	49	56	52	S. West	rising	cloudy	cloudy	cloudy	rain
14	29.63	29.94	48	62	49	Westerly	strong	fine	sun	fine	dry
15	30.10	30.03	42	62	48	S. West	lively	fine	sun	fine	dry
16	29.88	29.87	48	70	55	W. by South	calmer	fine	sun	fine	dry
17	29.87	29.80	52	62	55	Every way	calm	cloudy	cloudy	cloudy	rain
18	29.67	29.67	49	70	56	E. by South	lively	cloudy	fine	cloudy	dry
19	29.81	29.93	48	65	52	E. by South	gentle	fine	sun	fine	dry
20	29.98	29.99	47	68	54	S. East	lively	fine	sun	cloudy	rain
21	29.99	30.0	48	58	50	N. East	gentle	gloom	gloom	cloudy	rain
22	30.—	30.01	48	62	52	N. by E.	gentle	cloudy	fine	cloudy	dry
23	30.02	30.02	48	57	52	N.N.E.	lively	cloudy	cloudy	cloudy	dry

ESTIMATED AVERAGES OF MAY.

Barometer. High.	Barometer. Low.	Thermometer. High.	Thermometer. Low	Thermometer. Mean.
30.38	29.16	70	33	54·0

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
59.55	41.74	50.80

WEATHER AND PHENOMENA.

April 23—Crossing cirrus. 24—Oppressive cold wind. 25—partial lunar halo 10 p.m. 26—clear, hot sun. 27—Overcast day, clear evening. 28—Rain commenced at 7 p.m. 29—Soft rain all night. 30—a little more rain; overcast.

LUNATION. — First quarter, 27th day, 8 h. 3 m. morn.

May 1—Change of wind: the northerly current bringing that settled, clear, and cold weather which continued nine days. 10—Changeable, rain commencing. 11—Showers, hail. 12—Rainy morning; heavy showers at 1 p.m. 13—Rain in last night. 14—Clearing, with stiff westerly breeze. 15—Very fine; some light cirro-stratus. 16—Superb; blue of the sky intense. 17—Much rain; repeated distant thunder. 18 and 19—Fine. 20—Rainy evening, and in the night. 21—Smoky gloom all day. 22—Much finer, evening overcast. 23—Cold, overcast.

LUNATIONS.—Full moon, 3rd day, 10 h. 23 m. night. Last quarter, 10th day, 11 h. 23 m. night. New moon, 19th day, 3 h. 15 m. morning.

REMARKS REFERRING TO AGRICULTURE.

The critical and seasonable rain at the close of April prepared the land for the future; but the improvement in its temperament was not immediately manifest, in consequence of the drought and frosts which occurred during the early part of May. So soon, however, as the more copious rains of May fell, the succeeding genial temperature operated like a charm, growth became rapid, and all nature was decked with verdant luxuriance.

J. TOWERS,

Croydon.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF MAY.

Those who expected that something definite would have been proposed for the relief of the agricultural interest when the Derby Ministry should come into power have met with disappointment. The work of the sessions is drawing to a close, and a general election is close at hand; yet not only has no attempt been made by the Government to mitigate the hardships under which the owners and occupiers of land are labouring in consequence of the permanent depression caused by the repeal of the corn-laws in the value of all kinds of agricultural produce, but the subject seems to have been altogether abandoned. Whether the new House of Commons will have the will and the power to bring forward measures calculated to benefit that interest which has been so long neglected remains to be seen. Much will depend on the electors themselves; the struggle is at hand—let them ponder well on their choice of candidates. If the idea of protection is to be abandoned, relief must be afforded in some other way; and to obtain this, practical men, feeling and knowing the imperative necessity that exists for putting the farmers of Great Britain on a fair footing to enable them to obtain a living by their industry and capital, alone should be returned.

Past experience must now have satisfied all who are open to conviction that the continental growers can produce wheat at a price which enables them to undersell the English farmer in his own market. Since the repeal of the corn-laws, we have had a variety of seasons, good crops, and deficient harvests; but the supplies from abroad have at all times been in excess of the demand. When millions of quarters have been wanted—as was the case in 1850 and 1851—they have been readily furnished. When our own harvest exceeded an average, and prices were consequently moderate, importations have nevertheless taken place; and it must now have become clear to the least reflecting, that unless the British farmer is put in a position to grow wheat at a less cost than he can at present, he will be wholly unable in the long run to compete successfully with the continental and American growers. This, in our opinion, is so self-evident that it would be vain to dwell longer on the subject. Wheat at 40s. per qr., with present rents, &c., cannot pay; and so long as we admit the surplus growth of the rest of the world, a higher price cannot, on the average of years, be reckoned upon.

When we last addressed our readers, some uneasiness was beginning to be felt in regard to the weather; during nearly the whole of March and April we were without rain, and the wind having all the while been from the eastward, vegetation was exceedingly backward. The autumn-sown wheat even then looked well, but the spring corn crops were backward; indeed, in many instances, the seeds, deprived of the requisite heat and moisture, had not germinated, whilst the grass lands were bare and brown.

With the commencement of May, however, a complete change of weather took place—the wind shifted to the westward, the temperature rose, and copious rains refreshed and invigorated the crops. Under these circumstances, a most wonderful improvement has taken place in the appearance of the country; and, notwithstanding the extreme backwardness of the spring, the promise for the future is very encouraging.

The wheat plant is quite as forward at present as desirable, and its aspect is healthy and luxuriant; the spring-sown crops have come up evenly and strong, and, though less forward than usual at the close of May, are in every other respect promising.

Grass has grown amazingly within the last three weeks, and we shall most probably have a better produce of hay than could have been well anticipated a month ago.

The effect of the auspicious alteration in the weather was, in the first instance, to cause a depression in the grain trade, and in the early part of the month prices tended downwards in all parts of the kingdom; latterly, however, holders have regained confidence—owing, principally, to the belief that the importations from abroad will not be on so overwhelming a scale for some time to come as seriously to influence prices.

The failure of the rye and potato crops in the north of Europe last autumn has certainly caused wheat to be more extensively consumed in Germany, Holland, &c., than in ordinary years, and prices have therefore been kept up relatively above our quotations in most of the continental markets during the past winter and spring. The shipments to Great Britain have, consequently, been comparatively light, and this alone has saved our markets from being swamped by foreign supplies. Had the importations been as large as in former seasons, the consequence must have been a still lower range of

prices than what we have had ; this will be readily understood by reference to the following comparative table of the importations during the three months in 1852 and 1851, ending each year respectively on the 5th of May :—

1852.

	Wheat	Barley	Oats	Rye	Peas	Beans	Maize	Flour
								cwt.
Feb. 5..	126354	27413	20404	—	1588	65998	58135	192102
March 5	117614	44928	68265	58	5700	28951	72987	172709
April 5.	187458	50043	69978	—	2863	47248	144782	334792

1851.

	Wheat	Barley	Oats	Rye	Peas	Beans	Maize	Flour
								cwt.
Feb. 5..	323482	70742	41917	854	8956	20123	56007	411979
March 5	283416	65907	56829	2866	3737	17759	82644	446803
April 5	493954	49917	31644	2259	3656	44775	139162	180227

Notwithstanding this great decrease in the supplies, we have had a constant pressure of foreign wheat on the different markets, which, added to good deliveries from our own growers, has kept down the value at a point which, after making full allowance for the large yield, will, we fear, scarcely remunerate our farmers ; fortunately, they have been in some measure compensated for the lowness of the price of wheat by the comparatively high value which spring corn has borne—barley, oats, &c., having realized good prices throughout the year.

With respect to the probable future course of the trade, nothing can be said very definitely, as this must depend mainly on the character of the summer. We are, however, inclined to think that the same cause which has prevented large foreign supplies reaching us thus far—namely, the scarcity of food in the north of Europe—will continue to operate and that the shipments from the Baltic, of wheat as well as spring corn, will, during the summer, be on a less liberal scale than usual. Should we be right in this conjecture, present quotations would probably be maintained, even if nothing of an unfavourable nature should occur to create uneasiness in regard to the growing crops ; and threatening weather at any period between this and harvest would be very likely to lead to speculation and a higher range of prices, more especially as money is so abundant that capitalists experience the utmost difficulty in finding profitable employment for their capital.

Hitherto, however, the corn trade has been quite neglected, and grain is certainly not in favour as an article for investment. The only symptom which has yet manifested itself of a disposition to buy, except for immediate consumption, has been the purchase of American flour, to hold over. The large arrivals of this article at this port and at Liverpool reduced the price and tempted buyers ; but there have been no takers of wheat beyond those who have bought to supply their actual and immediate wants.

The arrivals of wheat coastwise into the port of London have not been large at any period of the month, nor has the quantity brought forward by land-carriage samples from the home counties increased ; still prices have been less firmly sustained at Mark Lane than in the markets in the agricultural districts. This we are inclined to attribute partly to the fact that American flour has been selling at rates lower than those at which our millers could have manufactured an article of equally good quality. They have consequently ground less wheat than usual, finding it more to their advantage to purchase American Flour and re-sell it to their customers. This state of affairs affords a fair example of how British industry is affected by free trade.

The wheat exhibited on the Essex and Kent stands, the first Monday in the month (3rd inst.), was placed with great difficulty, a few picked lots of white brought the rates of that day week; but after the best samples had been selected factors were compelled to give way, and a decline of 1s. per qr. was submitted to on the general runs. During the succeeding week the depression increased, and on the 10th a further reduction of 1s. to 2s. per qr. took place, very good qualities of red being on that occasion parted with at 40s., and superior lots at 41s. per qr. The somewhat firmer tone which farmers have since assumed, and the consequent belief that the deliveries are likely to be small if our prices do not improve, have tended to restore some degree of confidence, and the Essex and Kent stands were cleared on the 17th, without any further abatement being acceded to. The following Monday a disposition was shown to demand rather higher rates, and in partial instances a trifle more money was made for fine white wheat.

Thus far the home supplies (assisted by the receipts of flour from the other side of the Atlantic) have proved amply sufficient to satisfy the consumptive inquiry, and the transactions in foreign wheat have, therefore, been on a very restricted retail scale. Importers have, however, manifested less anxiety to realize than might under the circumstances have been expected, which has no doubt been caused in the first place by the reduced state of the stocks of fine wheat in granary, further by the moderate character of the arrivals from abroad, and lastly by the conviction that the importations will not increase materially so long as quotations here remain as low as they now are. The fall which took place in the value of English wheat, the first fortnight in May, failed to cause a corresponding reduction in foreign, and the finer kinds, such as Danzig, Rostock, &c., have scarcely

varied in price since we last addressed our readers. We have lately received a few thousand quarters of new and old mixed Danzig, of only moderate quality, which the receivers have been rather anxious to sell from on board ship, and have therefore consented to accept relatively lower terms than have been insisted on for granaried parcels. By this means they have succeeded in placing some quantity; but a part will have to be landed on account of the shippers, the millers having declined to take more than they could immediately employ. There has been less doing this month in floating cargoes than in April, owing no doubt, in some measure, to the paucity of arrivals off the coast; but more, we think, to the unwillingness of sellers to accommodate themselves to the altered position of affairs. Notwithstanding the decline which took place in the early part of the month of nearly 3s. per qr. on English wheat, the parties having Black Sea cargoes on passage to this country have asked nearly the same rates as those demanded at the close of April, viz., 35s. for red Polish Odessa, 38s. to 40s. for white ditto, and 29s. to 30s. per qr., cost, freight, and insurance, for Egyptian. The continental inquiry has wholly ceased, and the Irish demand has slackened, which, with the absence of all disposition to enter into speculative investments, accounts for the difficulty which sellers have experienced in obtaining offers.

The nominal top price of town-made flour has not varied; the sale has been slow throughout the month, the bakers having been enabled to supply themselves cheaper with foreign than with that of home manufacture. Norfolk and other kinds of country flour receded in value more or less in the beginning of the month; but within the last week or two the decline has been partly recovered, and good Norfolk households cannot at present be bought below 28s. 6d. to 29s. per sack. The arrivals of flour into the port of London from the United States have, during the month, exceeded 100,000 barrels, and at Liverpool about 150,000 barrels have been received. This supply being much larger than was generally calculated on, something like a panic was temporarily created thereby. At Liverpool very good brands were, we believe, at one time sold below 20s., and in London rather a large parcel of excellent quality was forced off at 20s. 6d. per barrel. Since then, buyers have come forward more freely, and sellers have displayed much less eagerness to realize. At present we quote good Genessee and similar sorts 21s., and superior Baltimore 22s. per barrel, with more purchasers than sellers at the rates named. Both here and at Liverpool considerable quantities have been bought to hold over, which will be brought forward on the first favourable opportunity which may offer for the resale, and though there is probably little now on passage from America, the May and June shipments from the United States will be rather considerable; hence any material rise in prices can hardly be reckoned on, except in case of bad weather.

The receipts of barley of home growth have been very scanty for some time past, but the maltsters having generally left off work, the quantity which has appeared at market has proved sufficient to satisfy the inquiry. The value of malting sorts has become almost nominal, and there has not been much doing in distilling qualities. The turn has, on the whole, been rather in favour of the buyer, but not so decidedly so as to warrant alteration in quotations.

The arrivals of barley from abroad have been quite moderate, and nearly one-half of the entire quantity received has been from Egypt. The value of the latter has not changed, but the quality is not liked for feeding, and the sale has consequently been dull. Good European barley has met a steady inquiry: for the lighter kinds rather less money has in some cases been accepted; but sweet heavy Baltic sorts have commanded former rates: at present, quotations range from 26s. to 28s. per qr.

Malt has moved off very tardily throughout the month; the brewers are, we believe, well stocked, and the dealers do not seem disposed to buy; we have, therefore, had a dragging dull trade in this article, and the turn has been decidedly in favour of the purchaser.

Oats of home growth have come forward sparingly—during an interval of westerly wind about the middle of the month, a few thousand quarters arrived from Ireland; but including this supply the receipts have been so small that the dealers would have found it difficult to have kept their regular customers supplied, had they not been assisted by arrivals from the Danish islands and some of the Dutch ports. The foreign supply has been larger than calculated on, and this has checked the advance in prices generally anticipated. The demand has not at any period of the month been active, and prices have scarcely varied: at first the tendency was upwards, but subsequently the receipts from abroad brought prices down to precisely the same point as before, and there is no quotable difference between present rates and those current a month ago. English feed, of 37 to 38 lbs. weight, are obtainable at 20s. to 21s., heavier weight at at proportionate prices; good Scotch may be had 22s. to 23s.; Irish at 20s. to 22s.; whilst prices for foreign ranged between 18s. to 22s. per qr., according to quality, weight, and condition.

Opinion is still in favour of a rise in the value

of this grain. The home stocks are unquestionably short, and we have no great quantity of foreign on hand, either here or at outports.

The purchases made at Riga for spring shipment during the winter were less than in ordinary seasons, in consequence of the high prices there; and what was purchased at Archangel cannot come forward for at least two months. Meanwhile, the shipments from the near continental ports have not hitherto been extensive; and as a very large consumption is going on, the probabilities are certainly in favour of a moderate improvement on present rates.

Beans have excited a moderate degree of attention, and have rather crept up in value. The supplies of English have been small, and the receipts from abroad not by any means abundant. Quotations of English range wide, according to quality, say from 28s. up to 35s. per qr. Egyptian beans, on the spot, have sold in retail at 22s. per qr.; and for parcels on passage, 21s. per qr., cost, freight, and insurance, has been demanded.

The supplies of peas have about kept pace with the demand, and very little change has taken place in prices. Towards the close of the month, the government contract for 1,000 qrs. of white boilers imparted increased activity to the demand, but former rates were not easily exceeded.

For Indian corn arrived off the coast, as well as for cargoes close at hand, a good inquiry has been experienced (principally on Irish account), and previous prices have been well maintained. Distant cargoes have, on the other hand, been neglected, as the consumptive demand for this article decreases towards the close of the summer, when potatoes begin to come to market.

The growing crop of potatoes in Ireland, as well as on this side of the channel, is very well spoken of, and a larger breadth has, we believe, been planted than in any previous season for several years past.

The discouraging tone of the English advices in regard to the wheat trade has had less influence on the continental markets than usual, still the tendency of prices has been downwards as well at the near as at the more distant ports.

The weather has been very similar all over the north of Europe to that experienced here—the winter mild and open, the spring unusually dry, and since the commencement of May a higher range of temperature, with occasional showers.

The autumn-sown wheat is generally well spoken of. Rye is not so promising in appearance, and the spring corn crops are represented to be backward. On the whole, the seasons have been favourable for everything except grass; and should the summer prove tolerably auspicious, the next harvest would probably be exceedingly productive in this country as well as abroad.

Holders in the Baltic seem inclined to speculate on the chapter of accidents rather than consent to incur immediate and certain loss, which they would have to submit to if they consigned largely at present to the British markets. The shipments in progress are, consequently, comparatively small.

A letter from Danzig, dated 21st instant, states that not a single vessel had been chartered to load for London during a period of nearly a fortnight, though freights were temptingly low; the last charter had been closed at 1s. 11d. per qr. for wheat to London.

The supplies from Poland had been smaller than calculated on, and the greater part of what had come to hand had consisted of inferior quality. Holders of granaried parcels had therefore remained very firm, and fine parcels had not been offered below 44s. to 45s. per qr., free on board. Inferior to fair qualities of new had been taken, partly for shipment to Holland and partly for the interior, at equal to 38s. to 40s. per qr., free on board.

At the Lower Baltic ports, from which we are in the habit of drawing our supplies of fine red wheat, the quality of last year's produce is much complained of; and stocks of old having become nearly exhausted, the latter had been held at comparatively high prices.

The best new Ukermark and Pommeranian wheat, weighing 61lbs. to 62lbs. per bushel., might now be purchased at 40s. per qr., cost, freight, and insurance; and some purchases have, we believe, been made at that price at Rostock, &c., on English account. Generally, however, buyers have acted cautiously, as there is little or no margin for profit in our markets.

At the near ports, quotations have also continued too high, thus far, to allow of business being done with this country with advantage. At Hamburgh, 40s. per qr., free on board, has been asked for 60½lbs. red Wahren; and in the Dutch and Belgian markets, quotations are too near on a par with our own to admit of shipments being made from hence there, or from the other side to this, except at a loss to the parties concerned.

In the French markets, prices of wheat and flour have lately given way; and it is not improbable that consignments of the last-named article, on a moderate scale, may later in the summer be made to England, if our prices should at all improve.

From the Mediterrannean we have nothing of much interest to communicate; in some of the southern counties vegetation is said to have suffered from drought, but the reports, on the whole, speak well of the crops.

Letters from Odessa and Ibraila, of recent dates, represent the prospects for the next harvest as highly promising; but owing to a good many vessels having arrived out, all requiring cargoes, prices had rather risen than receded.

The latest advices from America state that the supplies expected at the different ports on the coast from the interior had not come forward, owing to the canal navigation having remained closed longer than usual. Stocks on the sea-board had, meanwhile, become much reduced, and prices of wheat and flour had, consequently, risen more or less at New York, Baltimore, &c. It may, however, be looked upon as certain that considerable shipments of flour and Indian corn will be made this month and in June for Great Britain, in fulfilment of contracts previously entered into.

CURRENCY PER IMPERIAL MEASURE.

					Shillings per Quarter.	
WHEAT, Essex and Kent, white			39	to 43	fine up to	49
Ditto	ditto	old ..	39	43	„	49
Ditto	ditto	red, new	37	39	„	41
Ditto	ditto	old	37	39	„	42
Norfolk, Lincoln, & Yorksh., red			38	40	„	41
Ditto	ditto	old,	none		„	—
Ditto	ditto	white new	40	42	„	44
Ditto	ditto	old	none		„	—
BARLEY, malting, new				28		32
Chevalier				32		33
Distilling				26		29
Grinding				26		28
MALT, Essex, Norfolk, and Suffolk, new			51	53	extra	58
Ditto	ditto	old	43	46	„	49
Kingston, Ware, and town made, new			58	59	„	62
OATS, English feed				19	20	fine 22
Ditto Potato				21	24	extra 26
Scotch feed				21	23	fine 25
Ditto Potato				23	25	fine 26
RYE				26	28	old 26 28
BEANS, Mazagan				27	28	„ 27 29
Ticks				26	28	„ 28 32
Harrow				29	30	„ 30 32
Pigeon				32	34	„ 32 34
PEAS, white boilers				34	35	„ 32 35
Maple				30	31	„ 30 32
Grey				29	30	„ 29 31
FLOUR, town made, per sack of 280 lbs.				—	—	„ 35 40
Country Households				—	—	„ 33 35
Norfolk and Suffolk, ex-ship				—	—	„ 28 31

FOREIGN GRAIN.

					Shillings per Quarter.	
WHEAT, Dantzic, mixed			41	to 43	high mixed	45 47 extra 53
Konigsberg			41	43	„	44 45 „ 47
Rostock, new			40	41	fine old	43 45 „ 47
Pomera., Mecklbg., and Uckermk., red			39	40	extra	42 45
BARLEY, grinding						26 28
Distilling						28 29
Malting					none	— —
OATS, Dutch, brew, and Polands						20 22
Feed						18 20
Danish and Swedish feed						19 22
BEANS, Friesland and Holstein			26	28	Konigsberg	30 32
PEAS, feeding			28	30	fine boilers	32 34
INDIAN CORN, white			28	29	yellow	28 29
FLOUR, French, per sack			28	32	fine	33 35
American, sour per barrel			18	19	sweet	20 22

SEED MARKET.

FRIDAY, May 28.

Both on the spot and for arrival the demand for Linseed has become inactive, at barely last week's quotations. Cakes are very dull, and the turn lower. In other articles next to nothing doing.

BOROUGH HOP MARKET.

FRIDAY, May 28.

Since our last report the general demand has slightly improved, but no advance can be noticed in prices. The show of samples is limited. From most of the plantations in Kent and Sussex we have accounts to the effect that the bine is growing rapidly, and is tolerably free from vermin.

Sussex pockets, per cwt.	108s. to 126s.
Weald of Kents	120s. to 145s.
Mid and East Kents ..	140s. to 250s.
Yearlings	70s. to 110s.
Old olds	22s. to 50s.

POTATO MARKETS.

BOROUGH AND SPITALFIELDS, FRIDAY, May 28.

Old Potatoes have come rather more freely to hand; but they are now selling at very irregular and uncertain prices. The following are present rates:—

York Regents, per ton	95s. to 125s.
Scotch do.	80s. to 105s.
Cambridge and Wisbeach	80s. to 105s.
Essex and Kent	85s. to 105s.

ENGLISH BUTTER MARKET.

MONDAY, May 24.

The market is steady, and a fair amount of business was transacted since our last.

Dorset, fine weekly.....	76s. to 80s. per cwt.
Do. middling	60s. to 70s. „
Fresh	6s. to 10s. 6d. per doz.

HAY MARKETS.

THURSDAY, May 27.

Meadow Hay and Straw met a dull inquiry, on lower terms; but Clover Hay changed hands at full currencies. The present heaviness in the demand is the result of increased supplies of green food.

	At per load of 36 trusses.					
	Smithfield.		Cumberland.		Whitechapel.	
Meadow Hay..	65s. to 84s.		70s. to 88s.		65s. to 84s.	
Clover Hay ..	75s.	97s.	72s.	96s.	75s.	100s.
Straw.....	23s.	28s.	25s.	30s.	23s.	29s.

WOOL MARKET.

FRIDAY, May 28.

A very large number of both home and foreign buyers has been in attendance at the public sales of colonial Wool held this week; and the whole of the parcels offered up to this time, about 14,000 bales, have changed hands, at an advance in the quotations of from 1d. to in some instances, 3d. per lb. British Wools are held for more money. The imports are under 2,000 bales, chiefly from Germany and South America; but several ships are close at hand from Australia.

BARK.

Per load of 45 cwt.

English, Tree				£12	0	0	to	£13 0 0
Coppice				13	0	0		14 10 0
Mimosa			per ton	10	0	0		11 0 0
Valonia			„	14	0	0		16 0 0

END OF VOLUME XXXVI.

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